

PERMESSO DI COSTRUIRE

AMPLIAMENTO DEL COMPARTO AUTODROMO DI MODENA

LOCALITA' MARZAGLIA – COMUNE DI MODENA

Provvedimento Autorizzatorio Unico (PAUR) e Valutazione di Impatto Ambientale (VIA), L.R. n. 4/2018, D.Lgs. 152/06
Progetto di modifica e ampliamento del comparto "Autodromo di Modena", in località Marzaglia, Comune di Modena (MO)



COMPARTO: AUTODROMO DI MODENA

PROPONENTE: AERAUTODROMO MODENA SPA

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STR - R06 - RELAZIONE DI CALCOLO PARTE 2 - U.S. OSPITALITY

P.d.C.4

**REALIZZAZIONE DI TRIBUNA E VISITOR
CENTER E REALIZZAZIONE DI POSTI AUTO
PDC 4 - VIA**

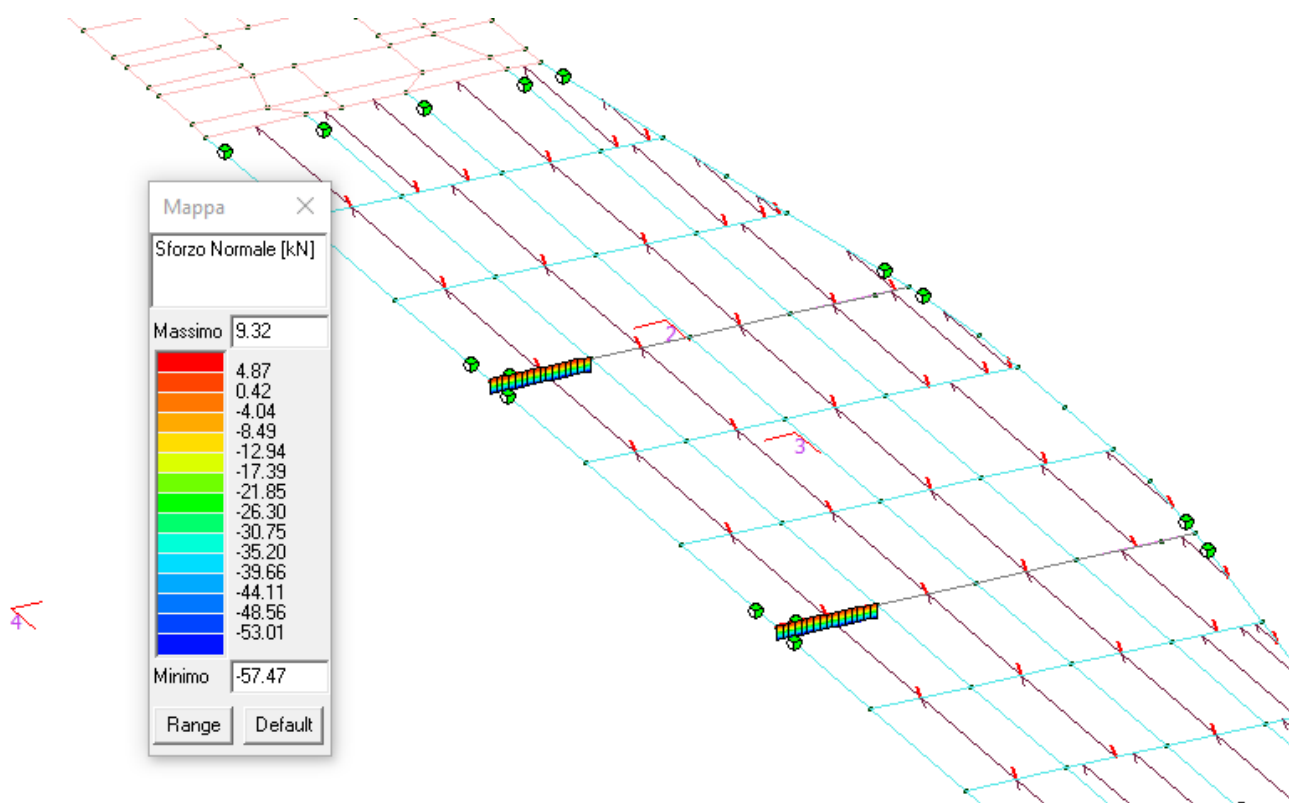


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RELAZIONE DI CALCOLO COLLEGAMENTI ELEMENTI IN ACCIAIO – SECONDO SOLAIO

COLLEGAMENTO TRAVE PRINCIPALE HEA 600 – PILASTRO
PREFABBRICATO



COLLEGAMENTO PILASTRO TRAVE - GIUNTO DI TIPO A

capannone monopiano

Il collegamento previsto si adotta per strutture calcolate senza gerarchia delle resistenze. Pertanto si confrontano le sollecitazioni puntuali con le resistenze degli elementi di collegamento

caratteristiche spinotto:

barra filettata cl. 8.8

Φ 24 mm

f_{yk} 6400 daN/cm²

f_{yd} 5565 daN/cm²

f_{tb} 8000 daN/cm²

A netta = 3.53 cm²

caratteristiche appoggio

R_{ck} = 50 MPa

f_{ck} = 40 MPa

γ_c = 1.5

α_{cc} = 0.85

f_{cd} = 23 MPa

F_{ctk} = 2.46 MPa

VERIFICA LATO ACCIAIO

Verifica per la direzione lungo l'asse della trave:

Taglio resistente per ciascuna trave per dimensionamento spinotto:

n° spinotti = 2

Ved = 60 kN

Ved singolo spinotto = 30 kN < VRd = 124.2 kN (4.2.18)

VERIFICATO

VERIFICA LATO CALCESTRUZZO

$V_{ed\parallel} = 60 \text{ kN}$
 $V_{ed\perp \text{ spinotto}} = 15 \text{ kN}$
 $V \text{ risultante} = 61.85 \text{ kN}$ angolo di inclinazione della risultante = $14.06^\circ = \text{rad} = 0.245393$

distanza tra la barra e l'asse della staffatura lungo la direzione della trave

$d = 10 \text{ cm}$ copriferro = 3 cm
 $du = 7 \text{ cm}$

distanza tra la barra e l'asse della staffatura lungo la direzione ortogonale della trave

$d = 10 \text{ cm}$ copriferro = 3 cm
 $du = 7 \text{ cm}$

lato verifica sezione calcestruzzo

$L = 51.47 \text{ cm}$
Infissione della barra nel pilastro (=0.5 infissione effettiva)
 $l = 30 \text{ cm}$
 $A_{cls} = 1544.1 \text{ cm}^2$ Area Calcestruzzo di verifica

resistenza a trazione del calcestruzzo nella sezione di verifica

$V \text{ risultante} = 61.85 \text{ kN} < R_{cls} = 379.85 \text{ kN}$ **VERIFICATO**

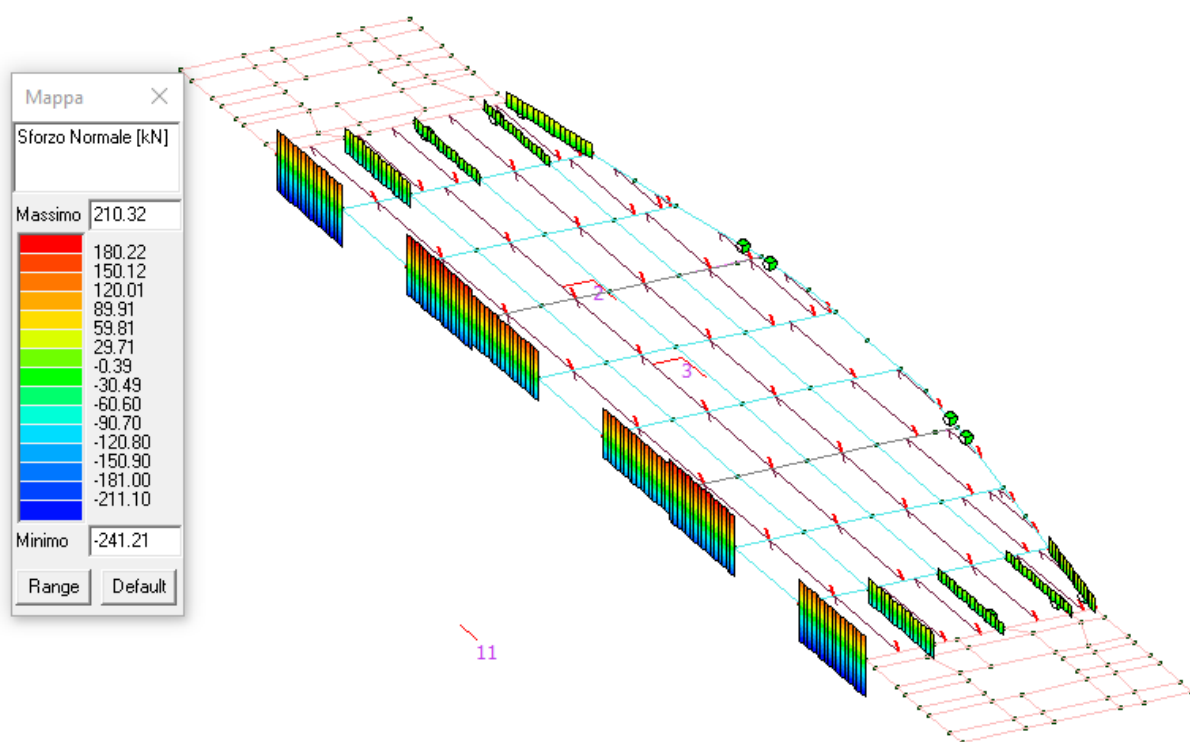
Area staffe cerchiate

passo staffe 5 cm
 $n^\circ \text{ staffe} = 8 \text{ cm}$
diametro staffe 10 mm
Area 1 braccio staffa = 0.79 cm^2
 $n^\circ \text{ braccia} = 4$

$V \text{ risultante} = 61.85 \text{ kN} < \text{Resistenza acciaio in esercizio staffe} = 910 \text{ kN}$ **VERIFICATO**

essendo la resistenza del calcestruzzo a trazione per il cuneo attivato dallo spinotto, maggiore al taglio sollecitante, tale azione è equilibrata dall'acciaio della staffatura che reagisce in fase elastica

COLLEGAMENTO IPE 500 – PILASTRO



COLLEGAMENTO PILASTRO TRAVE - GIUNTO DI TIPO A

capannone monopiano

Il collegamento previsto si adotta per strutture calcolate senza gerarchia delle resistenze. Pertanto si confrontano le sollecitazioni puntuali con le resistenze degli elementi di collegamento

caratteristiche spinotto: barra filettata cl. 8.8

Φ 24 mm

f_{yk} 6400 daN/cm²

f_{yd} 5565 daN/cm²

f_{tb} 8000 daN/cm²

A netta = 3.53 cm²

caratteristiche appoggio

R_{ck} = 50 MPa

f_{ck} = 40 MPa

γ/c = 1.5

α_{cc} = 0.85

f_{cd} = 23 MPa

F_{ctk} = 2.46 MPa

VERIFICA LATO ACCIAIO

Verifica per la direzione lungo l'asse della trave:

Taglio resistente per ciascuna trave per dimensionamento spinotto:

n° spinotti = 4

Ved = 250 kN

Ved singolo spinotto = 62.5 kN < VRd = 124.2 kN (4.2.18)

VERIFICATO

VERIFICA LATO CALCESTRUZZO

$V_{ed\parallel} = 250$ kN

$V_{ed\perp\text{spinotto}} = 15.625$ kN

$V_{\text{risultante}} = 250.49$ kN angolo di inclinazione della risultante = $3.59^\circ = \text{rad} = 0.062657$

distanza tra la barra e l'asse della staffatura lungo la direzione della trave

$d = 10$ cm

copriferro = 3 cm

$d_u = 7$ cm

distanza tra la barra e l'asse della staffatura lungo la direzione ortogonale della trave

$d = 10$ cm

copriferro = 3 cm

$d_u = 7$ cm

lato verifica sezione calcestruzzo

$L = 169.72$ cm

Infissione della barra nel pilastro (=0.5 infissione effettiva)

$l = 30$ cm

$A_{cls} = 5091.6$ cmq

Area Calcestruzzo di verifica

resistenza a trazione del calcestruzzo nella sezione di verifica

$V_{\text{risultante}} = 250.49$ kN <

$R_{cls} = 1252.53$ kN

VERIFICATO

Area staffe cerchiate

passo staffe 5 cm

n° staffe 8 cm

diametro staffe 10 mm

Area 1 braccio staffa = 0.79 cmq

n° braccia 4

$V_{\text{risultante}} = 250.49$ kN <

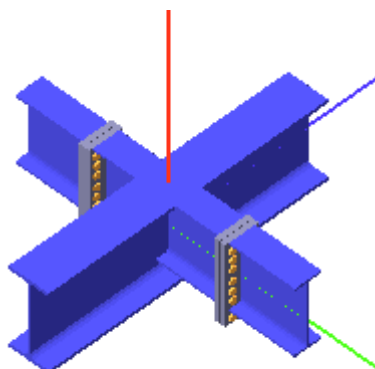
Resistenza acciaio in esercizio staffe = 910 kN

VERIFICATO

essendo la resistenza del calcestruzzo a trazione per il cuneo attivato dallo spinotto, maggiore al taglio sollecitante, tale azione è equilibrata dall'acciaio della staffatura che reagisce in fase elastica

COLLEGAMENTO IPE 500 – HEA 600

Verifica secondo il D.M. 17/01/2018 dei nodi: 1216, 1237, 1277, 1280, 1281, 1282



Trave 3

Tipo di profilo: HEA 600

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Coefficienti di sicurezza utilizzati

$\gamma_{M0} = 1.05$

$\gamma_{M1} = 1.10$

$\gamma_{M2} = 1.25$

Trave lato 2+

Tipo di profilo: IPE 500

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Flangia:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Dimensioni (B x H x Sp): 250.0 x 600.0 x 40.0 mm

Bullonature:

Viti cl. 10.9 Dadi 10 o 12 ($f_{yb} = 900 \text{ N/mm}^2$, $f_{tb} = 1000 \text{ N/mm}^2$)

Diametro gambo $\varnothing = 30 \text{ mm}$ $A_{res} = 579.6 \text{ mm}^2$ (ridotta per filettatura)

Diametro dado/testa $d_m = 46 \text{ mm}$

Diametro foro $\varnothing_0 = 31.5 \text{ mm}$

Saldature:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\beta_1 = 0.70$ $\beta_2 = 0.85$

Spessore cordoni d'angolo $s_c = 20 \text{ mm}$

Sollecitazioni nella sezione d'attacco dell'elemento:

Nodo.CMB	V2 [N]	V3 [N]	N [N]	M2 [N mm]	M3 [N mm]	T [N mm]
1216.1	35067.0	-24.2	2188.2	49231.0	-65108560.0	-18358.0
1216.2	32536.9	-27.6	1797.5	56538.0	-58890060.0	-20333.0
1216.3	72274.5	-48.7	-4685.5	100108.0	-139893000.0	-36564.0
1216.4	69744.3	-52.1	-5077.1	107422.0	-133774500.0	-38539.0
1216.5	26975.6	-19.1	1796.8	39107.0	-50106860.0	-14120.0
1216.6	24445.4	-22.5	1406.2	46414.0	-43898410.0	-16095.0
1216.7	64183.0	-43.7	-5077.1	89986.0	-124991300.0	-32326.0
1216.8	61652.8	-47.1	-5468.7	97300.0	-118772900.0	-34301.0
1216.9	30006.7	-31.0	1406.3	63849.0	-52681610.0	-22308.0
1216.10	61112.2	-41.3	-2623.0	84843.0	-117446700.0	-31102.0

1216.11	56051.9	-48.2	-3406.2	99470.0	-105109700.0	-35052.0
1216.12	21915.2	-25.9	1014.8	53726.0	-37679950.0	-18070.0
1216.13	53020.8	-36.3	-3014.5	74719.0	-102445000.0	-26864.0
1216.14	47960.4	-43.1	-3797.8	89347.0	-90108060.0	-30814.0
1216.15	58582.1	-44.8	-3014.6	92156.0	-111228200.0	-33077.0
1216.16	50490.6	-39.7	-3406.2	82034.0	-96326510.0	-28839.0
1216.17	36199.9	-22.9	2222.9	46458.0	-67874750.0	-17482.0
1216.18	33669.8	-26.3	1832.4	53764.0	-61666240.0	-19457.0
1216.19	73407.3	-47.4	-4650.3	97332.0	-142719200.0	-35688.0
1216.20	70877.2	-50.8	-5041.9	104646.0	-136500700.0	-37663.0
1216.21	28108.4	-17.8	1831.6	36333.0	-52883090.0	-13244.0
1216.22	25578.3	-21.2	1441.1	43640.0	-46664590.0	-15219.0
1216.23	65315.9	-42.3	-5041.8	87209.0	-127717500.0	-31451.0
1216.24	62785.7	-45.8	-5433.5	94523.0	-121499000.0	-33426.0
1216.25	31139.6	-29.7	1441.5	61074.0	-55447790.0	-21432.0
1216.26	62245.1	-40.0	-2588.0	82068.0	-120272900.0	-30227.0
1216.27	57184.8	-46.9	-3371.0	96694.0	-107835900.0	-34176.0
1216.28	23048.1	-24.6	1050.0	50950.0	-40446140.0	-17194.0
1216.29	54153.6	-35.0	-2979.4	71944.0	-105271200.0	-25989.0
1216.30	49093.3	-41.8	-3762.6	86571.0	-92834240.0	-29939.0
1216.31	36955.2	-22.0	2246.2	44608.0	-69722190.0	-16898.0
1216.32	34425.0	-25.4	1855.6	51915.0	-63503740.0	-18873.0
1216.33	63000.4	-39.2	-2564.7	80218.0	-122090300.0	-29643.0
1216.34	60470.2	-42.6	-2955.8	87529.0	-115871800.0	-31618.0
1216.35	28863.7	-16.9	1855.0	34482.0	-54720540.0	-12661.0
1216.36	26333.5	-20.4	1464.3	41791.0	-48512080.0	-14636.0
1216.37	54908.9	-34.1	-2956.0	70094.0	-107088600.0	-25405.0
1216.38	52378.7	-37.5	-3347.4	77406.0	-100870200.0	-27380.0
1216.39	59715.0	-43.4	-2979.3	89380.0	-114054400.0	-32201.0
1216.40	51623.5	-38.4	-3370.9	79257.0	-99052700.0	-27964.0
1216.41	34613.9	-24.7	2174.2	50340.0	-63998060.0	-18708.0
1216.42	32083.7	-28.1	1783.5	57648.0	-57789610.0	-20683.0
1216.43	71821.3	-49.2	-4699.6	101219.0	-138822500.0	-36914.0
1216.44	69291.2	-52.6	-5091.2	108533.0	-132604000.0	-38889.0
1216.45	26522.4	-19.6	1782.9	40216.0	-49006400.0	-14470.0
1216.46	23992.3	-23.0	1392.1	47524.0	-42787900.0	-16445.0
1216.47	63729.8	-44.2	-5091.2	91096.0	-123820900.0	-32677.0
1216.48	61199.7	-47.6	-5482.8	98410.0	-117602400.0	-34652.0
1216.49	29553.6	-31.5	1392.2	64959.0	-51571100.0	-22658.0
1216.50	60659.1	-41.9	-2637.1	85953.0	-116376200.0	-31453.0
1216.51	55598.8	-48.7	-3420.3	100581.0	-103939200.0	-35402.0
1216.52	21462.1	-26.5	1000.7	54837.0	-36569450.0	-18420.0
1216.53	52567.6	-36.8	-3028.6	75830.0	-101374500.0	-27215.0
1216.54	47507.3	-43.6	-3811.9	90458.0	-88937550.0	-31165.0
1216.55	58128.9	-45.3	-3028.7	93267.0	-110157700.0	-33427.0
1216.56	50037.4	-40.2	-3420.3	83144.0	-95156060.0	-29190.0
1216.57	34311.8	-25.0	2165.0	51080.0	-63261080.0	-18942.0
1216.58	31781.6	-28.4	1774.2	58388.0	-57042620.0	-20917.0
1216.59	60357.0	-42.2	-2646.5	86693.0	-115629200.0	-31686.0
1216.60	57826.8	-45.6	-3038.1	94007.0	-109410700.0	-33661.0
1216.61	26220.3	-20.0	1773.6	40955.0	-48269420.0	-14704.0
1216.62	23690.2	-23.4	1382.8	48264.0	-42050910.0	-16679.0
1216.63	52265.5	-37.2	-3038.0	76570.0	-100627500.0	-27448.0
1216.64	49735.4	-40.6	-3429.7	83884.0	-94409020.0	-29423.0
1216.108	5924.7	15.8	31845.5	-17830.0	-53019140.0	-16651.0
1216.109	15349.9	5.3	29914.7	5563.0	-70335270.0	-28183.0
1216.110	3882.3	-65.3	26352.8	166149.0	-45583620.0	-25782.0
1216.111	13307.7	-75.9	24272.4	189749.0	-62909650.0	-37314.0
1216.112	70409.2	16.0	-26967.0	-64914.0	-97137740.0	-5493.0
1216.113	79834.2	5.1	-28869.8	-40519.0	-114464000.0	-17025.0

1216.114	68366.1	-68.2	-32569.4	127574.0	-89672570.0	-14623.0
1216.115	77791.5	-79.0	-34552.3	151821.0	-106998600.0	-26155.0
1216.116	6083.8	4.8	32599.2	-356.0	-53428560.0	-13952.0
1216.117	15508.8	-5.8	30662.0	23109.0	-70744790.0	-25484.0
1216.118	3723.4	-54.3	25477.7	148833.0	-45174100.0	-28481.0
1216.119	13148.8	-65.0	23397.5	172461.0	-62500130.0	-40012.0
1216.120	70567.9	4.9	-26264.6	-47293.0	-97557360.0	-2795.0
1216.121	79993.0	-6.0	-28168.6	-23020.0	-114883600.0	-14327.0
1216.122	68207.4	-57.1	-33316.4	110017.0	-89352950.0	-17321.0
1216.123	77632.9	-68.0	-35293.9	134258.0	-106678900.0	-28853.0
1216.124	6120.1	20.0	31923.0	-34370.0	-53210170.0	-17236.0
1216.125	15545.2	9.4	29989.5	-10923.0	-70536360.0	-28768.0
1216.126	4076.9	-61.5	26537.6	150617.0	-45775050.0	-26368.0
1216.127	13503.1	-71.8	24528.7	173465.0	-63100680.0	-37900.0
1216.128	70212.3	8.6	-27317.0	-39849.0	-96937470.0	-4908.0
1216.129	79637.8	-2.2	-29279.4	-15681.0	-114263400.0	-16440.0
1216.130	68170.7	-75.2	-32896.5	151805.0	-89571540.0	-14038.0
1216.131	77596.3	-86.0	-34911.5	175945.0	-106797500.0	-25569.0
1216.132	6279.1	9.0	32665.9	-16831.0	-53619640.0	-14538.0
1216.133	15704.4	-1.5	30714.7	6489.0	-70945720.0	-26070.0
1216.134	3919.0	-50.2	25725.4	132508.0	-45365020.0	-29066.0
1216.135	13344.7	-60.7	23672.2	155848.0	-62690910.0	-40598.0
1216.136	70371.8	-2.2	-26588.4	-22841.0	-97356680.0	-2210.0
1216.137	79797.0	-13.1	-28517.4	1462.0	-114682800.0	-13742.0
1216.138	68011.2	-64.3	-33690.1	134733.0	-89152330.0	-16737.0
1216.139	77437.1	-75.0	-35673.2	158643.0	-106478100.0	-28268.0
1216.140	30879.9	112.3	17130.8	-253956.0	-77149330.0	-2091.0
1216.141	40305.2	101.8	15219.5	-230623.0	-94485420.0	-13623.0
1216.142	24069.7	-162.1	-1426.3	370785.0	-52358700.0	-32528.0
1216.143	33495.1	-173.0	-3457.6	395070.0	-69674730.0	-44060.0
1216.144	50225.1	113.0	-513.4	-269934.0	-90360980.0	1256.0
1216.145	59650.4	102.5	-2423.3	-246710.0	-107687100.0	-10276.0
1216.146	43415.1	-163.9	-19083.6	361633.0	-65600250.0	-29180.0
1216.147	52840.5	-174.7	-21113.7	385906.0	-82936290.0	-40712.0
1216.148	30938.7	113.6	17171.7	-258894.0	-77209550.0	-2267.0
1216.149	40364.0	103.1	15260.3	-235601.0	-94555640.0	-13798.0
1216.150	24128.2	-160.1	-1346.7	363594.0	-52419060.0	-32704.0
1216.151	33553.6	-170.9	-3376.6	387905.0	-69735100.0	-44235.0
1216.152	50166.3	111.7	-577.9	-264781.0	-90290770.0	1431.0
1216.153	59591.6	101.2	-2484.9	-241567.0	-107616800.0	-10100.0
1216.154	43356.6	-165.9	-19170.0	368826.0	-65539880.0	-29005.0
1216.155	52782.0	-176.8	-21200.0	393099.0	-82865920.0	-40536.0
1216.156	31408.9	75.3	19485.1	-195048.0	-78511390.0	6903.0
1216.157	40834.3	64.8	17580.9	-171759.0	-95817420.0	-4628.0
1216.158	23540.9	-125.4	-4229.7	312194.0	-50996540.0	-41522.0
1216.159	32966.3	-136.2	-6262.6	336511.0	-68322570.0	-53054.0
1216.160	50754.3	76.3	1816.4	-211836.0	-91792940.0	10250.0
1216.161	60179.6	65.9	-86.4	-188652.0	-109119000.0	-1281.0
1216.162	42886.5	-127.1	-21812.8	302998.0	-64237990.0	-38174.0
1216.163	52311.9	-137.9	-23846.4	327321.0	-81604020.0	-49706.0
1216.164	31467.7	76.5	19536.4	-199766.0	-78561620.0	6728.0
1216.165	40893.0	66.0	17632.2	-176495.0	-95887700.0	-4804.0
1216.166	23599.5	-123.3	-4172.0	304952.0	-51056850.0	-41698.0
1216.167	33024.9	-134.1	-6204.9	329270.0	-68372890.0	-53229.0
1216.168	50695.6	75.0	1746.1	-206848.0	-91722680.0	10426.0
1216.169	60120.9	64.6	-156.9	-183662.0	-109048800.0	-1106.0
1216.170	42827.9	-129.1	-21881.0	310290.0	-64177670.0	-37999.0
1216.171	52253.3	-140.0	-23912.9	334621.0	-81533700.0	-49530.0
1216.268	17498.8	29.4	13616.2	-65082.0	-48256860.0	708.0
1216.269	48916.4	-5.5	7220.8	12611.0	-106023800.0	-37730.0

1216.270	15455.7	-51.8	8175.1	119319.0	-40821690.0	-8423.0
1216.271	46873.7	-87.7	1370.8	199556.0	-98558470.0	-46861.0
1216.272	36844.0	30.3	-4039.2	-81626.0	-61498510.0	4055.0
1216.273	68261.0	-5.5	-10438.7	-1539.0	-119225800.0	-34383.0
1216.274	34800.6	-53.3	-9515.4	109512.0	-54063490.0	-5075.0
1216.275	66218.8	-89.5	-16280.1	190511.0	-111760200.0	-43514.0
1216.276	17657.5	18.3	14337.2	-47353.0	-48666480.0	3407.0
1216.277	49074.8	-16.7	7936.1	30520.0	-106443600.0	-35032.0
1216.278	15296.7	-40.9	7312.4	102158.0	-40412220.0	-11121.0
1216.279	46714.7	-76.8	525.6	182247.0	-98139010.0	-49560.0
1216.280	37002.8	19.3	-3325.6	-64255.0	-61908080.0	6754.0
1216.281	68420.3	-16.4	-9710.4	15588.0	-119645100.0	-31685.0
1216.282	34642.3	-42.2	-10281.5	91799.0	-53653680.0	-7773.0
1216.283	66060.3	-78.4	-17036.6	172886.0	-111440500.0	-46212.0
1216.284	17557.5	30.7	13657.1	-70150.0	-48317120.0	533.0
1216.285	48975.0	-4.3	7257.0	7634.0	-106094200.0	-37906.0
1216.286	15514.2	-50.6	8268.5	114474.0	-40882060.0	-8599.0
1216.287	46932.2	-86.1	1451.6	193650.0	-98628840.0	-47037.0
1216.288	36785.3	28.5	-4102.9	-75119.0	-61438240.0	4231.0
1216.289	68202.4	-7.6	-10567.9	5671.0	-119155500.0	-34208.0
1216.290	34742.1	-55.4	-9611.7	116703.0	-54003120.0	-4899.0
1216.291	66160.3	-91.5	-16371.9	197570.0	-111789800.0	-43338.0
1216.292	17716.3	19.6	14389.1	-52462.0	-48726690.0	3231.0
1216.293	49133.6	-15.4	7952.9	25464.0	-106513800.0	-35208.0
1216.294	15355.3	-39.6	7392.9	97095.0	-40472540.0	-11297.0
1216.295	46773.2	-75.3	598.7	176475.0	-98209380.0	-49736.0
1216.296	36944.1	17.5	-3399.4	-57609.0	-61847810.0	6930.0
1216.297	68361.6	-18.5	-9800.5	22826.0	-119574800.0	-31509.0
1216.298	34583.7	-44.3	-10366.7	98976.0	-53593360.0	-7597.0
1216.299	66001.7	-80.5	-17129.2	179969.0	-111370100.0	-46036.0
1237.1	74274.0	-11.9	4193.9	28225.0	-130980200.0	-78936.0
1237.2	74510.4	-14.5	4495.9	34585.0	-130460500.0	-83491.0
1237.3	147800.0	-26.6	742.5	63752.0	-265239300.0	-154740.0
1237.4	148000.0	-29.2	1044.0	70115.0	-264738000.0	-159295.0
1237.5	57142.5	-9.8	3533.1	23245.0	-100857300.0	-60727.0
1237.6	57378.9	-12.4	3835.1	29605.0	-100237600.0	-65282.0
1237.7	130600.0	-24.5	81.5	58773.0	-235051100.0	-136531.0
1237.8	130900.0	-27.1	383.0	65136.0	-234499200.0	-141086.0
1237.9	74746.7	-17.2	4797.6	40946.0	-129940800.0	-88047.0
1237.10	125700.0	-22.2	1778.1	53093.0	-225032900.0	-131999.0
1237.11	126200.0	-27.5	2381.1	65818.0	-223879700.0	-141110.0
1237.12	57615.2	-15.0	4136.6	35967.0	-99717900.0	-69838.0
1237.13	108600.0	-20.1	1117.2	48114.0	-194794100.0	-113790.0
1237.14	109100.0	-25.3	1720.1	60839.0	-193640800.0	-122901.0
1237.15	126000.0	-24.8	2079.7	59456.0	-224381000.0	-136554.0
1237.16	108800.0	-22.7	1418.7	54477.0	-194292800.0	-118345.0
1237.17	74165.6	-11.0	3984.4	26014.0	-131235100.0	-76900.0
1237.18	74401.9	-13.6	4286.5	32373.0	-130715400.0	-81456.0
1237.19	147700.0	-25.7	533.2	61540.0	-265490000.0	-152704.0
1237.20	147900.0	-28.3	834.7	67903.0	-264988700.0	-157260.0
1237.21	57034.0	-8.9	3323.5	21034.0	-101012300.0	-58691.0
1237.22	57270.4	-11.5	3625.6	27394.0	-100492500.0	-63247.0
1237.23	130500.0	-23.6	-127.8	56561.0	-235301700.0	-134495.0
1237.24	130800.0	-26.2	173.7	62924.0	-234749800.0	-139051.0
1237.25	74638.3	-16.3	4588.3	38734.0	-130195700.0	-86011.0
1237.26	125600.0	-21.3	1568.7	50881.0	-225183600.0	-129963.0
1237.27	126100.0	-26.5	2171.8	63606.0	-224130400.0	-139074.0
1237.28	57506.7	-14.1	3927.4	33755.0	-99972860.0	-67802.0
1237.29	108500.0	-19.2	907.8	45902.0	-195044800.0	-111754.0
1237.30	109000.0	-24.4	1510.8	58627.0	-193891500.0	-120865.0

1237.31	74093.3	-10.4	3844.7	24539.0	-131371700.0	-75543.0
1237.32	74329.6	-13.0	4146.8	30899.0	-130852100.0	-80099.0
1237.33	125500.0	-20.7	1429.1	49407.0	-225434300.0	-128606.0
1237.34	125800.0	-23.3	1730.8	55768.0	-224782300.0	-133161.0
1237.35	56961.7	-8.3	3183.8	19559.0	-101248900.0	-57334.0
1237.36	57198.1	-10.9	3485.9	25920.0	-100629200.0	-61890.0
1237.37	108400.0	-18.6	768.2	44427.0	-195195400.0	-110397.0
1237.38	108600.0	-21.2	1069.8	50789.0	-194694100.0	-114952.0
1237.39	125800.0	-23.9	1870.4	57243.0	-224682300.0	-134519.0
1237.40	108700.0	-21.8	1209.4	52264.0	-194443500.0	-116310.0
1237.41	74317.4	-12.3	4277.7	29109.0	-130958200.0	-79750.0
1237.42	74553.8	-14.9	4579.7	35469.0	-130338500.0	-84306.0
1237.43	147800.0	-27.0	826.2	64637.0	-265139300.0	-155554.0
1237.44	148000.0	-29.6	1127.7	71000.0	-264638000.0	-160110.0
1237.45	57185.9	-10.2	3616.9	24129.0	-100735300.0	-61541.0
1237.46	57422.2	-12.8	3918.8	30490.0	-100215700.0	-66097.0
1237.47	130700.0	-24.9	165.2	59658.0	-235000400.0	-137345.0
1237.48	130900.0	-27.5	466.7	66021.0	-234399200.0	-141901.0
1237.49	74790.1	-17.5	4881.4	41831.0	-129818800.0	-88861.0
1237.50	125800.0	-22.6	1861.9	53978.0	-224882300.0	-132813.0
1237.51	126200.0	-27.8	2464.8	66703.0	-223779700.0	-141924.0
1237.52	57658.6	-15.4	4220.4	36852.0	-99595920.0	-70652.0
1237.53	108600.0	-20.5	1200.9	48999.0	-194694100.0	-114604.0
1237.54	109100.0	-25.7	1803.9	61724.0	-193640800.0	-123715.0
1237.55	126000.0	-25.2	2163.4	60340.0	-224381000.0	-137369.0
1237.56	108900.0	-23.1	1502.4	55361.0	-194142100.0	-119160.0
1237.57	74346.3	-12.5	4333.6	29699.0	-130843600.0	-80293.0
1237.58	74582.7	-15.1	4635.6	36059.0	-130323900.0	-84849.0
1237.59	125800.0	-22.8	1917.7	54568.0	-224882300.0	-133356.0
1237.60	126000.0	-25.4	2219.2	60930.0	-224281000.0	-137911.0
1237.61	57214.8	-10.4	3672.8	24719.0	-100720700.0	-62084.0
1237.62	57451.2	-13.0	3974.7	31080.0	-100101000.0	-66640.0
1237.63	108700.0	-20.7	1256.7	49589.0	-194643500.0	-115147.0
1237.64	108900.0	-23.3	1558.2	55951.0	-194142100.0	-119702.0
1237.108	121700.0	14.5	29631.8	-25673.0	-181458900.0	-102324.0
1237.109	137900.0	4.0	33277.1	-203.0	-214753600.0	-115260.0
1237.110	133300.0	-64.2	50306.1	167892.0	-207983600.0	-116569.0
1237.111	149500.0	-74.6	53763.2	193014.0	-241278300.0	-129504.0
1237.112	23529.1	44.3	-50468.0	-120861.0	-67742510.0	-52585.0
1237.113	39733.8	33.7	-46752.4	-95247.0	-101074800.0	-65521.0
1237.114	35202.0	-34.6	-29694.9	72895.0	-94170180.0	-66827.0
1237.115	51406.8	-45.0	-26091.8	98249.0	-127462400.0	-79762.0
1237.116	119500.0	9.0	23561.9	-21857.0	-178173200.0	-99064.0
1237.117	135700.0	-1.5	27200.9	3631.0	-211468000.0	-112000.0
1237.118	135500.0	-58.5	56188.9	163461.0	-211269200.0	-119829.0
1237.119	151700.0	-68.9	59649.8	188625.0	-244564000.0	-132764.0
1237.120	21389.5	38.7	-56577.1	-116830.0	-64416220.0	-49326.0
1237.121	37594.2	28.1	-52878.0	-91362.0	-97658540.0	-62261.0
1237.122	37341.6	-28.8	-23679.2	68399.0	-97486480.0	-70086.0
1237.123	53546.5	-39.3	-20074.8	93713.0	-130778700.0	-83021.0
1237.124	121400.0	37.6	25981.4	-58193.0	-181210900.0	-102299.0
1237.125	137600.0	27.1	29628.3	-32671.0	-214505600.0	-115235.0
1237.126	133000.0	-41.3	46838.7	135841.0	-207635500.0	-116545.0
1237.127	149200.0	-51.5	50321.4	160521.0	-240930200.0	-129480.0
1237.128	23823.9	21.0	-46916.1	-88215.0	-68073190.0	-52611.0
1237.129	40028.7	10.6	-43309.8	-63035.0	-101325500.0	-65546.0
1237.130	35497.4	-57.3	-26250.4	104247.0	-94520570.0	-66851.0
1237.131	51702.1	-67.7	-22709.3	129304.0	-127812900.0	-79786.0
1237.132	119200.0	32.1	19890.5	-54426.0	-177825200.0	-99040.0
1237.133	135400.0	21.6	23518.1	-28909.0	-211119900.0	-111976.0

1237.134	135200.0	-35.3	52712.7	130698.0	-210921200.0	-119804.0
1237.135	151400.0	-45.7	56196.0	155845.0	-244215900.0	-132739.0
1237.136	21684.7	15.7	-53064.9	-84832.0	-64756700.0	-49351.0
1237.137	37889.3	5.2	-49393.9	-59356.0	-98009070.0	-62286.0
1237.138	37637.7	-51.6	-20268.3	99963.0	-97836500.0	-70113.0
1237.139	53842.0	-61.9	-16697.4	124942.0	-131129000.0	-83047.0
1237.140	73695.1	117.2	-23331.2	-285860.0	-110873400.0	-68295.0
1237.141	89899.8	106.7	-19668.1	-260457.0	-144165700.0	-81230.0
1237.142	112600.0	-146.2	45783.4	361735.0	-198968100.0	-115774.0
1237.143	128800.0	-156.6	49313.3	386858.0	-232262800.0	-128709.0
1237.144	44256.2	126.1	-47402.7	-314301.0	-76724230.0	-53375.0
1237.145	60461.0	115.6	-43739.8	-288883.0	-109976500.0	-66310.0
1237.146	83168.6	-137.1	21809.5	332603.0	-164875100.0	-100851.0
1237.147	99373.3	-147.5	25339.1	357708.0	-198167400.0	-113786.0
1237.148	73606.3	124.2	-24412.6	-295722.0	-110718400.0	-68287.0
1237.149	89811.1	113.7	-20749.9	-270308.0	-144010700.0	-81223.0
1237.150	112500.0	-139.4	44734.7	352382.0	-198918800.0	-115767.0
1237.151	128700.0	-149.8	48270.3	377547.0	-232213500.0	-128702.0
1237.152	44345.0	119.1	-46346.5	-304470.0	-76819260.0	-53382.0
1237.153	60549.8	108.7	-42682.0	-279062.0	-110131500.0	-66318.0
1237.154	83257.2	-143.9	22849.6	341945.0	-164930200.0	-100858.0
1237.155	99461.9	-154.2	26379.1	367050.0	-198222500.0	-113793.0
1237.156	66560.7	98.3	-43601.3	-271883.0	-99787010.0	-57427.0
1237.157	82765.5	87.8	-39935.2	-246506.0	-133079300.0	-70362.0
1237.158	119700.0	-126.6	65374.7	345755.0	-210172000.0	-126640.0
1237.159	135900.0	-137.0	68907.9	370910.0	-243366700.0	-139575.0
1237.160	37122.1	107.2	-67719.7	-300236.0	-65617660.0	-42507.0
1237.161	53327.0	96.7	-64053.7	-274845.0	-98889870.0	-55442.0
1237.162	90301.7	-117.4	41469.7	316442.0	-175962200.0	-111717.0
1237.163	106500.0	-127.8	45002.3	341599.0	-209257700.0	-124652.0
1237.164	66471.8	105.3	-44665.0	-281765.0	-99632030.0	-57419.0
1237.165	82676.7	94.8	-40999.3	-256386.0	-132924200.0	-70355.0
1237.166	119700.0	-119.8	64302.5	336426.0	-209972000.0	-126633.0
1237.167	135900.0	-130.2	67835.6	361581.0	-243266700.0	-139568.0
1237.168	37211.0	100.2	-66676.5	-290403.0	-65722620.0	-42515.0
1237.169	53415.9	89.7	-63010.6	-265011.0	-99044850.0	-55450.0
1237.170	90390.2	-124.2	42535.9	325804.0	-176017400.0	-111724.0
1237.171	106600.0	-134.6	46070.0	350964.0	-209307100.0	-124659.0
1237.268	68409.0	37.3	-2627.6	-88799.0	-102850800.0	-69823.0
1237.269	122400.0	2.3	9546.5	-4143.0	-213804400.0	-112941.0
1237.270	80083.7	-41.8	18190.1	105738.0	-129337600.0	-84068.0
1237.271	134100.0	-76.5	29914.6	189630.0	-240278400.0	-127185.0
1237.272	38970.0	46.1	-26715.0	-117134.0	-68731700.0	-54903.0
1237.273	92985.4	11.0	-14457.6	-32144.0	-179702900.0	-98020.0
1237.274	50643.3	-32.9	-5789.8	77160.0	-95149170.0	-69145.0
1237.275	104700.0	-67.5	5976.3	160807.0	-206069500.0	-112262.0
1237.276	66268.7	31.6	-8693.7	-84634.0	-99534900.0	-66563.0
1237.277	120300.0	-3.4	3482.2	145.0	-210468000.0	-109682.0
1237.278	82223.6	-36.1	24080.6	101265.0	-132653800.0	-87328.0
1237.279	136200.0	-70.8	35841.8	185358.0	-243614700.0	-130445.0
1237.280	36830.0	40.4	-32797.2	-112917.0	-65405610.0	-51642.0
1237.281	90845.4	5.5	-20560.8	-28326.0	-176386800.0	-94759.0
1237.282	52783.2	-27.0	163.2	72227.0	-98465310.0	-72405.0
1237.283	106800.0	-61.7	11969.5	156179.0	-209505800.0	-115521.0
1237.284	68320.3	44.2	-3710.8	-98640.0	-102795800.0	-69816.0
1237.285	122300.0	9.2	8470.3	-13858.0	-213755100.0	-112934.0
1237.286	79994.9	-34.9	17182.5	95977.0	-129182600.0	-84060.0
1237.287	134000.0	-69.7	28887.0	180122.0	-240129000.0	-127178.0
1237.288	39058.7	39.2	-25642.4	-107515.0	-68836770.0	-54910.0
1237.289	93074.0	4.2	-13457.5	-22724.0	-179758000.0	-98028.0

1237.290	50731.9	-39.7	-4758.0	86538.0	-95304300.0	-69152.0
1237.291	104700.0	-74.3	7009.5	170184.0	-206269500.0	-112269.0
1237.292	66180.2	38.6	-9772.4	-94530.0	-99479730.0	-66555.0
1237.293	120200.0	3.6	2377.6	-9633.0	-210418700.0	-109674.0
1237.294	82134.9	-29.2	23054.6	91515.0	-132498700.0	-87321.0
1237.295	136200.0	-64.0	34802.0	175757.0	-243514700.0	-130438.0
1237.296	36918.6	33.6	-31735.1	-103329.0	-65510730.0	-51650.0
1237.297	90934.1	-1.3	-19509.3	-18811.0	-176441900.0	-94767.0
1237.298	52871.7	-33.8	1211.8	81665.0	-98620480.0	-72412.0
1237.299	106900.0	-68.5	13000.6	165529.0	-209555200.0	-115529.0
1277.1	84906.9	-39.9	225.7	92055.0	-178694700.0	47229.0
1277.2	83822.4	-45.6	-871.0	105632.0	-176544000.0	50953.0
1277.3	170500.0	-84.4	-9973.4	196090.0	-363441800.0	88408.0
1277.4	169400.0	-90.1	-11071.5	209659.0	-361298900.0	92132.0
1277.5	65318.2	-31.3	82.7	72231.0	-137516300.0	36340.0
1277.6	64233.7	-36.9	-1014.0	85808.0	-135365600.0	40065.0
1277.7	150900.0	-75.7	-10116.7	176264.0	-322169200.0	77519.0
1277.8	149800.0	-81.4	-11214.9	189833.0	-320026300.0	81244.0
1277.9	82737.9	-51.3	-1968.5	119205.0	-174393200.0	54677.0
1277.10	144800.0	-71.1	-6913.1	164882.0	-308058800.0	76054.0
1277.11	142700.0	-82.4	-9109.4	192021.0	-303622500.0	83502.0
1277.12	63149.2	-42.6	-2111.8	99379.0	-133214900.0	43789.0
1277.13	125200.0	-62.4	-7056.3	145057.0	-266786200.0	65166.0
1277.14	123100.0	-73.8	-9252.7	172195.0	-262449900.0	72614.0
1277.15	143800.0	-76.7	-8011.2	178452.0	-305765300.0	79778.0
1277.16	124200.0	-68.1	-8154.5	158626.0	-264592700.0	68890.0
1277.17	85387.2	-37.7	507.2	86747.0	-179651400.0	45546.0
1277.18	84302.7	-43.4	-589.3	100326.0	-177500700.0	49270.0
1277.19	171000.0	-82.2	-9691.1	190786.0	-364388500.0	86725.0
1277.20	169900.0	-87.9	-10789.3	204355.0	-362145700.0	90449.0
1277.21	65798.5	-29.0	364.4	66924.0	-138473100.0	34657.0
1277.22	64714.0	-34.7	-732.2	80502.0	-136322400.0	38382.0
1277.23	151400.0	-73.5	-9834.4	170960.0	-323115900.0	75836.0
1277.24	150300.0	-79.2	-10932.6	184529.0	-320973100.0	79561.0
1277.25	83218.2	-49.1	-1686.4	113901.0	-175350000.0	52994.0
1277.26	145300.0	-68.8	-6631.1	159577.0	-308905500.0	74371.0
1277.27	143100.0	-80.2	-8827.1	186717.0	-304619800.0	81819.0
1277.28	63629.5	-40.4	-1829.6	94076.0	-134171700.0	42106.0
1277.29	125700.0	-60.2	-6774.2	139752.0	-267732900.0	63483.0
1277.30	123600.0	-71.5	-8970.4	166891.0	-263396600.0	70931.0
1277.31	85707.4	-36.2	695.1	83210.0	-180289200.0	44424.0
1277.32	84622.9	-41.9	-401.5	96788.0	-178138500.0	48148.0
1277.33	145600.0	-67.3	-6443.2	156039.0	-309553600.0	73249.0
1277.34	144600.0	-73.0	-7540.7	169613.0	-307360100.0	76973.0
1277.35	66118.7	-27.5	552.5	63390.0	-139110900.0	33535.0
1277.36	65034.2	-33.2	-544.5	76964.0	-136960200.0	37260.0
1277.37	126000.0	-58.7	-6586.2	136215.0	-268381000.0	62361.0
1277.38	125000.0	-64.4	-7684.0	149787.0	-266187500.0	66085.0
1277.39	144200.0	-74.5	-7728.9	173148.0	-306762700.0	78095.0
1277.40	124600.0	-65.8	-7872.2	153323.0	-265590100.0	67207.0
1277.41	84714.8	-40.8	113.1	94178.0	-178292000.0	47902.0
1277.42	83630.3	-46.5	-983.8	107755.0	-176141200.0	51626.0
1277.43	170300.0	-85.3	-10086.3	198211.0	-363043000.0	89081.0
1277.44	169200.0	-91.0	-11184.4	211780.0	-360900200.0	92805.0
1277.45	65126.1	-32.2	-29.9	74354.0	-137113600.0	37014.0
1277.46	64041.6	-37.8	-1126.8	87931.0	-134962900.0	40738.0
1277.47	150700.0	-76.6	-10229.6	178385.0	-321870500.0	78193.0
1277.48	149700.0	-82.3	-11327.8	191954.0	-319677000.0	81917.0
1277.49	82545.8	-52.2	-2081.4	121327.0	-173990500.0	55350.0
1277.50	144600.0	-72.0	-7026.0	167004.0	-307660100.0	76727.0

1277.51	142500.0	-83.3	-9222.3	194142.0	-303323700.0	84176.0
1277.52	62957.1	-43.5	-2224.8	101501.0	-132812200.0	44462.0
1277.53	125100.0	-63.3	-7169.2	147179.0	-266336800.0	65839.0
1277.54	122900.0	-74.7	-9365.6	174316.0	-262051200.0	73288.0
1277.55	143600.0	-77.6	-8124.1	180574.0	-305466600.0	80451.0
1277.56	124000.0	-69.0	-8267.5	160747.0	-264194000.0	69563.0
1277.57	84586.7	-41.4	37.9	95593.0	-178056800.0	48351.0
1277.58	83502.2	-47.1	-1058.9	109169.0	-175906100.0	52075.0
1277.59	144500.0	-72.6	-7101.2	168419.0	-307410800.0	77176.0
1277.60	143400.0	-78.2	-8199.4	181988.0	-305167900.0	80900.0
1277.61	64998.0	-32.8	-105.0	75769.0	-136878500.0	37462.0
1277.62	63913.5	-38.4	-1202.0	89345.0	-134727800.0	41187.0
1277.63	124900.0	-63.9	-7244.5	148593.0	-266138100.0	66288.0
1277.64	123800.0	-69.6	-8342.7	162162.0	-263995300.0	70012.0
1277.108	52416.5	69.8	33668.6	-178230.0	-161051000.0	35311.0
1277.109	67824.1	54.7	29786.6	-140502.0	-190747100.0	50714.0
1277.110	43981.4	-42.0	80.8	104360.0	-144023400.0	26915.0
1277.111	59389.2	-56.8	-3918.7	141144.0	-173619400.0	42318.0
1277.112	139700.0	-28.6	-4548.0	52815.0	-249042000.0	63293.0
1277.113	155100.0	-42.4	-8432.5	86916.0	-278741900.0	78696.0
1277.114	131300.0	-128.0	-38362.7	302420.0	-231996500.0	54897.0
1277.115	146700.0	-141.7	-42294.3	336139.0	-261696400.0	70300.0
1277.116	53459.6	69.8	40538.7	-188179.0	-162222700.0	37924.0
1277.117	68867.2	54.6	36648.8	-150470.0	-191918800.0	53327.0
1277.118	42938.5	-41.7	-6862.1	113512.0	-142751600.0	24301.0
1277.119	58346.3	-56.5	-10865.2	150355.0	-172447600.0	39704.0
1277.120	140800.0	-28.9	2256.0	43481.0	-250284800.0	65907.0
1277.121	156200.0	-42.7	-1615.4	77548.0	-279884700.0	81310.0
1277.122	130300.0	-127.7	-45178.8	311565.0	-230803100.0	52284.0
1277.123	145700.0	-141.3	-49100.6	345126.0	-260402900.0	67687.0
1277.124	52603.6	114.5	37523.0	-295390.0	-161256300.0	63635.0
1277.125	68011.2	99.4	33633.9	-257612.0	-190952300.0	79039.0
1277.126	44167.8	3.4	3971.8	-14822.0	-144229000.0	55240.0
1277.127	59576.3	-11.6	90.0	22519.0	-173824600.0	70643.0
1277.128	139500.0	-61.6	-8777.8	138784.0	-248843200.0	34969.0
1277.129	155000.0	-75.3	-12677.5	172647.0	-278492500.0	50372.0
1277.130	131100.0	-160.6	-42448.7	387294.0	-231797900.0	26573.0
1277.131	146500.0	-174.3	-46391.6	421215.0	-261497700.0	41975.0
1277.132	53646.8	114.5	44389.7	-305419.0	-162427900.0	66249.0
1277.133	69054.5	99.4	40488.6	-267656.0	-192123900.0	81652.0
1277.134	43125.8	3.8	-2837.4	-5770.0	-142956800.0	52626.0
1277.135	58533.8	-11.2	-6805.3	31501.0	-172652600.0	68029.0
1277.136	140600.0	-61.9	-1885.2	129329.0	-250086100.0	37582.0
1277.137	156000.0	-75.6	-5778.9	163422.0	-279686000.0	52985.0
1277.138	130100.0	-160.3	-49332.2	396470.0	-230604400.0	23960.0
1277.139	145500.0	-174.1	-53238.5	430570.0	-260204300.0	39362.0
1277.140	92820.1	160.3	59179.1	-412172.0	-211786600.0	54897.0
1277.141	108200.0	145.2	55319.1	-374567.0	-241496700.0	70300.0
1277.142	64700.4	-197.4	-53318.9	489481.0	-154929200.0	26912.0
1277.143	80108.2	-211.1	-57283.5	523242.0	-184525200.0	42315.0
1277.144	119000.0	127.6	47728.3	-334506.0	-238226500.0	63292.0
1277.145	134400.0	112.3	43870.6	-296477.0	-267826400.0	78695.0
1277.146	90894.6	-219.0	-64820.9	537756.0	-181261900.0	35307.0
1277.147	106300.0	-232.7	-68782.8	571499.0	-210959100.0	50710.0
1277.148	92876.4	173.9	60357.8	-447838.0	-211858100.0	63394.0
1277.149	108300.0	158.7	56497.8	-410063.0	-241446000.0	78797.0
1277.150	64756.5	-187.7	-52115.6	464061.0	-154900800.0	35410.0
1277.151	80164.3	-201.3	-56082.9	497861.0	-184596800.0	50813.0
1277.152	119000.0	114.3	46528.7	-299652.0	-238126500.0	54795.0
1277.153	134400.0	99.0	42675.2	-261635.0	-267726400.0	70198.0

1277.154	90838.5	-228.8	-66029.3	563170.0	-181190300.0	26809.0
1277.155	106200.0	-242.4	-69991.1	596910.0	-210909700.0	42212.0
1277.156	96296.0	159.4	81808.2	-443399.0	-215726100.0	63608.0
1277.157	111700.0	144.3	77959.4	-405774.0	-245424000.0	79011.0
1277.158	61225.1	-196.5	-76239.5	520402.0	-150889500.0	18201.0
1277.159	76632.9	-210.2	-80209.8	554129.0	-180585400.0	33604.0
1277.160	122500.0	125.6	70353.7	-362866.0	-242153700.0	72003.0
1277.161	137900.0	110.3	66507.0	-324830.0	-271853700.0	87406.0
1277.162	87419.4	-217.9	-87662.1	568103.0	-177322100.0	26595.0
1277.163	102800.0	-231.5	-91633.3	601828.0	-207031800.0	41998.0
1277.164	96352.1	173.3	82990.2	-479809.0	-215797600.0	72105.0
1277.165	111800.0	158.1	79141.6	-442112.0	-245473300.0	87508.0
1277.166	61281.2	-186.8	-75055.8	495181.0	-150961100.0	26699.0
1277.167	76689.0	-200.5	-79026.3	528909.0	-180657000.0	42102.0
1277.168	122400.0	112.1	69155.7	-327542.0	-242104400.0	63506.0
1277.169	137800.0	96.9	65308.9	-289508.0	-271804300.0	78909.0
1277.170	87363.3	-227.5	-88860.2	593263.0	-177250500.0	18098.0
1277.171	102800.0	-241.2	-92830.0	627004.0	-206931800.0	33501.0
1277.268	65001.5	48.1	24964.1	-128300.0	-157276700.0	27134.0
1277.269	116400.0	-2.3	12081.7	-2504.0	-256143400.0	78477.0
1277.270	56565.7	-63.7	-8642.4	154276.0	-140149500.0	18739.0
1277.271	107900.0	-110.5	-21889.1	270140.0	-239048700.0	70082.0
1277.272	91195.8	14.5	13503.1	-48213.0	-183609300.0	35529.0
1277.273	142600.0	-32.8	555.3	69163.0	-282473100.0	86873.0
1277.274	82759.5	-87.0	-20209.1	206855.0	-166582300.0	27133.0
1277.275	134100.0	-132.3	-33411.8	318941.0	-265478400.0	78476.0
1277.276	66044.2	48.0	31767.7	-138002.0	-158448600.0	29747.0
1277.277	117400.0	-2.5	18871.4	-12261.0	-257336900.0	81091.0
1277.278	55522.8	-63.2	-15570.1	162972.0	-138977700.0	16125.0
1277.279	106900.0	-110.3	-28816.6	279755.0	-237855200.0	67468.0
1277.280	92238.7	13.9	20308.3	-56700.0	-184881100.0	38142.0
1277.281	143600.0	-33.2	7410.0	60125.0	-283766600.0	89486.0
1277.282	81717.1	-86.5	-27007.3	215616.0	-165410300.0	24520.0
1277.283	133100.0	-131.9	-40224.1	327823.0	-264284800.0	75863.0
1277.284	65057.7	61.5	26144.0	-163446.0	-157348300.0	35631.0
1277.285	116400.0	11.1	13246.3	-37616.0	-256243400.0	86975.0
1277.286	56621.7	-50.2	-7435.0	118825.0	-140221100.0	27236.0
1277.287	108000.0	-98.8	-20694.5	239436.0	-239098000.0	78579.0
1277.288	91139.7	3.5	12303.9	-19544.0	-183537700.0	27031.0
1277.289	142500.0	-42.6	-699.2	94893.0	-282523700.0	78375.0
1277.290	82703.4	-96.7	-21428.9	232384.0	-166510700.0	18636.0
1277.291	134100.0	-142.3	-34624.7	344919.0	-265378400.0	69979.0
1277.292	66100.6	61.4	32964.7	-173198.0	-158520000.0	38244.0
1277.293	117500.0	10.9	20026.6	-47414.0	-257386300.0	89588.0
1277.294	55578.8	-50.0	-14371.1	128323.0	-139049300.0	24623.0
1277.295	106900.0	-98.3	-27623.5	248195.0	-237955200.0	75966.0
1277.296	92182.6	3.2	19100.6	-28641.0	-184809500.0	29645.0
1277.297	143500.0	-43.0	6183.8	85876.0	-283717200.0	80988.0
1277.298	81661.0	-96.4	-28221.8	241391.0	-165338700.0	16022.0
1277.299	133000.0	-141.9	-41440.5	354032.0	-264235500.0	67365.0
1280.1	36441.1	3.3	1442.5	-130.0	-64572580.0	33105.0
1280.2	34065.5	3.6	980.9	552.0	-58265820.0	33211.0
1280.3	75602.9	6.1	-5873.0	1763.0	-138607100.0	68203.0
1280.4	73227.3	6.4	-6333.9	2440.0	-132310400.0	68309.0
1280.5	28029.9	2.6	1214.2	79.0	-49692860.0	25461.0
1280.6	25654.3	2.8	752.6	761.0	-43396100.0	25567.0
1280.7	67191.7	5.4	-6101.1	1971.0	-123767400.0	60560.0
1280.8	64816.1	5.6	-6562.0	2648.0	-117470600.0	60666.0
1280.9	31689.9	3.9	519.6	1232.0	-51959060.0	33317.0
1280.10	63854.3	5.3	-3678.6	1197.0	-116457800.0	57673.0

1280.11	59103.1	5.8	-4600.5	2552.0	-103864300.0	57886.0
1280.12	23278.7	3.1	291.4	1440.0	-37089340.0	25674.0
1280.13	55443.2	4.5	-3906.7	1405.0	-101518000.0	50030.0
1280.14	50692.0	5.1	-4828.7	2759.0	-88924500.0	50242.0
1280.15	61478.7	5.5	-4139.6	1875.0	-110161000.0	57780.0
1280.16	53067.6	4.8	-4367.7	2082.0	-95221260.0	50136.0
1280.17	37505.8	3.2	1511.7	-373.0	-67373310.0	33061.0
1280.18	35130.2	3.5	1050.0	310.0	-61076560.0	33167.0
1280.19	76667.6	6.0	-5804.1	1522.0	-141467900.0	68160.0
1280.20	74292.0	6.3	-6265.1	2199.0	-135171100.0	68266.0
1280.21	29094.6	2.5	1283.3	-163.0	-52503590.0	25418.0
1280.22	26719.0	2.7	821.7	519.0	-46196830.0	25524.0
1280.23	68256.4	5.2	-6032.2	1730.0	-126628100.0	60516.0
1280.24	65880.8	5.5	-6493.2	2407.0	-120331400.0	60623.0
1280.25	32754.6	3.7	588.5	991.0	-54769790.0	33273.0
1280.26	64919.1	5.2	-3609.6	955.0	-119218500.0	57630.0
1280.27	60167.8	5.7	-4531.7	2311.0	-106625000.0	57842.0
1280.28	24343.4	3.0	360.3	1199.0	-39900070.0	25630.0
1280.29	56507.9	4.4	-3837.8	1164.0	-104378800.0	49987.0
1280.30	51756.7	4.9	-4759.8	2519.0	-91785230.0	50199.0
1280.31	38215.6	3.1	1557.7	-534.0	-69243800.0	33032.0
1280.32	35840.0	3.4	1096.0	148.0	-62947040.0	33138.0
1280.33	65628.9	5.1	-3563.5	794.0	-121059000.0	57601.0
1280.34	63253.3	5.3	-4024.8	1473.0	-114762200.0	57707.0
1280.35	29804.4	2.4	1329.1	-323.0	-54374070.0	25389.0
1280.36	27428.8	2.7	867.8	357.0	-48067310.0	25495.0
1280.37	57217.7	4.3	-3791.8	1003.0	-106219200.0	49958.0
1280.38	54842.1	4.6	-4252.9	1681.0	-99922470.0	50064.0
1280.39	62543.4	5.4	-4070.7	1634.0	-112921800.0	57736.0
1280.40	54132.3	4.7	-4298.9	1841.0	-98081980.0	50093.0
1280.41	36015.2	3.4	1414.8	-32.0	-63448300.0	33122.0
1280.42	33639.6	3.6	953.2	649.0	-57141540.0	33228.0
1280.43	75177.0	6.1	-5900.5	1859.0	-137522800.0	68220.0
1280.44	72801.4	6.4	-6361.5	2536.0	-131226100.0	68326.0
1280.45	27604.0	2.6	1186.5	177.0	-48578580.0	25479.0
1280.46	25228.4	2.9	725.0	858.0	-42271820.0	25585.0
1280.47	66765.8	5.4	-6128.6	2067.0	-122683100.0	60577.0
1280.48	64390.2	5.7	-6589.6	2744.0	-116386400.0	60683.0
1280.49	31264.0	3.9	492.0	1328.0	-50844780.0	33334.0
1280.50	63428.5	5.3	-3706.1	1293.0	-115273500.0	57691.0
1280.51	58677.2	5.8	-4628.1	2648.0	-102680000.0	57903.0
1280.52	22852.8	3.2	263.9	1536.0	-35965060.0	25691.0
1280.53	55017.3	4.6	-3934.3	1501.0	-100433700.0	50048.0
1280.54	50266.1	5.1	-4856.2	2856.0	-87840220.0	50260.0
1280.55	61052.9	5.6	-4167.1	1971.0	-108976700.0	57797.0
1280.56	52641.7	4.8	-4395.2	2178.0	-94136980.0	50154.0
1280.57	35731.3	3.4	1396.4	32.0	-62702100.0	33133.0
1280.58	33355.7	3.7	934.8	714.0	-56395340.0	33240.0
1280.59	63144.5	5.3	-3724.5	1358.0	-114517300.0	57702.0
1280.60	60768.9	5.6	-4185.5	2035.0	-108220600.0	57808.0
1280.61	27320.1	2.7	1168.1	241.0	-47822370.0	25490.0
1280.62	24944.5	2.9	706.6	923.0	-41525610.0	25596.0
1280.63	54733.4	4.6	-3952.6	1566.0	-99677530.0	50059.0
1280.64	52357.8	4.9	-4413.6	2243.0	-93380780.0	50165.0
1280.108	42943.7	-38.3	-15865.6	71834.0	-111849000.0	28791.0
1280.109	52965.4	-35.2	-17754.0	74036.0	-128873000.0	48444.0
1280.110	38397.7	-20.4	-22777.1	93238.0	-104651600.0	35032.0
1280.111	48419.8	-17.1	-24720.8	95158.0	-121675400.0	54685.0
1280.112	38971.6	22.2	20431.0	-87749.0	-36970880.0	24321.0
1280.113	48993.5	25.2	18526.9	-85016.0	-53964790.0	43974.0

1280.114	34428.1	38.2	13417.0	-60615.0	-29792170.0	30560.0
1280.115	44450.2	41.1	11421.5	-57936.0	-46785980.0	50213.0
1280.116	42918.0	-56.3	-16211.5	120406.0	-111362000.0	28384.0
1280.117	52939.4	-53.2	-18106.5	122670.0	-128386200.0	48037.0
1280.118	38423.2	-2.4	-22422.4	44679.0	-105138600.0	35439.0
1280.119	48445.3	0.9	-24367.1	46602.0	-122162500.0	55092.0
1280.120	38945.4	4.2	20024.4	-39021.0	-36484160.0	23913.0
1280.121	48967.3	7.1	18125.9	-36256.0	-53478060.0	43566.0
1280.122	34453.9	56.2	13889.7	-109156.0	-30269100.0	30968.0
1280.123	44476.0	59.1	11896.2	-106395.0	-47262910.0	50621.0
1280.124	42914.9	-51.5	-16120.3	116816.0	-111563600.0	28983.0
1280.125	52936.4	-48.4	-18013.3	119025.0	-128587700.0	48636.0
1280.126	38368.5	-33.7	-23010.6	138743.0	-104366400.0	35225.0
1280.127	48390.9	-30.6	-24938.6	140947.0	-121390000.0	54877.0
1280.128	39000.0	33.3	20378.8	-126905.0	-37236500.0	24128.0
1280.129	49022.0	36.3	18456.2	-124151.0	-54230360.0	43781.0
1280.130	34456.8	49.0	13414.0	-99121.0	-30057630.0	30368.0
1280.131	44479.2	52.0	11467.2	-96636.0	-47051280.0	50021.0
1280.132	42888.5	-69.6	-16504.1	165632.0	-111077000.0	28576.0
1280.133	52910.5	-66.5	-18435.5	167732.0	-128100800.0	48229.0
1280.134	38394.4	-15.9	-22636.8	90586.0	-104853200.0	35632.0
1280.135	48416.6	-12.7	-24591.3	92549.0	-121877000.0	55285.0
1280.136	38974.0	15.1	19996.0	-77903.0	-36759670.0	23721.0
1280.137	48996.0	18.1	18104.6	-75217.0	-53753520.0	43374.0
1280.138	34481.2	66.9	13828.4	-147337.0	-30535270.0	30775.0
1280.139	44504.2	70.0	11927.5	-145031.0	-47528620.0	50428.0
1280.140	46857.6	-36.9	4273.1	-12539.0	-94066620.0	19947.0
1280.141	56879.6	-33.8	2416.7	-10333.0	-110990500.0	39599.0
1280.142	31708.2	20.4	-19046.1	65947.0	-70089790.0	40747.0
1280.143	41730.3	23.4	-21016.1	68508.0	-87063610.0	60400.0
1280.144	45665.2	-18.4	15157.8	-61508.0	-71570580.0	18606.0
1280.145	55687.1	-15.2	13302.9	-59434.0	-88594480.0	38259.0
1280.146	30517.4	37.1	-8186.2	22111.0	-47622940.0	39405.0
1280.147	40539.5	40.1	-10155.3	24682.0	-64616740.0	59058.0
1280.148	46849.2	-40.9	4219.0	1113.0	-93970880.0	20004.0
1280.149	56871.2	-37.8	2362.3	3267.0	-110994700.0	39657.0
1280.150	31699.4	17.2	-19068.5	77483.0	-70004260.0	40805.0
1280.151	41721.5	20.2	-21038.1	80035.0	-86968060.0	60457.0
1280.152	45673.5	-14.5	15185.2	-74857.0	-71646370.0	18548.0
1280.153	55695.5	-11.3	13329.4	-72768.0	-88590230.0	38201.0
1280.154	30526.2	40.4	-8167.5	10568.0	-47708480.0	39348.0
1280.155	40548.3	43.4	-10136.7	13140.0	-64702290.0	59000.0
1280.156	46772.7	-96.4	3123.2	148120.0	-92409620.0	18587.0
1280.157	56794.6	-93.3	1262.3	150369.0	-109433500.0	38240.0
1280.158	31792.7	80.2	-17641.8	-95245.0	-71677000.0	42105.0
1280.159	41814.9	83.2	-19608.2	-92727.0	-88720750.0	61757.0
1280.160	45580.1	-77.7	13949.7	98809.0	-69973680.0	17247.0
1280.161	55602.1	-74.6	12090.5	100928.0	-86937540.0	36900.0
1280.162	30602.1	97.0	-6713.8	-139226.0	-49220040.0	40763.0
1280.163	40624.3	100.0	-8681.2	-136702.0	-66213790.0	60416.0
1280.164	46764.3	-100.4	3091.7	161787.0	-92413880.0	18645.0
1280.165	56786.2	-97.3	1230.8	164014.0	-109337800.0	38298.0
1280.166	31784.0	77.0	-17688.0	-83671.0	-71601410.0	42162.0
1280.167	41806.2	80.0	-19654.5	-81152.0	-88625160.0	61815.0
1280.168	45588.5	-73.9	13954.7	85530.0	-70049420.0	17189.0
1280.169	55610.4	-70.7	12095.3	87653.0	-87033330.0	36842.0
1280.170	30610.9	100.2	-6668.9	-150835.0	-49295580.0	40705.0
1280.171	40633.1	103.3	-8635.7	-148288.0	-66289340.0	60358.0
1280.268	29861.5	-19.9	-846.6	10890.0	-65825150.0	4298.0
1280.269	63267.7	-9.5	-7071.6	18214.0	-122454900.0	69808.0

1280.270	25316.0	-2.0	-7718.7	32569.0	-58637440.0	10539.0
1280.271	58723.0	8.2	-14279.7	40485.0	-115256800.0	76048.0
1280.272	28669.2	-1.0	10064.4	-38863.0	-43359050.0	2958.0
1280.273	62075.8	9.0	3811.7	-30453.0	-99958610.0	68467.0
1280.274	24125.1	15.2	3129.2	-12426.0	-36170640.0	9197.0
1280.275	57532.2	25.1	-3432.0	-3646.0	-92859940.0	74707.0
1280.276	29836.0	-37.7	-1185.9	59140.0	-65348060.0	3891.0
1280.277	63241.7	-27.4	-7443.4	66576.0	-121968100.0	69400.0
1280.278	25341.1	15.9	-7339.7	-15648.0	-59114730.0	10946.0
1280.279	58748.3	26.2	-13902.5	-8026.0	-115744000.0	76455.0
1280.280	28643.6	-18.9	9680.1	9378.0	-42872020.0	2550.0
1280.281	62050.5	-8.9	3459.4	17969.0	-99471420.0	68059.0
1280.282	24150.9	33.1	3603.2	-60839.0	-36647570.0	9605.0
1280.283	57558.0	43.0	-2977.6	-52139.0	-93246870.0	75114.0
1280.284	29853.1	-23.8	-901.1	24384.0	-65739410.0	4356.0
1280.285	63259.2	-13.4	-7138.9	31667.0	-122359200.0	69866.0
1280.286	25307.4	-5.9	-7735.3	45985.0	-58551800.0	10597.0
1280.287	58714.3	4.6	-14307.6	53065.0	-115161200.0	76106.0
1280.288	28677.8	2.4	10063.6	-50953.0	-43434690.0	2900.0
1280.289	62084.5	12.3	3796.2	-42149.0	-100054200.0	68409.0
1280.290	24133.9	18.4	3134.9	-24045.0	-36256180.0	9139.0
1280.291	57540.9	28.4	-3420.9	-15451.0	-92855540.0	74649.0
1280.292	29827.5	-41.7	-1242.9	72689.0	-65262370.0	3948.0
1280.293	63233.2	-31.3	-7543.5	80042.0	-121872400.0	69458.0
1280.294	25332.6	12.0	-7368.8	-2415.0	-59029040.0	11004.0
1280.295	58739.7	22.6	-13937.7	4673.0	-115648300.0	76513.0
1280.296	28652.3	-15.5	9683.6	-2628.0	-42957610.0	2492.0
1280.297	62059.1	-5.7	3456.9	6360.0	-99567060.0	68002.0
1280.298	24159.6	36.4	3618.9	-72527.0	-36733160.0	9547.0
1280.299	57566.7	46.4	-2943.1	-64024.0	-93342470.0	75056.0
1281.1	65156.2	13.2	6916.7	-21662.0	-135798400.0	-45849.0
1281.2	65355.4	14.2	7570.7	-22459.0	-135297500.0	-48681.0
1281.3	129700.0	23.4	6256.9	-35761.0	-274806900.0	-86802.0
1281.4	129900.0	24.4	6910.9	-36574.0	-274305700.0	-89634.0
1281.5	50126.1	10.1	5668.4	-16210.0	-104511100.0	-35282.0
1281.6	50325.3	11.0	6322.4	-17008.0	-104010200.0	-38114.0
1281.7	114600.0	20.3	5008.7	-30313.0	-243555100.0	-76235.0
1281.8	114800.0	21.2	5662.6	-31126.0	-243053800.0	-79067.0
1281.9	65554.6	15.1	8224.6	-23264.0	-134796600.0	-51513.0
1281.10	110300.0	20.4	6454.9	-31526.0	-233133100.0	-74516.0
1281.11	110700.0	22.2	7762.8	-33150.0	-232130400.0	-80181.0
1281.12	50524.4	11.9	6976.3	-17816.0	-103509400.0	-40946.0
1281.13	95291.7	17.2	5206.6	-26076.0	-201834800.0	-63949.0
1281.14	95690.1	19.1	6514.5	-27701.0	-200733000.0	-69613.0
1281.15	110500.0	21.3	7108.8	-32337.0	-232631700.0	-77348.0
1281.16	95490.9	18.2	5860.6	-26889.0	-201333900.0	-66781.0
1281.17	65065.3	12.7	6572.8	-21078.0	-136044400.0	-44572.0
1281.18	65264.5	13.7	7226.8	-21873.0	-135543500.0	-47404.0
1281.19	129600.0	22.9	5913.1	-35170.0	-275057600.0	-85525.0
1281.20	129800.0	23.9	6567.0	-35982.0	-274556300.0	-88357.0
1281.21	50035.2	9.6	5324.5	-15625.0	-104757200.0	-34005.0
1281.22	50234.4	10.5	5978.6	-16421.0	-104256300.0	-36837.0
1281.23	114600.0	19.8	4664.8	-29722.0	-243755100.0	-74958.0
1281.24	114800.0	20.7	5318.8	-30534.0	-243153800.0	-77790.0
1281.25	65463.7	14.6	7880.8	-22675.0	-134942600.0	-50236.0
1281.26	110200.0	19.9	6111.0	-30937.0	-233383700.0	-73239.0
1281.27	110600.0	21.8	7418.9	-32559.0	-232281100.0	-78903.0
1281.28	50433.6	11.5	6632.5	-17225.0	-103655400.0	-39669.0
1281.29	95200.8	16.7	4862.8	-25486.0	-202080800.0	-62672.0
1281.30	95599.2	18.6	6170.6	-27110.0	-200979000.0	-68336.0

1281.31	65004.7	12.4	6343.5	-20687.0	-136175100.0	-43720.0
1281.32	65203.9	13.3	6997.6	-21483.0	-135674200.0	-46553.0
1281.33	110200.0	19.6	5881.8	-30546.0	-233483700.0	-72388.0
1281.34	110400.0	20.5	6535.7	-31351.0	-232982400.0	-75220.0
1281.35	49974.6	9.3	5095.1	-15230.0	-104887900.0	-33153.0
1281.36	50173.8	10.2	5749.3	-16031.0	-104387000.0	-35985.0
1281.37	95140.2	16.4	4633.5	-25094.0	-202211500.0	-61820.0
1281.38	95339.4	17.3	5287.5	-25903.0	-201710600.0	-64653.0
1281.39	110400.0	20.8	6765.0	-31746.0	-232882400.0	-76071.0
1281.40	95400.0	17.7	5516.7	-26297.0	-201479900.0	-65504.0
1281.41	65192.5	13.4	7054.2	-21896.0	-135780000.0	-46360.0
1281.42	65391.7	14.3	7708.2	-22694.0	-135179100.0	-49192.0
1281.43	129700.0	23.6	6394.5	-35998.0	-274706900.0	-87313.0
1281.44	129900.0	24.6	7048.4	-36810.0	-274205700.0	-90145.0
1281.45	50162.4	10.3	5806.0	-16444.0	-104392700.0	-35793.0
1281.46	50361.6	11.2	6460.0	-17243.0	-103891800.0	-38625.0
1281.47	114700.0	20.5	5146.2	-30549.0	-243404400.0	-76746.0
1281.48	114900.0	21.4	5800.2	-31363.0	-242903200.0	-79578.0
1281.49	65590.9	15.3	8362.1	-23501.0	-134678200.0	-52024.0
1281.50	110400.0	20.6	6592.4	-31762.0	-232982400.0	-75027.0
1281.51	110800.0	22.4	7900.3	-33387.0	-231979800.0	-80691.0
1281.52	50560.8	12.1	7113.9	-18053.0	-103391000.0	-41457.0
1281.53	95328.0	17.4	5344.2	-26313.0	-201716400.0	-64460.0
1281.54	95726.4	19.3	6652.0	-27938.0	-200714600.0	-70124.0
1281.55	110600.0	21.5	7246.4	-32574.0	-232481100.0	-77859.0
1281.56	95527.2	18.3	5998.1	-27126.0	-201215500.0	-67292.0
1281.57	65216.8	13.5	7145.9	-22052.0	-135667700.0	-46700.0
1281.58	65416.0	14.5	7799.9	-22850.0	-135166800.0	-49533.0
1281.59	110400.0	20.7	6684.1	-31919.0	-232982400.0	-75367.0
1281.60	110600.0	21.6	7338.1	-32731.0	-232481100.0	-78200.0
1281.61	50186.7	10.4	5897.7	-16600.0	-104380400.0	-36133.0
1281.62	50385.9	11.3	6551.6	-17399.0	-103879500.0	-38965.0
1281.63	95352.3	17.5	5435.9	-26471.0	-201704100.0	-64800.0
1281.64	95551.5	18.5	6089.8	-27284.0	-201103200.0	-67633.0
1281.108	40600.7	-1.0	-38120.7	-18776.0	-55395740.0	-6417.0
1281.109	58280.1	1.0	-33459.1	-21106.0	-87681130.0	-31196.0
1281.110	56365.2	8.1	1448.5	20757.0	-88351020.0	-15370.0
1281.111	74045.0	10.4	6011.4	17879.0	-120696200.0	-40149.0
1281.112	77817.9	18.5	3525.8	-63555.0	-199485200.0	-63162.0
1281.113	95497.5	20.5	8159.2	-66009.0	-231830500.0	-87940.0
1281.114	93585.5	29.2	42720.0	-28080.0	-232498900.0	-72116.0
1281.115	111300.0	31.2	47237.8	-30397.0	-264826500.0	-96894.0
1281.116	41665.1	-13.9	-34598.2	18056.0	-59186620.0	-6208.0
1281.117	59344.3	-12.0	-29921.7	15835.0	-91542110.0	-30987.0
1281.118	55300.8	21.2	-2051.8	-16492.0	-84590140.0	-15579.0
1281.119	72980.6	23.4	2515.5	-19351.0	-116935300.0	-40358.0
1281.120	78882.1	5.5	7035.9	-26465.0	-203246200.0	-62953.0
1281.121	96561.7	7.5	11666.4	-28949.0	-235591500.0	-87732.0
1281.122	92521.1	42.3	39315.4	-65472.0	-228738000.0	-72325.0
1281.123	110200.0	44.3	43833.3	-67785.0	-260983700.0	-97103.0
1281.124	40689.6	20.0	-36675.4	-68462.0	-55790720.0	-6520.0
1281.125	58368.9	22.0	-32005.7	-70727.0	-88136150.0	-31299.0
1281.126	56454.2	29.0	2983.4	-28493.0	-88805950.0	-15473.0
1281.127	74133.4	31.1	7541.7	-31012.0	-121151400.0	-40251.0
1281.128	77730.0	-1.8	1762.5	-15913.0	-199129700.0	-63060.0
1281.129	95409.6	0.3	6355.6	-18513.0	-231375100.0	-87839.0
1281.130	93496.8	8.9	40966.2	19588.0	-232143900.0	-72013.0
1281.131	111200.0	11.0	45512.5	16831.0	-264377200.0	-96792.0
1281.132	41753.3	6.9	-33130.7	-31119.0	-59571960.0	-6311.0
1281.133	59432.9	8.9	-28538.5	-33431.0	-91897240.0	-31090.0

1281.134	55389.1	41.9	-528.7	-65432.0	-85045420.0	-15681.0
1281.135	73068.7	44.1	4016.5	-68121.0	-117290700.0	-40460.0
1281.136	78793.7	-14.9	5267.8	21254.0	-202891000.0	-62851.0
1281.137	96473.4	-12.7	9896.6	18548.0	-235236200.0	-87630.0
1281.138	92431.6	21.7	37633.0	-17107.0	-228283400.0	-72223.0
1281.139	110100.0	24.0	42167.7	-20240.0	-260634400.0	-97001.0
1281.140	35232.8	-6.0	-70384.4	-77856.0	-67324580.0	-15830.0
1281.141	52912.4	-3.9	-65716.7	-80416.0	-99599870.0	-40608.0
1281.142	87786.9	27.0	60763.8	47494.0	-177335900.0	-45676.0
1281.143	105500.0	29.1	65309.5	44874.0	-209664300.0	-70454.0
1281.144	46397.3	-0.6	-57792.6	-90208.0	-110499800.0	-32853.0
1281.145	64076.9	1.5	-53123.9	-92732.0	-142845100.0	-57632.0
1281.146	98952.9	33.5	73127.7	32220.0	-220580400.0	-62699.0
1281.147	116600.0	35.7	77673.7	29604.0	-252942100.0	-87478.0
1281.148	35259.6	0.3	-69945.3	-92917.0	-67441020.0	-15860.0
1281.149	52939.1	2.4	-65277.6	-95460.0	-99786340.0	-40639.0
1281.150	87813.4	33.1	61283.8	33322.0	-177422500.0	-45707.0
1281.151	105500.0	35.2	65832.4	30704.0	-209764300.0	-70485.0
1281.152	46370.5	-7.0	-58251.9	-75154.0	-110413300.0	-32822.0
1281.153	64050.1	-4.9	-53582.1	-77641.0	-142758600.0	-57601.0
1281.154	98926.3	27.5	72603.4	46383.0	-220493800.0	-62668.0
1281.155	116600.0	29.6	77149.5	43767.0	-252742100.0	-87447.0
1281.156	38782.9	-48.3	-58743.1	43086.0	-79946460.0	-15136.0
1281.157	56462.4	-46.2	-54074.4	40636.0	-112301800.0	-39915.0
1281.158	84237.6	70.6	49370.2	-76717.0	-164733700.0	-46372.0
1281.159	101900.0	72.7	53913.2	-79415.0	-197087600.0	-71151.0
1281.160	49947.0	-43.0	-46202.0	31180.0	-123201800.0	-32159.0
1281.161	67626.5	-41.0	-41532.1	28764.0	-155447200.0	-56937.0
1281.162	95403.6	77.1	61791.7	-91968.0	-207978100.0	-63396.0
1281.163	113100.0	79.2	66335.2	-94658.0	-240214800.0	-88174.0
1281.164	38809.7	-41.8	-58283.5	27899.0	-80062890.0	-15167.0
1281.165	56489.2	-39.8	-53614.8	25456.0	-112388200.0	-39946.0
1281.166	84264.2	76.6	49859.9	-90911.0	-164820200.0	-46403.0
1281.167	101900.0	78.8	54402.9	-93608.0	-197187600.0	-71182.0
1281.168	49920.1	-49.4	-46679.7	46375.0	-123015500.0	-32128.0
1281.169	67599.6	-47.4	-42009.3	43962.0	-155360800.0	-56906.0
1281.170	95377.1	71.1	61293.4	-77881.0	-207791500.0	-63365.0
1281.171	113100.0	73.2	65843.1	-80538.0	-240114800.0	-88144.0
1281.268	33000.3	3.0	-28840.7	-30652.0	-68115350.0	2632.0
1281.269	91931.9	9.9	-13284.1	-38836.0	-175836500.0	-79964.0
1281.270	48765.7	12.6	10701.8	8011.0	-101100200.0	-6322.0
1281.271	107700.0	19.7	25860.5	-762.0	-208850000.0	-88918.0
1281.272	44164.9	8.6	-16242.3	-43135.0	-111330500.0	-14392.0
1281.273	103100.0	15.7	-758.7	-52109.0	-219079900.0	-96988.0
1281.274	59932.0	19.1	23062.0	-7171.0	-144344400.0	-23346.0
1281.275	118900.0	26.2	38222.3	-15919.0	-252077200.0	-105942.0
1281.276	34065.3	-9.6	-25338.4	5695.0	-71905930.0	2840.0
1281.277	92996.5	-2.9	-9762.8	-2083.0	-179597300.0	-79756.0
1281.278	47701.0	25.6	7259.0	-29204.0	-97339440.0	-6531.0
1281.279	106600.0	32.7	22405.0	-37933.0	-205107100.0	-89127.0
1281.280	45229.7	-4.3	-12775.4	-6450.0	-115091200.0	-14183.0
1281.281	104200.0	3.0	2706.9	-15614.0	-222822700.0	-96779.0
1281.282	58867.3	32.2	19659.8	-44509.0	-140583700.0	-23555.0
1281.283	117800.0	39.3	34788.8	-53261.0	-248334300.0	-106150.0
1281.284	33027.0	9.4	-28401.8	-45659.0	-68231820.0	2601.0
1281.285	91958.6	16.2	-12851.7	-53800.0	-176023000.0	-79995.0
1281.286	48792.5	18.9	11203.7	-6847.0	-101186600.0	-6353.0
1281.287	107700.0	25.9	26364.3	-15308.0	-208950000.0	-88949.0
1281.288	44138.2	2.3	-16759.2	-28457.0	-111244000.0	-14361.0
1281.289	103100.0	9.7	-1316.3	-37953.0	-218979900.0	-96957.0

1281.290	59905.5	13.0	22526.4	7036.0	-144257900.0	-23315.0
1281.291	118800.0	20.1	37690.5	-1665.0	-252027800.0	-105911.0
1281.292	34091.8	-3.4	-24893.2	-9164.0	-72022500.0	2809.0
1281.293	93023.2	3.4	-9370.9	-16955.0	-179783700.0	-79787.0
1281.294	47727.8	31.9	7742.9	-44022.0	-97425870.0	-6562.0
1281.295	106700.0	38.9	22889.8	-52553.0	-205156400.0	-89158.0
1281.296	45203.0	-10.5	-13297.1	8065.0	-115004700.0	-14152.0
1281.297	104100.0	-3.1	2177.8	-1294.0	-222773300.0	-96748.0
1281.298	58840.8	26.1	19140.5	-30270.0	-140397100.0	-23524.0
1281.299	117800.0	33.2	34292.5	-39064.0	-248134300.0	-106120.0
1282.1	98168.9	-9.2	-5771.8	24380.0	-172577500.0	120014.0
1282.2	97972.0	-9.6	-7501.1	26043.0	-169977200.0	126418.0
1282.3	197500.0	-16.1	-21097.8	44349.0	-351066200.0	235352.0
1282.4	197300.0	-16.5	-22826.0	45988.0	-348467600.0	241755.0
1282.5	75516.6	-7.0	-4581.3	18803.0	-132850800.0	92326.0
1282.6	75319.6	-7.4	-6310.5	20466.0	-130250600.0	98730.0
1282.7	174800.0	-13.9	-19907.0	38767.0	-311263800.0	207663.0
1282.8	174600.0	-14.2	-21635.1	40405.0	-308665100.0	214067.0
1282.9	97775.1	-10.0	-9229.8	27693.0	-167376900.0	132821.0
1282.10	167700.0	-14.0	-16500.4	38367.0	-297459900.0	200750.0
1282.11	167300.0	-14.8	-19956.8	41646.0	-292362600.0	213557.0
1282.12	75122.7	-7.8	-8039.0	22111.0	-127650400.0	105133.0
1282.13	145000.0	-11.8	-15309.7	32787.0	-257757500.0	173062.0
1282.14	144600.0	-12.6	-18766.0	36064.0	-252560100.0	185869.0
1282.15	167500.0	-14.4	-18228.7	40008.0	-294961200.0	207154.0
1282.16	144800.0	-12.2	-17037.8	34425.0	-255158800.0	179466.0
1282.17	98253.9	-9.0	-5217.9	23577.0	-173734400.0	117144.0
1282.18	98056.9	-9.4	-6947.2	25243.0	-171134200.0	123548.0
1282.19	197500.0	-15.9	-20544.3	43558.0	-352166200.0	232482.0
1282.20	197300.0	-16.2	-22272.5	45197.0	-349667600.0	238885.0
1282.21	75601.5	-6.8	-4027.4	18002.0	-133907800.0	89456.0
1282.22	75404.6	-7.2	-5756.7	19667.0	-131307600.0	95860.0
1282.23	174900.0	-13.6	-19353.5	37975.0	-312413200.0	204794.0
1282.24	174700.0	-14.0	-21081.7	39614.0	-309814500.0	211197.0
1282.25	97860.0	-9.8	-8676.2	26900.0	-168533900.0	129951.0
1282.26	167800.0	-13.8	-15946.7	37572.0	-298609300.0	197881.0
1282.27	167400.0	-14.6	-19403.3	40855.0	-293411900.0	210687.0
1282.28	75207.7	-7.5	-7485.5	21321.0	-128707300.0	102263.0
1282.29	145100.0	-11.6	-14756.1	31993.0	-258906800.0	170192.0
1282.30	144700.0	-12.3	-18212.5	35273.0	-253709500.0	182999.0
1282.31	98310.5	-8.9	-4848.7	23044.0	-174505700.0	115231.0
1282.32	98113.6	-9.2	-6578.0	24710.0	-171905500.0	121635.0
1282.33	167800.0	-13.7	-15577.6	37039.0	-299409300.0	195967.0
1282.34	167600.0	-14.0	-17306.2	38690.0	-296810600.0	202371.0
1282.35	75658.2	-6.6	-3658.6	17474.0	-134679100.0	87543.0
1282.36	75461.2	-7.0	-5387.4	19133.0	-132078900.0	93946.0
1282.37	145200.0	-11.4	-14387.0	31463.0	-259556200.0	168279.0
1282.38	145000.0	-11.8	-16115.4	33108.0	-256957500.0	174682.0
1282.39	167600.0	-14.2	-17675.2	39217.0	-296010600.0	204284.0
1282.40	144900.0	-12.0	-16484.4	33635.0	-256308100.0	176596.0
1282.41	98134.9	-9.3	-5993.4	24700.0	-172194700.0	121162.0
1282.42	97938.0	-9.7	-7722.6	26362.0	-169594400.0	127566.0
1282.43	197400.0	-16.2	-21319.2	44665.0	-350616900.0	236500.0
1282.44	197200.0	-16.6	-23047.4	46304.0	-348018200.0	242903.0
1282.45	75482.6	-7.1	-4802.9	19124.0	-132368100.0	93474.0
1282.46	75285.6	-7.5	-6532.0	20785.0	-129767800.0	99878.0
1282.47	174800.0	-14.0	-20128.4	39083.0	-310763800.0	208811.0
1282.48	174600.0	-14.3	-21856.5	40721.0	-308165100.0	215215.0
1282.49	97741.1	-10.1	-9451.2	28010.0	-166994100.0	133969.0
1282.50	167600.0	-14.1	-16721.8	38684.0	-297110600.0	201898.0

1282.51	167200.0	-14.9	-20178.2	41962.0	-291913200.0	214705.0
1282.52	75088.7	-7.9	-8260.3	22428.0	-127167600.0	106281.0
1282.53	145000.0	-11.9	-15531.1	33103.0	-257257500.0	174210.0
1282.54	144600.0	-12.6	-18987.4	36380.0	-252060100.0	187017.0
1282.55	167400.0	-14.5	-18450.0	40324.0	-294511900.0	208302.0
1282.56	144800.0	-12.3	-17259.2	34741.0	-254658800.0	180614.0
1282.57	98112.3	-9.4	-6141.1	24914.0	-171806100.0	121928.0
1282.58	97915.3	-9.8	-7870.3	26575.0	-169205900.0	128331.0
1282.59	167600.0	-14.2	-16869.4	38896.0	-296810600.0	202664.0
1282.60	167400.0	-14.6	-18597.6	40535.0	-294211900.0	209067.0
1282.61	75459.9	-7.2	-4950.6	19338.0	-132079600.0	94239.0
1282.62	75263.0	-7.6	-6679.6	20997.0	-129479300.0	100643.0
1282.63	145000.0	-12.0	-15678.7	33314.0	-256957500.0	174976.0
1282.64	144800.0	-12.3	-17406.8	34952.0	-254358800.0	181379.0
1282.108	126500.0	130.2	5108.1	-377243.0	-257527700.0	143556.0
1282.109	143400.0	125.0	57.9	-365375.0	-286567900.0	168784.0
1282.110	118100.0	146.7	-47369.5	-367465.0	-237282400.0	153432.0
1282.111	135000.0	141.6	-52442.5	-355926.0	-266322500.0	178659.0
1282.112	95447.5	-152.8	30577.3	386589.0	-142055800.0	98254.0
1282.113	112400.0	-156.9	25532.5	395438.0	-171069400.0	123482.0
1282.114	87054.1	-124.2	-21744.2	363803.0	-121807100.0	108126.0
1282.115	104000.0	-128.4	-26850.9	373197.0	-150824000.0	133353.0
1282.116	126200.0	122.8	1225.7	-362931.0	-255979700.0	143399.0
1282.117	143100.0	117.6	-3851.1	-350912.0	-285019800.0	168628.0
1282.118	118400.0	154.2	-43504.9	-382065.0	-238730400.0	153589.0
1282.119	135300.0	149.2	-48584.1	-370513.0	-267770500.0	178816.0
1282.120	95153.1	-160.1	26593.1	400717.0	-140505000.0	98098.0
1282.121	112100.0	-164.2	21561.2	409603.0	-169521300.0	123326.0
1282.122	87348.0	-116.7	-17745.7	349246.0	-123358200.0	108282.0
1282.123	104300.0	-120.9	-22848.1	358427.0	-152372000.0	133510.0
1282.124	126400.0	235.0	3231.0	-653263.0	-257178400.0	143427.0
1282.125	143400.0	229.8	-1835.7	-641247.0	-286167900.0	168656.0
1282.126	118000.0	252.5	-49268.8	-646079.0	-237033000.0	153304.0
1282.127	135000.0	247.3	-54296.3	-634143.0	-265922500.0	178531.0
1282.128	95497.1	-247.7	32170.3	635989.0	-142330700.0	98384.0
1282.129	112500.0	-251.8	27123.9	645004.0	-171318800.0	123612.0
1282.130	87103.4	-218.9	-20062.2	612728.0	-122082100.0	108254.0
1282.131	104100.0	-223.1	-25111.6	621978.0	-151073300.0	133481.0
1282.132	126100.0	227.4	-739.9	-638262.0	-255730400.0	143272.0
1282.133	143100.0	222.1	-5803.3	-626309.0	-284719800.0	168499.0
1282.134	118300.0	259.9	-45345.6	-660459.0	-238481100.0	153460.0
1282.135	135300.0	254.7	-50418.6	-648523.0	-267470500.0	178687.0
1282.136	95202.7	-255.1	28239.8	650221.0	-140879800.0	98227.0
1282.137	112200.0	-259.2	23215.3	659190.0	-169870700.0	123455.0
1282.138	87396.6	-211.7	-16240.9	598932.0	-123633600.0	108414.0
1282.139	104400.0	-215.7	-21193.1	607741.0	-152621400.0	133640.0
1282.140	125400.0	4.1	74695.7	-100840.0	-240684900.0	116176.0
1282.141	142400.0	-0.8	69699.9	-89585.0	-269674400.0	141404.0
1282.142	97414.0	76.0	-100100.0	-113258.0	-173259800.0	149090.0
1282.143	114400.0	71.8	-105200.0	-103961.0	-202256400.0	174318.0
1282.144	116100.0	-83.2	82242.1	134782.0	-206095300.0	102587.0
1282.145	133000.0	-88.3	77247.6	146634.0	-235135500.0	127815.0
1282.146	88113.1	-1.7	-92370.8	96560.0	-138570700.0	135498.0
1282.147	105100.0	-6.0	-97461.5	105850.0	-167566800.0	160726.0
1282.148	125400.0	35.9	74170.9	-184607.0	-240584900.0	116137.0
1282.149	142300.0	30.9	69174.5	-173113.0	-269625100.0	141365.0
1282.150	97399.1	104.3	-100600.0	-187642.0	-173167300.0	149052.0
1282.151	114400.0	100.1	-105700.0	-178342.0	-202156400.0	174280.0
1282.152	116100.0	-114.6	82736.1	217475.0	-206195300.0	102626.0
1282.153	133100.0	-119.8	77739.5	229376.0	-235184800.0	127854.0

1282.154	88128.0	-30.1	-91831.9	170966.0	-138763200.0	135536.0
1282.155	105100.0	-34.3	-96922.6	180250.0	-167666800.0	160764.0
1282.156	124400.0	-19.9	61818.0	-54654.0	-235691400.0	115652.0
1282.157	141400.0	-24.9	56814.7	-43235.0	-264680900.0	140880.0
1282.158	98392.7	100.7	-87054.3	-161195.0	-178264100.0	149614.0
1282.159	115300.0	96.5	-92138.1	-152009.0	-207300500.0	174841.0
1282.160	115100.0	-108.2	69301.8	183700.0	-201101900.0	102063.0
1282.161	132100.0	-113.4	64300.0	195697.0	-229991300.0	127291.0
1282.162	89091.8	22.7	-79259.4	49236.0	-143675000.0	136021.0
1282.163	106000.0	18.6	-84345.4	58422.0	-172711000.0	161249.0
1282.164	124400.0	12.1	61316.3	-138908.0	-235591400.0	115613.0
1282.165	141400.0	7.1	56312.8	-127387.0	-264580900.0	140841.0
1282.166	98377.9	129.1	-87613.6	-235805.0	-178171600.0	149575.0
1282.167	115300.0	124.9	-92697.7	-226620.0	-207200500.0	174803.0
1282.168	115100.0	-139.7	69772.5	266596.0	-201201900.0	102103.0
1282.169	132100.0	-144.9	64769.9	278591.0	-230091300.0	127331.0
1282.170	89106.7	-5.6	-78696.1	123631.0	-143767500.0	136059.0
1282.171	106100.0	-9.8	-83786.9	132854.0	-172760400.0	161287.0
1282.268	95820.1	32.9	19998.6	-112224.0	-183267100.0	98266.0
1282.269	152300.0	15.9	3278.8	-73483.0	-279960100.0	182360.0
1282.270	87425.1	50.6	-32392.8	-105664.0	-163019200.0	108142.0
1282.271	143900.0	35.6	-49372.0	-72244.0	-259714700.0	192234.0
1282.272	86517.9	-55.5	27578.2	126173.0	-148578700.0	84677.0
1282.273	143000.0	-69.9	10874.6	158216.0	-245370500.0	168771.0
1282.274	78124.2	-28.6	-24705.9	108246.0	-128430100.0	94550.0
1282.275	134600.0	-42.4	-41675.4	138417.0	-225125100.0	178642.0
1282.276	95526.3	25.7	16138.6	-98414.0	-181715900.0	98109.0
1282.277	152000.0	8.5	-657.9	-59016.0	-278512000.0	182204.0
1282.278	87718.7	58.3	-28539.5	-120818.0	-164570500.0	108300.0
1282.279	144200.0	43.1	-45507.4	-86740.0	-261262700.0	192392.0
1282.280	86224.0	-63.0	23671.0	140850.0	-147127500.0	84520.0
1282.281	142700.0	-77.3	7028.9	172312.0	-243822400.0	168613.0
1282.282	78418.0	-21.2	-20705.0	93677.0	-129881300.0	94706.0
1282.283	134900.0	-34.9	-37681.8	123807.0	-226573200.0	178798.0
1282.284	95805.4	64.4	19472.4	-195252.0	-183174600.0	98227.0
1282.285	152300.0	47.4	2734.7	-156401.0	-279860100.0	182321.0
1282.286	87410.4	82.1	-32899.5	-188698.0	-162926600.0	108103.0
1282.287	143900.0	65.7	-49905.5	-151479.0	-259614700.0	192196.0
1282.288	86532.7	-84.8	28078.8	203401.0	-148671200.0	84716.0
1282.289	143100.0	-98.4	11377.3	233057.0	-245419900.0	168809.0
1282.290	78139.1	-57.1	-24181.2	182997.0	-128522600.0	94589.0
1282.291	134700.0	-71.2	-41145.1	214020.0	-225174400.0	178681.0
1282.292	95511.5	57.1	15604.6	-181214.0	-181623400.0	98071.0
1282.293	152000.0	39.9	-1224.0	-141794.0	-278412000.0	182165.0
1282.294	87704.0	89.6	-29053.3	-203109.0	-164477900.0	108261.0
1282.295	144200.0	73.4	-46036.2	-166569.0	-261162700.0	192353.0
1282.296	86238.8	-92.1	24181.0	217538.0	-147220000.0	84559.0
1282.297	142800.0	-105.7	7533.1	247167.0	-243871800.0	168651.0
1282.298	78432.9	-49.7	-20177.3	168751.0	-129973700.0	94745.0
1282.299	135000.0	-63.7	-37142.4	199536.0	-226622500.0	178837.0

Calcolo resistenze

Resistenza a trazione dei bulloni

$$F_{tb,Rd} = 0.9 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} = 417329.2 \text{ N}$$

Resistenza a punzonamento flangia

$$B_{pf,Rd} = 0.6 \cdot \pi \cdot d_m \cdot t_f \cdot f_{tk} / \gamma_{M2} = 1415074.0 \text{ N}$$

Bull.	$F_{t,Rd} \text{ [N]}$	$F_{t,Rd} \text{ [N]}$
1	414334.7	414334.7
2	396403.8	396403.8
3	134077.3	134077.3
4	151973.6	151973.6
5	151973.6	151973.6

Legenda

$$F_{t,Rd} = \min [F_{tb,Rd} , B_{pf,Rd} , F_{f,Rd}]$$
 resistenza a trazione di progetto

231849.5 N

Legenda

$$F_{v,y,Rd} = \min [F_{vb,Rd} , F_{bf,y,Rd}]$$
 resistenza a taglio di progetto in direzione y

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Bull.	X [mm]	Y [mm]	F _{v,Ed} [N]	F _{v,Rd} [N]	F _{t,Ed} [N]	F _{t,Rd} [N]	FV ₁	VER
1	75.00	-305.00	12199.3	231849.5	0.0	414334.7	0.052617	Ok
2	75.00	-182.50	12199.2	231849.5	17147.6	396403.8	0.083515	Ok
3	75.00	-113.20	12199.2	231849.5	40743.5	134077.3	0.269674	Ok
4	75.00	-43.90	12199.2	231849.5	64339.3	151973.6	0.355016	Ok
5	75.00	43.90	12199.2	231849.5	94234.3	151973.6	0.495524	Ok
6	75.00	113.20	12199.2	231849.5	117830.1	134077.3	0.680347	Ok
7	75.00	182.50	12199.3	231849.5	141426.0	396403.8	0.307455	Ok
8	-75.00	-305.00	12229.5	231849.5	0.0	414334.7	0.052748	Ok
9	-75.00	-182.50	12229.4	231849.5	17058.0	396403.8	0.083484	Ok
10	-75.00	-113.20	12229.4	231849.5	40653.9	134077.3	0.269328	Ok
11	-75.00	-43.90	12229.4	231849.5	64249.8	151973.6	0.354726	Ok
12	-75.00	43.90	12229.4	231849.5	94144.7	151973.6	0.495234	Ok
13	-75.00	113.20	12229.5	231849.5	117740.6	134077.3	0.680001	Ok
14	-75.00	182.50	12229.5	231849.5	141336.5	396403.8	0.307424	Ok

2-Trazione (Nodo n. 1277, CMB n. 19)

Bull.	X [mm]	Y [mm]	F _{t,Ed} [N]	F _{t,Rd} [N]	FV ₂	VER
1	75.00	-305.00	0.0	414334.7	0.000000	Ok
2	75.00	-182.50	17147.6	396403.8	0.043258	Ok
3	75.00	-113.20	40743.5	134077.3	0.303880	Ok
4	75.00	-43.90	64339.3	151973.6	0.423359	Ok
5	75.00	43.90	94234.3	151973.6	0.620070	Ok
6	75.00	113.20	117830.1	134077.3	0.878823	Ok
7	75.00	182.50	141426.0	396403.8	0.356773	Ok
8	-75.00	-305.00	0.0	414334.7	0.000000	Ok
9	-75.00	-182.50	17058.0	396403.8	0.043032	Ok
10	-75.00	-113.20	40653.9	134077.3	0.303213	Ok
11	-75.00	-43.90	64249.8	151973.6	0.422770	Ok
12	-75.00	43.90	94144.7	151973.6	0.619481	Ok
13	-75.00	113.20	117740.6	134077.3	0.878155	Ok
14	-75.00	182.50	141336.5	396403.8	0.356547	Ok

Legenda

F_{v,Ed} forza di taglio agente sul bullone
 F_{v,Rd} resistenza a taglio di progetto del bullone
 F_{t,Ed} forza di trazione agente sul bullone
 F_{t,Rd} resistenza a trazione di progetto del bullone
 $FV_1 = F_{v,Ed} / F_{v,Rd} + F_{t,Ed} / (1.4 \cdot F_{t,Rd})$
 $FV_2 = F_{t,Ed} / F_{t,Rd}$
 VER → FV_i ≤ 1

Verifiche sulle saldature profilo-flangia (versione beta)

Si considera la sezione di gola (avente altezza $a = s_c / 2^{0.5} = 14.142$) in posizione ribaltata: vengono considerate positive le tensioni normali di trazione e le tensioni tangenziali agenti verso destra e verso il basso. Tutte le tensioni sono espresse in N/mm².

Verifica formula (4.2.84) (Nodo n. 1277, CMB n. 19)

Cordoni	n _⊥	t _⊥	τ	FV ₁	VER ₁
Nervatura inferiore lato destro	-159.24	0.00	11.95	159.69	Ok
Nervatura inferiore lato sinistro	-159.24	0.00	11.95	159.69	Ok
Ala inferiore esterno	-117.76	0.00	-0.01	117.76	Ok
Ala inferiore interno lato destro	-103.23	0.00	-0.01	103.23	Ok
Ala inferiore interno lato sinistro	-104.09	0.00	-0.01	104.09	Ok
Anima lato destro	-97.09	0.00	11.95	97.82	Ok
Anima lato sinistro	-97.09	0.00	11.95	97.82	Ok
Ala superiore interno lato destro	103.18	0.00	-0.01	103.18	Ok
Ala superiore interno lato sinistro	102.32	0.00	-0.01	102.32	Ok

Verifica formula (4.2.85) (Nodo n. 1277, CMB n. 19)

Cordoni	n _⊥	t _⊥	τ	FV ₂	VER ₂
Nervatura inferiore lato destro	-159.24	0.00	11.95	159.24	Ok
Nervatura inferiore lato sinistro	-159.24	0.00	11.95	159.24	Ok
Ala inferiore esterno	-117.76	0.00	-0.01	117.76	Ok

Ala inferiore interno lato destro	-103.23	0.00	-0.01	103.23	Ok
Ala inferiore interno lato sinistro	-104.09	0.00	-0.01	104.09	Ok
Anima lato destro	-97.09	0.00	11.95	97.09	Ok
Anima lato sinistro	-97.09	0.00	11.95	97.09	Ok
Ala superiore interno lato destro	103.18	0.00	-0.01	103.18	Ok
Ala superiore interno lato sinistro	102.32	0.00	-0.01	102.32	Ok

Legenda

n_{\perp} tensione normale perpendicolare all'asse del cordone

t_{\perp} tensione tangenziale perpendicolare all'asse del cordone

τ_{\parallel} tensione tangenziale parallela all'asse del cordone

$$FV_1 = (n_{\perp}^2 + t_{\perp}^2 + \tau_{\parallel}^2)^{0.5}$$

$$FV_2 = |n_{\perp}| + |t_{\perp}|$$

$$VER_i \rightarrow FV_i \leq \beta_i \cdot f_{yk} \quad (\beta_1 \cdot f_{yk} = 248.50 \text{ N/mm}^2 \quad \beta_2 \cdot f_{yk} = 301.75 \text{ N/mm}^2)$$

Verifica del momento di progetto del giunto (Nodo n. 1277, CMB n. 19)

Momento resistente del giunto $M_{j,Rd} = 848727800.0 \text{ N mm}$

Momento di progetto $M_{j,Ed} = 361375500.0 \text{ N mm}$

$$M_{j,Ed} / M_{j,Rd} = 0.425785 \quad \text{Ok}$$

Trave lato 2-

Tipo di profilo: IPE 500

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Flangia:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Dimensioni (B x H x Sp): 250.0 x 600.0 x 40.0 mm

Bullonature:

Viti cl. 10.9 Dadi 10 o 12 ($f_{yb} = 900 \text{ N/mm}^2$, $f_{tb} = 1000 \text{ N/mm}^2$)

Diametro gambo $\varnothing = 30 \text{ mm}$ $A_{res} = 579.6 \text{ mm}^2$ (ridotta per filettatura)

Diametro dado/testa $d_m = 46 \text{ mm}$

Diametro foro $\varnothing_0 = 31.5 \text{ mm}$

Saldature:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\beta_1 = 0.70$ $\beta_2 = 0.85$

Spessore cordoni d'angolo $s_c = 20 \text{ mm}$

Sollecitazioni nella sezione d'attacco dell'elemento:

Nodo.CMB	V2 [N]	V3 [N]	N [N]	M2 [N mm]	M3 [N mm]	T [N mm]
1216.1	36427.6	-1.6	1334.4	-4690.0	-64369420.0	-33111.0
1216.2	34054.1	-1.6	859.4	-6093.0	-58071600.0	-33219.0
1216.3	75558.6	-2.0	-6077.2	-13225.0	-138229600.0	-68200.0
1216.4	73185.2	-2.0	-6552.9	-14635.0	-131931700.0	-68308.0
1216.5	28019.5	-1.2	1129.1	-3863.0	-49548120.0	-25467.0
1216.6	25646.1	-1.2	654.1	-5266.0	-43250250.0	-25575.0
1216.7	67150.6	-1.6	-6282.7	-12400.0	-123388200.0	-60555.0
1216.8	64777.2	-1.6	-6758.4	-13810.0	-117090400.0	-60663.0
1216.9	31680.7	-1.6	384.1	-7500.0	-51773720.0	-33328.0
1216.10	63819.3	-1.9	-3853.5	-10662.0	-116075500.0	-57673.0
1216.11	59072.5	-1.9	-4804.9	-13482.0	-103479800.0	-57889.0
1216.12	23272.7	-1.2	178.6	-6675.0	-36952380.0	-25683.0
1216.13	55411.3	-1.5	-4058.9	-9836.0	-101234200.0	-50028.0
1216.14	50664.4	-1.5	-5010.3	-12656.0	-88638480.0	-50245.0
1216.15	61445.9	-1.9	-4329.1	-12072.0	-109777600.0	-57781.0
1216.16	53037.9	-1.5	-4534.6	-11246.0	-94936300.0	-50137.0
1216.17	37491.3	-1.5	1408.4	-4189.0	-67170660.0	-33067.0
1216.18	35117.9	-1.6	933.6	-5591.0	-60872780.0	-33175.0
1216.19	76622.4	-2.0	-6002.8	-12721.0	-140990800.0	-68156.0

1216.20	74249.0	-2.0	-6478.5	-14131.0	-134692900.0	-68264.0
1216.21	29083.3	-1.2	1203.1	-3361.0	-52349310.0	-25422.0
1216.22	26709.8	-1.2	728.3	-4765.0	-46051490.0	-25530.0
1216.23	68214.3	-1.6	-6208.3	-11896.0	-126149400.0	-60511.0
1216.24	65840.9	-1.6	-6684.0	-13306.0	-119851600.0	-60619.0
1216.25	32744.4	-1.6	458.4	-6997.0	-54574960.0	-33283.0
1216.26	64883.1	-1.8	-3779.2	-10159.0	-118836700.0	-57629.0
1216.27	60136.2	-1.9	-4730.4	-12978.0	-106241000.0	-57845.0
1216.28	24336.4	-1.2	253.0	-6171.0	-39753610.0	-25638.0
1216.29	56475.0	-1.5	-3984.5	-9333.0	-103995400.0	-49984.0
1216.30	51728.2	-1.5	-4935.9	-12152.0	-91399670.0	-50200.0
1216.31	38200.5	-1.5	1457.8	-3854.0	-69041440.0	-33038.0
1216.32	35827.0	-1.5	982.9	-5257.0	-62743620.0	-33146.0
1216.33	65592.2	-1.8	-3729.8	-9824.0	-120677600.0	-57600.0
1216.34	63218.8	-1.8	-4205.1	-11231.0	-114379700.0	-57708.0
1216.35	29792.4	-1.2	1252.6	-3026.0	-54220150.0	-25393.0
1216.36	27419.0	-1.2	777.7	-4430.0	-47922280.0	-25501.0
1216.37	57184.2	-1.5	-3935.0	-8997.0	-105836200.0	-49955.0
1216.38	54810.8	-1.5	-4410.6	-10406.0	-99538330.0	-50063.0
1216.39	62509.6	-1.8	-4254.7	-11567.0	-112538900.0	-57737.0
1216.40	54101.6	-1.5	-4460.2	-10742.0	-97697540.0	-50092.0
1216.41	36002.1	-1.6	1304.7	-4890.0	-63244940.0	-33129.0
1216.42	33628.6	-1.6	829.7	-6294.0	-56947110.0	-33237.0
1216.43	75133.2	-2.0	-6107.0	-13427.0	-137045000.0	-68217.0
1216.44	72759.7	-2.0	-6582.7	-14837.0	-130747200.0	-68326.0
1216.45	27594.0	-1.2	1099.5	-4063.0	-48423640.0	-25484.0
1216.46	25220.6	-1.2	624.4	-5467.0	-42125760.0	-25592.0
1216.47	66725.1	-1.6	-6312.5	-12601.0	-122203700.0	-60573.0
1216.48	64351.7	-1.6	-6788.2	-14011.0	-115905900.0	-60681.0
1216.49	31255.2	-1.6	354.3	-7702.0	-50649240.0	-33345.0
1216.50	63393.8	-1.9	-3883.2	-10863.0	-114891000.0	-57691.0
1216.51	58647.0	-1.9	-4834.6	-13683.0	-102295300.0	-57907.0
1216.52	22847.2	-1.2	148.8	-6876.0	-35827890.0	-25700.0
1216.53	54985.8	-1.5	-4088.6	-10038.0	-100049700.0	-50046.0
1216.54	50238.9	-1.5	-5040.1	-12858.0	-87453990.0	-50262.0
1216.55	61020.4	-1.9	-4358.9	-12273.0	-108593200.0	-57799.0
1216.56	52612.4	-1.5	-4564.4	-11448.0	-93751820.0	-50154.0
1216.57	35718.4	-1.6	1285.0	-5024.0	-62498630.0	-33141.0
1216.58	33345.0	-1.6	810.0	-6428.0	-56200760.0	-33249.0
1216.59	63110.2	-1.9	-3903.0	-10998.0	-114134700.0	-57703.0
1216.60	60736.7	-1.9	-4378.7	-12408.0	-107836900.0	-57811.0
1216.61	27310.4	-1.2	1079.7	-4197.0	-47677280.0	-25496.0
1216.62	24936.9	-1.2	604.6	-5602.0	-41379460.0	-25604.0
1216.63	54702.1	-1.5	-4108.5	-10172.0	-99293380.0	-50058.0
1216.64	52328.7	-1.5	-4584.2	-11582.0	-92995510.0	-50166.0
1216.108	39114.7	25.2	16160.5	-34381.0	-36158400.0	-24033.0
1216.109	49129.0	23.5	14261.5	-36862.0	-53196160.0	-43678.0
1216.110	34627.2	-17.9	9818.8	10420.0	-29961320.0	-31062.0
1216.111	44641.8	-19.6	7794.3	7949.0	-46998930.0	-50707.0
1216.112	42704.8	14.3	-12254.7	-14818.0	-111070000.0	-28301.0
1216.113	52719.0	12.3	-14136.3	-16564.0	-128097800.0	-47946.0
1216.114	38216.4	-30.7	-18741.5	35852.0	-104943400.0	-35331.0
1216.115	48231.0	-32.8	-20700.5	34282.0	-121971000.0	-54975.0
1216.116	39141.5	7.8	16684.0	12777.0	-36644830.0	-24455.0
1216.117	49155.8	6.0	14780.7	10379.0	-53672590.0	-44099.0
1216.118	34600.6	-0.6	9212.4	-36540.0	-29484800.0	-30641.0
1216.119	44615.1	-2.3	7187.7	-39017.0	-46522450.0	-50286.0
1216.120	42731.3	-3.1	-11779.3	32354.0	-111556600.0	-28722.0
1216.121	52745.7	-5.1	-13660.0	30630.0	-128584300.0	-48367.0
1216.122	38189.9	-13.4	-19229.7	-11204.0	-104456800.0	-34910.0

1216.123	48204.5	-15.5	-21183.9	-12719.0	-121484400.0	-54554.0
1216.124	39138.2	26.2	16196.9	-35978.0	-36446500.0	-23846.0
1216.125	49152.5	24.4	14295.6	-38436.0	-53484260.0	-43491.0
1216.126	34650.0	-17.2	9950.8	9427.0	-30239780.0	-30875.0
1216.127	44665.3	-18.9	7989.1	7067.0	-47277030.0	-50520.0
1216.128	42679.8	10.9	-12573.2	-6535.0	-110782700.0	-28488.0
1216.129	52694.4	8.9	-14501.7	-8195.0	-127810300.0	-48133.0
1216.130	38192.8	-34.3	-19020.3	44707.0	-104655300.0	-35518.0
1216.131	48207.5	-36.3	-20992.8	42941.0	-121682900.0	-55163.0
1216.132	39165.0	8.7	16712.2	11528.0	-36922930.0	-24268.0
1216.133	49179.5	6.9	14786.8	8993.0	-53960580.0	-43912.0
1216.134	34624.4	0.0	9403.4	-37231.0	-29772740.0	-30453.0
1216.135	44639.1	-1.7	7396.4	-39746.0	-46810290.0	-50098.0
1216.136	42707.1	-6.5	-12067.7	40831.0	-111268800.0	-28909.0
1216.137	52721.4	-8.5	-13969.7	39007.0	-128296600.0	-48554.0
1216.138	38165.7	-17.2	-19544.7	-1898.0	-104169100.0	-35096.0
1216.139	48180.6	-19.0	-21488.6	-3947.0	-121196500.0	-54741.0
1216.140	45609.3	72.4	13092.2	-82027.0	-69638890.0	-17326.0
1216.141	55623.8	70.7	11212.7	-84601.0	-86626540.0	-36970.0
1216.142	30648.5	-73.1	-8399.5	73325.0	-48956540.0	-40757.0
1216.143	40663.0	-75.1	-10387.6	71677.0	-65994190.0	-60402.0
1216.144	46686.2	69.6	4580.9	-77567.0	-92153440.0	-18605.0
1216.145	56700.7	67.9	2702.4	-80236.0	-109181100.0	-38250.0
1216.146	31725.4	-77.8	-16946.9	83504.0	-71441090.0	-42038.0
1216.147	41740.0	-79.9	-18933.6	81866.0	-88458690.0	-61682.0
1216.148	45616.5	72.7	13121.0	-82445.0	-69725240.0	-17270.0
1216.149	55630.9	71.0	11241.2	-85057.0	-86722950.0	-36914.0
1216.150	30655.4	-72.0	-8333.2	70723.0	-49043040.0	-40701.0
1216.151	40670.0	-74.1	-10320.5	69060.0	-66080640.0	-60346.0
1216.152	46679.0	69.2	4529.7	-76917.0	-92057090.0	-18661.0
1216.153	56693.6	67.5	2653.7	-79562.0	-109084700.0	-38306.0
1216.154	31718.4	-78.9	-17019.1	86107.0	-71354630.0	-42094.0
1216.155	41733.0	-80.9	-19005.8	84470.0	-88362240.0	-61739.0
1216.156	45697.4	15.3	14682.6	73468.0	-71224270.0	-18732.0
1216.157	55712.0	13.5	12808.9	70953.0	-88281870.0	-38376.0
1216.158	30560.4	-15.5	-10275.0	-82873.0	-47371160.0	-39353.0
1216.159	40575.0	-17.5	-12264.7	-84567.0	-64408760.0	-58997.0
1216.160	46774.6	12.6	6139.4	77463.0	-93708660.0	-20012.0
1216.161	56789.1	10.9	4266.8	74855.0	-110736300.0	-39656.0
1216.162	31637.5	-20.3	-18749.5	-72572.0	-69855610.0	-40633.0
1216.163	41652.1	-22.3	-20739.8	-74260.0	-86903220.0	-60278.0
1216.164	45704.5	15.5	14724.3	73154.0	-71310670.0	-18676.0
1216.165	55719.1	13.8	12850.5	70624.0	-88378270.0	-38320.0
1216.166	30567.4	-14.5	-10231.4	-85530.0	-47457610.0	-39296.0
1216.167	40582.0	-16.5	-12221.1	-87224.0	-64495220.0	-58941.0
1216.168	46767.5	12.2	6079.6	78089.0	-93612260.0	-20067.0
1216.169	56782.0	10.5	4206.8	75484.0	-110639900.0	-39712.0
1216.170	31630.5	-21.3	-18802.9	-69966.0	-69769150.0	-40689.0
1216.171	41645.0	-23.4	-20791.3	-71635.0	-86806810.0	-60334.0
1216.268	28688.3	24.4	8543.2	-27332.0	-42519380.0	-2608.0
1216.269	62069.9	18.6	2255.9	-35807.0	-99261590.0	-68090.0
1216.270	24200.2	-18.5	2220.4	16876.0	-36322600.0	-9637.0
1216.271	57582.0	-24.9	-4434.8	10553.0	-93134720.0	-75120.0
1216.272	29765.2	21.8	22.6	-23581.0	-65003920.0	-3888.0
1216.273	63146.3	15.5	-6284.4	-30548.0	-121816400.0	-69370.0
1216.274	25276.7	-22.8	-6362.6	25922.0	-58797350.0	-10918.0
1216.275	58658.7	-29.7	-12981.7	20572.0	-115589400.0	-76400.0
1216.276	28714.7	7.2	9033.9	19429.0	-42996000.0	-3030.0
1216.277	62096.1	1.3	2740.0	11191.0	-99748330.0	-68512.0
1216.278	24173.4	-1.2	1630.1	-29869.0	-35846170.0	-9216.0

1216.279	57555.2	-7.6	-5014.4	-36480.0	-92648300.0	-74698.0
1216.280	29791.8	4.6	499.9	23060.0	-65480460.0	-4310.0
1216.281	63173.3	-1.6	-5788.6	16202.0	-122302700.0	-69792.0
1216.282	25250.5	-5.5	-6857.8	-20911.0	-58320620.0	-10497.0
1216.283	58632.4	-12.3	-13479.4	-26383.0	-115102700.0	-75979.0
1216.284	28695.5	24.7	8571.5	-27862.0	-42605730.0	-2552.0
1216.285	62077.0	18.9	2277.0	-36350.0	-99358000.0	-68034.0
1216.286	24207.1	-18.2	2301.6	16441.0	-36399100.0	-9581.0
1216.287	57588.9	-24.3	-4367.6	9084.0	-93231220.0	-75063.0
1216.288	29758.2	21.0	-34.7	-21582.0	-64917470.0	-3944.0
1216.289	63139.2	14.5	-6397.5	-28041.0	-121720000.0	-69427.0
1216.290	25269.7	-23.8	-6445.4	28506.0	-58710900.0	-10974.0
1216.291	58651.7	-30.6	-13060.3	23056.0	-115492900.0	-76456.0
1216.292	28722.0	7.5	9072.5	19000.0	-43082310.0	-2974.0
1216.293	62103.4	1.6	2740.5	10705.0	-99844630.0	-68456.0
1216.294	24180.4	-0.9	1698.4	-30489.0	-35922630.0	-9160.0
1216.295	57562.2	-7.0	-4954.5	-37773.0	-92744740.0	-74642.0
1216.296	29784.7	3.8	433.9	25137.0	-65394050.0	-4366.0
1216.297	63166.2	-2.7	-5868.3	18768.0	-122206300.0	-69848.0
1216.298	25243.5	-6.5	-6930.4	-18383.0	-58234170.0	-10553.0
1216.299	58625.3	-13.3	-13551.9	-23965.0	-115006300.0	-76035.0
1237.1	65088.1	-13.2	6938.1	21723.0	-135532900.0	45733.0
1237.2	65287.9	-14.2	7595.5	22676.0	-134931700.0	48559.0
1237.3	129500.0	-23.8	6360.8	36839.0	-274208300.0	86596.0
1237.4	129700.0	-24.8	7018.2	37778.0	-273606900.0	89422.0
1237.5	50073.8	-10.1	5684.2	16279.0	-104237600.0	35193.0
1237.6	50273.6	-11.1	6341.6	17232.0	-103736400.0	38019.0
1237.7	114500.0	-20.6	5107.0	31391.0	-242905700.0	76055.0
1237.8	114700.0	-21.6	5764.3	32330.0	-242404400.0	78882.0
1237.9	65487.7	-15.2	8252.8	23622.0	-134430500.0	51385.0
1237.10	110200.0	-20.6	6534.0	32309.0	-232583700.0	74337.0
1237.11	110600.0	-22.6	7848.7	34187.0	-231481100.0	79989.0
1237.12	50473.4	-12.0	6998.9	18175.0	-103235200.0	40845.0
1237.13	95185.1	-17.5	5280.2	26863.0	-201288800.0	63797.0
1237.14	95584.7	-19.4	6594.8	28740.0	-200286400.0	69449.0
1237.15	110400.0	-21.6	7191.4	33249.0	-232082400.0	77163.0
1237.16	95384.9	-18.5	5937.5	27801.0	-200787600.0	66623.0
1237.17	64996.9	-12.7	6593.4	21081.0	-135679100.0	44459.0
1237.18	65196.7	-13.7	7250.8	22037.0	-135177900.0	47285.0
1237.19	129400.0	-23.3	6016.1	36204.0	-274358900.0	85321.0
1237.20	129600.0	-24.3	6673.5	37143.0	-273857600.0	88148.0
1237.21	49982.7	-9.6	5339.5	15639.0	-104483800.0	33918.0
1237.22	50182.5	-10.6	5996.9	16593.0	-103982600.0	36745.0
1237.23	114400.0	-20.1	4762.3	30757.0	-243156400.0	74781.0
1237.24	114600.0	-21.1	5419.6	31695.0	-242655100.0	77607.0
1237.25	65396.5	-14.7	7908.1	22986.0	-134676700.0	50111.0
1237.26	110100.0	-20.1	6189.3	31672.0	-232734400.0	73063.0
1237.27	110500.0	-22.1	7504.0	33553.0	-231731700.0	78715.0
1237.28	50382.3	-11.5	6654.3	17540.0	-103481400.0	39571.0
1237.29	95093.9	-17.0	4935.5	26228.0	-201534900.0	62522.0
1237.30	95493.5	-18.9	6250.2	28106.0	-200532500.0	68175.0
1237.31	64936.1	-12.4	6363.5	20656.0	-135909900.0	43609.0
1237.32	65135.9	-13.4	7021.0	21610.0	-135308700.0	46435.0
1237.33	110000.0	-19.8	5959.5	31247.0	-232985000.0	72213.0
1237.34	110200.0	-20.8	6616.9	32192.0	-232383700.0	75039.0
1237.35	49921.9	-9.2	5109.5	15216.0	-104614600.0	33069.0
1237.36	50121.7	-10.2	5767.1	16166.0	-104113400.0	35895.0
1237.37	95033.2	-16.6	4705.7	25803.0	-201665700.0	61673.0
1237.38	95233.0	-17.6	5363.0	26745.0	-201164500.0	64499.0
1237.39	110300.0	-21.1	6846.7	32615.0	-232233100.0	75889.0

1237.40	95293.7	-18.0	5592.8	27168.0	-201033700.0	65348.0
1237.41	65124.5	-13.4	7075.9	21979.0	-135414400.0	46243.0
1237.42	65324.3	-14.4	7733.3	22932.0	-134913200.0	49069.0
1237.43	129600.0	-24.0	6498.7	37093.0	-274057600.0	87106.0
1237.44	129800.0	-25.0	7156.0	38031.0	-273556300.0	89932.0
1237.45	50110.3	-10.3	5822.1	16535.0	-104219100.0	35702.0
1237.46	50310.1	-11.3	6479.5	17487.0	-103617900.0	38529.0
1237.47	114600.0	-20.8	5244.8	31645.0	-242855100.0	76565.0
1237.48	114800.0	-21.8	5902.2	32583.0	-242253800.0	79391.0
1237.49	65524.1	-15.4	8390.7	23876.0	-134412000.0	51895.0
1237.50	110200.0	-20.8	6671.9	32564.0	-232483700.0	74847.0
1237.51	110600.0	-22.8	7986.6	34441.0	-231481100.0	80499.0
1237.52	50509.9	-12.2	7136.8	18428.0	-103116700.0	41355.0
1237.53	95221.5	-17.7	5418.0	27117.0	-201270300.0	64306.0
1237.54	95621.1	-19.6	6732.7	28994.0	-200167900.0	69959.0
1237.55	110400.0	-21.8	7329.2	33503.0	-231982400.0	77673.0
1237.56	95421.3	-18.7	6075.4	28055.0	-200769100.0	67133.0
1237.57	65148.8	-13.5	7167.9	22150.0	-135402100.0	46583.0
1237.58	65348.6	-14.5	7825.2	23102.0	-134800900.0	49409.0
1237.59	110300.0	-20.9	6763.8	32733.0	-232433100.0	75187.0
1237.60	110500.0	-21.9	7421.1	33672.0	-231831700.0	78013.0
1237.61	50134.6	-10.4	5914.0	16706.0	-104106800.0	36042.0
1237.62	50334.4	-11.4	6571.4	17657.0	-103605600.0	38869.0
1237.63	95245.8	-17.8	5509.9	27286.0	-201158000.0	64646.0
1237.64	95445.6	-18.8	6167.3	28224.0	-200656800.0	67472.0
1237.108	78506.4	-7.4	3578.7	33309.0	-202836500.0	62765.0
1237.109	96273.1	-9.8	8269.5	36446.0	-235337700.0	87655.0
1237.110	92137.6	-46.7	36264.2	78431.0	-228332300.0	72145.0
1237.111	109900.0	-48.9	40820.3	80967.0	-260835600.0	97035.0
1237.112	41793.1	20.6	-31172.2	-36805.0	-58581790.0	6026.0
1237.113	59559.6	18.3	-26446.4	-33869.0	-91133060.0	30916.0
1237.114	55421.0	-17.4	1390.4	5030.0	-84029260.0	15403.0
1237.115	73187.6	-19.8	5999.9	8126.0	-116630500.0	40293.0
1237.116	77411.3	-20.5	259.7	70540.0	-198991200.0	62975.0
1237.117	95178.1	-22.9	4953.2	73711.0	-231592300.0	87866.0
1237.118	93232.8	-33.4	39496.7	40644.0	-232177600.0	71934.0
1237.119	111000.0	-35.5	44057.5	43177.0	-264678500.0	96824.0
1237.120	40698.2	7.4	-34508.4	468.0	-54746360.0	6237.0
1237.121	58464.7	5.1	-29797.8	3444.0	-87287630.0	31127.0
1237.122	56516.1	-4.1	4721.9	-32637.0	-87874590.0	15192.0
1237.123	74282.8	-6.5	9329.7	-29502.0	-120475800.0	40082.0
1237.124	78395.9	16.9	1943.2	16326.0	-202392500.0	62633.0
1237.125	96162.7	14.5	6638.9	19477.0	-234993600.0	87524.0
1237.126	92026.9	-22.5	34807.4	61405.0	-227888400.0	72014.0
1237.127	109800.0	-24.9	39352.9	64613.0	-260386300.0	96904.0
1237.128	41902.7	-2.8	-29753.0	-22113.0	-59006280.0	6158.0
1237.129	59669.3	-5.1	-25113.9	-19208.0	-91577500.0	31048.0
1237.130	55531.4	-41.0	2714.9	20248.0	-84473340.0	15534.0
1237.131	73297.8	-43.2	7310.1	22933.0	-117074700.0	40424.0
1237.132	77301.4	3.6	-1382.7	53882.0	-198546800.0	62845.0
1237.133	95068.0	1.2	3269.3	57088.0	-231148000.0	87735.0
1237.134	93122.8	-9.5	37999.7	24320.0	-231733300.0	71803.0
1237.135	110900.0	-11.7	42552.9	27159.0	-264229200.0	96693.0
1237.136	40808.3	-16.1	-33136.6	15554.0	-55180590.0	6369.0
1237.137	58574.7	-18.3	-28447.6	18367.0	-87731910.0	31259.0
1237.138	56627.3	-27.8	6066.1	-17242.0	-88318270.0	15325.0
1237.139	74393.3	-29.9	10672.8	-14708.0	-120819800.0	40214.0
1237.140	49756.1	47.4	-47486.0	-41294.0	-122598500.0	31963.0
1237.141	67522.6	45.0	-42782.7	-38268.0	-155199800.0	56854.0
1237.142	95187.3	-81.8	61216.2	104285.0	-207487600.0	63225.0

1237.143	113000.0	-84.1	65806.4	107004.0	-240065500.0	88115.0
1237.144	38742.8	55.5	-57868.1	-61624.0	-79366770.0	14943.0
1237.145	56509.4	53.1	-53164.9	-58565.0	-111878000.0	39833.0
1237.146	84172.4	-72.9	50741.3	81792.0	-164266700.0	46202.0
1237.147	101900.0	-75.1	55331.0	84520.0	-196787600.0	71093.0
1237.148	49722.8	54.7	-47967.5	-46448.0	-122515400.0	31924.0
1237.149	67489.4	52.3	-43264.6	-43408.0	-155016600.0	56814.0
1237.150	95154.3	-74.8	60810.9	99744.0	-207404400.0	63186.0
1237.151	112900.0	-77.0	65406.2	102451.0	-239916100.0	88076.0
1237.152	38776.1	48.2	-57410.8	-56481.0	-79499900.0	14983.0
1237.153	56542.7	45.8	-52706.9	-53388.0	-112061100.0	39873.0
1237.154	84205.4	-79.9	51140.1	86321.0	-164350000.0	46242.0
1237.155	102000.0	-82.2	55729.7	89050.0	-196937000.0	71132.0
1237.156	46103.5	4.4	-58570.2	80990.0	-109848600.0	32664.0
1237.157	63870.1	2.0	-53867.0	84123.0	-142349800.0	57554.0
1237.158	98839.1	-37.5	72049.1	-21314.0	-220338000.0	62522.0
1237.159	116600.0	-39.7	76641.6	-18667.0	-252842100.0	87412.0
1237.160	35090.6	12.2	-69014.0	61193.0	-66566610.0	15643.0
1237.161	52857.3	9.8	-64310.5	64356.0	-99127780.0	40534.0
1237.162	87824.1	-28.5	61636.2	-43767.0	-177017100.0	45499.0
1237.163	105600.0	-30.7	66228.4	-41117.0	-209613600.0	70390.0
1237.164	46070.1	11.7	-59028.3	75667.0	-109665500.0	32624.0
1237.165	63836.8	9.3	-54325.3	78806.0	-142266700.0	57514.0
1237.166	98806.0	-30.4	71617.0	-25840.0	-220154800.0	62483.0
1237.167	116600.0	-32.6	76209.4	-23194.0	-252742100.0	87373.0
1237.168	35124.1	4.9	-68576.6	66519.0	-66699640.0	15683.0
1237.169	52890.7	2.5	-63873.1	69683.0	-99210860.0	40574.0
1237.170	87857.1	-35.5	62063.2	-39341.0	-177200400.0	45539.0
1237.171	105600.0	-37.7	66658.7	-36672.0	-209713600.0	70429.0
1237.268	44929.4	4.8	-13953.3	6056.0	-114343300.0	13867.0
1237.269	104200.0	-3.1	1699.4	16368.0	-222822700.0	96835.0
1237.270	58559.5	-34.4	18782.4	50807.0	-139839600.0	23247.0
1237.271	117800.0	-41.8	34062.6	59862.0	-248334300.0	106214.0
1237.272	33915.9	13.0	-24343.6	-14351.0	-71091590.0	-3154.0
1237.273	93137.3	5.4	-8673.9	-4859.0	-179626000.0	79814.0
1237.274	47544.3	-25.4	8315.0	28251.0	-96518820.0	6224.0
1237.275	106800.0	-32.8	23616.8	37336.0	-205005800.0	89191.0
1237.276	43833.6	-8.1	-17266.5	42787.0	-110498300.0	14077.0
1237.277	103100.0	-16.1	-1604.6	53301.0	-218979900.0	97046.0
1237.278	59655.0	-21.0	22034.3	13053.0	-143684700.0	23036.0
1237.279	118900.0	-28.4	37337.5	22128.0	-252177200.0	106003.0
1237.280	32820.5	-0.1	-27685.5	22740.0	-67256420.0	-2943.0
1237.281	92041.8	-7.7	-12041.4	32285.0	-175780800.0	80024.0
1237.282	48639.7	-12.1	11611.6	-9357.0	-100364000.0	6013.0
1237.283	107900.0	-19.5	26921.4	-244.0	-208848700.0	88980.0
1237.284	44896.1	12.1	-14436.6	948.0	-114260100.0	13827.0
1237.285	104100.0	4.2	1219.6	11250.0	-222773300.0	96796.0
1237.286	58526.2	-27.1	18386.6	45620.0	-139656500.0	23207.0
1237.287	117700.0	-34.6	33660.1	54965.0	-248284900.0	106174.0
1237.288	33949.2	5.8	-23915.1	-9434.0	-71224730.0	-3114.0
1237.289	93170.2	-1.6	-8308.2	-399.0	-179709300.0	79853.0
1237.290	47577.3	-32.4	8704.8	32796.0	-96702100.0	6263.0
1237.291	106800.0	-39.9	24007.8	41922.0	-205205800.0	89230.0
1237.292	43800.6	-0.9	-17746.4	37809.0	-110415000.0	14038.0
1237.293	103000.0	-8.8	-2119.5	48294.0	-218930500.0	97006.0
1237.294	59621.7	-13.7	21620.8	7921.0	-143501600.0	22996.0
1237.295	118800.0	-21.2	36918.1	17192.0	-252027800.0	105963.0
1237.296	32853.6	-7.3	-27268.7	27544.0	-67379650.0	-2904.0
1237.297	92074.9	-14.8	-11635.9	36882.0	-175864100.0	80063.0
1237.298	48672.7	-19.1	12018.2	-4805.0	-100547300.0	6052.0

1237.299	107900.0	-26.5	27333.4	4203.0	-209048700.0	89019.0
1277.1	98081.5	3.1	-6172.1	-8164.0	-172421700.0	-119877.0
1277.2	97884.0	2.4	-7966.9	-6941.0	-169821700.0	-126273.0
1277.3	197300.0	0.9	-22057.7	-4123.0	-350567600.0	-235088.0
1277.4	197100.0	0.2	-23853.6	-2918.0	-347968900.0	-241485.0
1277.5	75449.3	2.2	-4896.4	-5970.0	-132684900.0	-92220.0
1277.6	75251.8	1.5	-6691.1	-4747.0	-130085000.0	-98617.0
1277.7	174600.0	-0.1	-20782.2	-1934.0	-310865100.0	-207432.0
1277.8	174400.0	-0.8	-22578.1	-730.0	-308266400.0	-213828.0
1277.9	97686.4	1.7	-9762.2	-5726.0	-167221800.0	-132670.0
1277.10	167500.0	1.6	-17291.6	-5329.0	-297161200.0	-200525.0
1277.11	167100.0	0.1	-20883.3	-2917.0	-291963800.0	-213318.0
1277.12	75054.3	0.7	-8486.7	-3537.0	-127485000.0	-105014.0
1277.13	144900.0	0.6	-16016.0	-3139.0	-257408100.0	-172868.0
1277.14	144500.0	-0.8	-19607.8	-728.0	-252210800.0	-185662.0
1277.15	167300.0	0.8	-19087.4	-4122.0	-294562600.0	-206921.0
1277.16	144700.0	-0.1	-17812.0	-1934.0	-254809500.0	-179265.0
1277.17	98166.7	3.3	-5595.0	-8401.0	-173578600.0	-117010.0
1277.18	97969.2	2.6	-7389.5	-7175.0	-170978600.0	-123407.0
1277.19	197400.0	1.0	-21480.0	-4352.0	-351716900.0	-232221.0
1277.20	197200.0	0.3	-23275.8	-3146.0	-349118200.0	-238618.0
1277.21	75534.6	2.3	-4319.1	-6206.0	-133741700.0	-89353.0
1277.22	75337.1	1.6	-6113.8	-4982.0	-131241800.0	-95750.0
1277.23	174700.0	0.1	-20204.5	-2163.0	-312014500.0	-204565.0
1277.24	174500.0	-0.6	-22000.4	-958.0	-309415700.0	-210962.0
1277.25	97771.7	1.9	-9184.6	-5957.0	-168378600.0	-129803.0
1277.26	167600.0	1.7	-16714.1	-5561.0	-298210600.0	-197658.0
1277.27	167200.0	0.3	-20305.6	-3146.0	-293113200.0	-210451.0
1277.28	75139.5	0.9	-7909.0	-3766.0	-128641800.0	-102147.0
1277.29	145000.0	0.8	-15438.4	-3369.0	-258457500.0	-170001.0
1277.30	144600.0	-0.7	-19030.1	-957.0	-253360100.0	-182795.0
1277.31	98223.6	3.4	-5210.0	-8557.0	-174249700.0	-115099.0
1277.32	98026.0	2.7	-7004.7	-7332.0	-171649800.0	-121495.0
1277.33	167700.0	1.8	-16329.1	-5717.0	-298959900.0	-195747.0
1277.34	167500.0	1.1	-18124.5	-4503.0	-296361200.0	-202143.0
1277.35	75591.4	2.4	-3934.0	-6357.0	-134512900.0	-87442.0
1277.36	75393.9	1.7	-5728.9	-5139.0	-131913000.0	-93839.0
1277.37	145000.0	0.9	-15053.4	-3524.0	-259257500.0	-168090.0
1277.38	144800.0	0.2	-16849.0	-2314.0	-256658800.0	-174487.0
1277.39	167400.0	1.0	-18509.7	-4350.0	-295711900.0	-204055.0
1277.40	144800.0	0.1	-17234.2	-2161.0	-255858800.0	-176398.0
1277.41	98047.4	3.1	-6403.0	-8069.0	-171939000.0	-121023.0
1277.42	97849.9	2.3	-8197.8	-6847.0	-169339000.0	-127420.0
1277.43	197200.0	0.8	-22288.8	-4032.0	-350118200.0	-236235.0
1277.44	197000.0	0.1	-24084.7	-2826.0	-347519500.0	-242632.0
1277.45	75415.2	2.1	-5127.2	-5876.0	-132202200.0	-93367.0
1277.46	75217.7	1.4	-6922.1	-4654.0	-129602200.0	-99764.0
1277.47	174600.0	-0.1	-21013.3	-1843.0	-310365100.0	-208578.0
1277.48	174400.0	-0.8	-22809.2	-638.0	-307766400.0	-214975.0
1277.49	97652.3	1.6	-9993.3	-5635.0	-166739100.0	-133817.0
1277.50	167500.0	1.5	-17522.7	-5237.0	-296661200.0	-201671.0
1277.51	167100.0	0.1	-21114.4	-2826.0	-291463800.0	-214465.0
1277.52	75020.2	0.7	-8717.8	-3446.0	-127002300.0	-106160.0
1277.53	144800.0	0.5	-16247.1	-3047.0	-256958800.0	-174015.0
1277.54	144400.0	-0.9	-19838.9	-637.0	-251761400.0	-186808.0
1277.55	167300.0	0.8	-19318.5	-4030.0	-294062600.0	-208068.0
1277.56	144600.0	-0.2	-18043.0	-1842.0	-254360100.0	-180412.0
1277.57	98024.6	3.0	-6556.9	-8006.0	-171650500.0	-121788.0
1277.58	97827.1	2.3	-8351.8	-6785.0	-169050600.0	-128185.0
1277.59	167500.0	1.5	-17676.7	-5175.0	-296361200.0	-202436.0

1277.60	167300.0	0.7	-19472.6	-3970.0	-293762600.0	-208833.0
1277.61	75392.5	2.1	-5281.2	-5813.0	-131913700.0	-94132.0
1277.62	75195.0	1.4	-7076.1	-4592.0	-129313700.0	-100528.0
1277.63	144800.0	0.5	-16401.2	-2986.0	-256658800.0	-174780.0
1277.64	144600.0	-0.2	-18197.1	-1781.0	-254060100.0	-181176.0
1277.108	95113.3	98.6	23422.4	-225479.0	-140025100.0	-97624.0
1277.109	112000.0	91.1	18179.6	-211389.0	-168972000.0	-122759.0
1277.110	87282.5	11.4	-22730.2	-61560.0	-122691400.0	-107747.0
1277.111	104200.0	4.3	-28070.5	-48547.0	-151622700.0	-132882.0
1277.112	126000.0	10.5	5180.6	7726.0	-256181000.0	-143718.0
1277.113	143000.0	4.3	-69.3	18025.0	-285070500.0	-168854.0
1277.114	118200.0	-63.7	-41157.6	137015.0	-238831700.0	-153841.0
1277.115	135100.0	-69.8	-46447.6	147169.0	-267771900.0	-178976.0
1277.116	95428.6	91.8	27400.2	-212234.0	-141565400.0	-97767.0
1277.117	112400.0	84.2	22144.3	-198151.0	-170469400.0	-122903.0
1277.118	86967.4	18.5	-26768.1	-75556.0	-121151000.0	-107604.0
1277.119	103900.0	11.4	-32113.7	-62510.0	-150074700.0	-132738.0
1277.120	126300.0	3.4	9077.8	21480.0	-257729100.0	-143862.0
1277.121	143300.0	-2.7	3845.2	31851.0	-286718600.0	-168997.0
1277.122	117900.0	-56.6	-45062.1	123121.0	-237283600.0	-153698.0
1277.123	134800.0	-62.6	-50342.1	133161.0	-266223800.0	-178832.0
1277.124	95164.2	141.0	25436.5	-332352.0	-140299300.0	-97741.0
1277.125	112100.0	133.4	20183.0	-318232.0	-169321300.0	-122876.0
1277.126	87332.9	54.6	-20711.1	-170738.0	-122965900.0	-107865.0
1277.127	104300.0	47.1	-25927.5	-156557.0	-151972000.0	-132998.0
1277.128	126000.0	-19.9	2772.9	82365.0	-255881000.0	-143605.0
1277.129	142900.0	-26.0	-2479.3	92656.0	-284821200.0	-168739.0
1277.130	118100.0	-94.1	-43396.4	211588.0	-238582400.0	-153725.0
1277.131	135100.0	-100.2	-48683.5	221876.0	-267471900.0	-178859.0
1277.132	95479.7	134.1	29394.8	-318972.0	-141939500.0	-97884.0
1277.133	112400.0	126.5	24136.6	-304839.0	-170869400.0	-123019.0
1277.134	87018.4	61.5	-24603.3	-184047.0	-121425200.0	-107719.0
1277.135	103900.0	54.1	-29913.1	-170397.0	-150374700.0	-132854.0
1277.136	126300.0	-27.1	6772.9	96580.0	-257429100.0	-143747.0
1277.137	143200.0	-33.3	1522.8	106886.0	-286369200.0	-168882.0
1277.138	117800.0	-87.0	-47402.5	197714.0	-236934300.0	-153583.0
1277.139	134800.0	-93.2	-52637.0	208133.0	-265923800.0	-178717.0
1277.140	115100.0	163.2	70602.5	-318329.0	-200901900.0	-101942.0
1277.141	132000.0	155.8	65389.8	-304390.0	-229842000.0	-127077.0
1277.142	88966.8	-110.8	-83720.8	184096.0	-143138300.0	-135687.0
1277.143	105900.0	-116.9	-89036.4	194210.0	-172061600.0	-160822.0
1277.144	124300.0	133.5	65121.5	-239774.0	-235842000.0	-115771.0
1277.145	141300.0	125.9	59911.2	-225401.0	-264731600.0	-140905.0
1277.146	98242.2	-129.3	-89213.2	232718.0	-177940300.0	-149515.0
1277.147	115200.0	-135.3	-94525.7	242829.0	-206851200.0	-174650.0
1277.148	115100.0	176.2	71234.6	-350883.0	-201001900.0	-101976.0
1277.149	132000.0	168.6	66021.8	-336772.0	-229942000.0	-127111.0
1277.150	88982.0	-101.8	-83076.9	161751.0	-143230600.0	-135722.0
1277.151	105900.0	-107.8	-88396.1	171874.0	-172161600.0	-160857.0
1277.152	124300.0	120.9	64466.4	-208015.0	-235742000.0	-115736.0
1277.153	141300.0	113.3	59259.6	-193630.0	-264631600.0	-140871.0
1277.154	98226.9	-138.4	-89861.9	255056.0	-177848100.0	-149480.0
1277.155	115200.0	-144.4	-95174.4	265164.0	-206751200.0	-174615.0
1277.156	116100.0	140.4	83617.8	-273986.0	-206095300.0	-102422.0
1277.157	133100.0	132.9	78414.0	-259950.0	-235084800.0	-127556.0
1277.158	87917.4	-87.6	-96948.3	138754.0	-137869800.0	-135208.0
1277.159	104800.0	-93.6	-102300.0	148776.0	-166818800.0	-160343.0
1277.160	125400.0	109.6	78128.0	-192335.0	-240984900.0	-116250.0
1277.161	142300.0	101.9	72926.6	-177881.0	-269925100.0	-141385.0
1277.162	97192.9	-105.9	-102400.0	186934.0	-172771800.0	-149036.0

1277.163	114100.0	-111.9	-107700.0	196954.0	-201708400.0	-174170.0
1277.164	116100.0	153.7	84254.8	-307360.0	-206295300.0	-102456.0
1277.165	133100.0	146.1	79051.3	-293251.0	-235184800.0	-127591.0
1277.166	87932.7	-78.6	-96322.7	116599.0	-137962100.0	-135243.0
1277.167	104900.0	-84.6	-101600.0	126621.0	-166868100.0	-160378.0
1277.168	125400.0	96.7	77472.1	-160011.0	-240884900.0	-116215.0
1277.169	142300.0	89.1	72270.4	-145560.0	-269825100.0	-141350.0
1277.170	97177.6	-114.8	-103000.0	208954.0	-172679600.0	-149001.0
1277.171	114100.0	-120.9	-108300.0	218999.0	-201608400.0	-174135.0
1277.268	86185.5	71.5	23297.5	-146767.0	-146947100.0	-84432.0
1277.269	142600.0	46.4	5897.2	-99715.0	-243373100.0	-168215.0
1277.270	78354.1	-15.4	-22869.6	16393.0	-129613600.0	-94556.0
1277.271	134800.0	-36.8	-40615.7	53318.0	-226023800.0	-178338.0
1277.272	95461.7	40.9	17814.6	-65907.0	-181748700.0	-98261.0
1277.273	151900.0	19.2	349.2	-27834.0	-278262700.0	-182044.0
1277.274	87629.3	-35.3	-28430.8	68941.0	-164415800.0	-108384.0
1277.275	144100.0	-55.3	-46136.4	102271.0	-260913300.0	-192166.0
1277.276	86500.5	64.7	27215.2	-133753.0	-148487500.0	-84576.0
1277.277	142900.0	39.6	9784.6	-86704.0	-245021200.0	-168359.0
1277.278	78039.1	-8.2	-26898.7	1995.0	-127973200.0	-94413.0
1277.279	134500.0	-29.8	-44645.2	39724.0	-224475700.0	-178195.0
1277.280	95776.7	33.7	21727.9	-51518.0	-183289100.0	-98404.0
1277.281	152200.0	12.1	4325.9	-13741.0	-279810700.0	-182187.0
1277.282	87314.5	-28.2	-32312.1	54941.0	-162875200.0	-108240.0
1277.283	143700.0	-48.2	-50034.4	88235.0	-259316000.0	-192022.0
1277.284	86200.8	84.2	23930.7	-178790.0	-147039300.0	-84466.0
1277.285	142600.0	59.1	6511.6	-131778.0	-243473100.0	-168249.0
1277.286	78369.2	-2.6	-22216.7	-16026.0	-129706000.0	-94591.0
1277.287	134800.0	-25.7	-39979.1	25622.0	-226123800.0	-178373.0
1277.288	95446.4	30.6	17164.0	-40286.0	-181656400.0	-98226.0
1277.289	151900.0	10.0	-345.8	-5265.0	-278162700.0	-182009.0
1277.290	87614.0	-44.4	-29091.9	91383.0	-164323500.0	-108349.0
1277.291	144000.0	-64.6	-46790.1	125184.0	-260864000.0	-192131.0
1277.292	86515.9	77.4	27862.4	-165720.0	-148579700.0	-84610.0
1277.293	142900.0	52.3	10390.7	-118713.0	-245121200.0	-168394.0
1277.294	78054.3	4.4	-26252.6	-29606.0	-128065500.0	-94448.0
1277.295	134500.0	-18.4	-44006.8	11209.0	-224575700.0	-178230.0
1277.296	95761.4	23.6	21072.4	-26545.0	-183196800.0	-98369.0
1277.297	152200.0	2.9	3652.7	8873.0	-279710700.0	-182152.0
1277.298	87299.2	-37.4	-32970.0	77599.0	-162782900.0	-108205.0
1277.299	143700.0	-57.5	-50692.0	111314.0	-259216000.0	-191987.0
1280.1	35154.0	25.3	2341.6	-52609.0	-65274500.0	18403.0
1280.2	32624.9	28.9	1964.2	-60523.0	-59045490.0	20379.0
1280.3	72460.8	51.7	-4447.0	-108767.0	-140298600.0	36649.0
1280.4	69931.7	55.3	-4823.5	-116673.0	-134079600.0	38625.0
1280.5	27042.5	20.0	1916.8	-41774.0	-50232980.0	14155.0
1280.6	24513.4	23.6	1539.4	-49688.0	-44013960.0	16131.0
1280.7	64349.2	46.4	-4871.6	-97929.0	-125307100.0	32401.0
1280.8	61820.1	50.0	-5248.1	-105835.0	-119088100.0	34377.0
1280.9	30095.8	32.5	1587.2	-68433.0	-52826480.0	22355.0
1280.10	61268.8	43.8	-2410.7	-91922.0	-117867400.0	31175.0
1280.11	56210.5	51.0	-3163.8	-107735.0	-105329400.0	35127.0
1280.12	21984.3	27.2	1162.6	-57596.0	-37784950.0	18107.0
1280.13	53157.2	38.5	-2835.4	-81086.0	-102775900.0	26927.0
1280.14	48099.0	45.7	-3588.4	-96897.0	-90337860.0	30879.0
1280.15	58739.6	47.4	-2787.3	-99829.0	-111548400.0	33151.0
1280.16	50628.1	42.1	-3211.9	-88991.0	-96556870.0	28903.0
1280.17	36286.4	23.9	2371.4	-49620.0	-68040940.0	17527.0
1280.18	33757.3	27.5	1993.8	-57536.0	-61821920.0	19503.0
1280.19	73593.2	50.3	-4417.6	-105782.0	-143125100.0	35773.0

1280.20	71064.1	53.9	-4794.2	-113688.0	-136906000.0	37749.0
1280.21	28174.9	18.6	1946.4	-38786.0	-53009410.0	13279.0
1280.22	25645.8	22.2	1569.0	-46700.0	-46780400.0	15255.0
1280.23	65481.6	45.0	-4842.3	-94945.0	-128033600.0	31524.0
1280.24	62952.5	48.6	-5218.8	-102850.0	-121814600.0	33500.0
1280.25	31228.2	31.1	1616.7	-65448.0	-55592920.0	21479.0
1280.26	62401.2	42.4	-2381.2	-88936.0	-120593800.0	30299.0
1280.27	57342.9	49.6	-3134.5	-104750.0	-108155800.0	34251.0
1280.28	23116.7	25.9	1192.0	-54611.0	-40561390.0	17231.0
1280.29	54289.6	37.1	-2806.0	-78100.0	-105602300.0	26051.0
1280.30	49231.4	44.3	-3559.1	-93913.0	-93064300.0	30003.0
1280.31	37041.4	23.0	2391.0	-47629.0	-69888530.0	16943.0
1280.32	34512.3	26.6	2013.7	-55544.0	-63669520.0	18919.0
1280.33	63156.1	41.5	-2361.5	-86945.0	-122411400.0	29715.0
1280.34	60627.0	45.1	-2738.4	-94855.0	-116192400.0	31691.0
1280.35	28929.8	17.7	1965.8	-36796.0	-54857060.0	12695.0
1280.36	26400.7	21.3	1588.8	-44709.0	-48628040.0	14671.0
1280.37	55044.5	36.2	-2786.3	-76109.0	-107420000.0	25467.0
1280.38	52515.4	39.8	-3163.1	-84017.0	-101201000.0	27443.0
1280.39	59872.0	46.0	-2758.0	-96845.0	-114374800.0	32275.0
1280.40	51760.5	40.7	-3182.6	-86007.0	-99383300.0	28027.0
1280.41	34701.1	25.8	2329.7	-53804.0	-64163890.0	18754.0
1280.42	32172.0	29.5	1952.3	-61718.0	-57934880.0	20730.0
1280.43	72007.8	52.2	-4458.7	-109960.0	-139228000.0	36999.0
1280.44	69478.7	55.9	-4835.2	-117866.0	-133009000.0	38975.0
1280.45	26589.5	20.5	1904.9	-42969.0	-49122420.0	14505.0
1280.46	24060.4	24.2	1527.5	-50882.0	-42903410.0	16481.0
1280.47	63896.3	47.0	-4883.3	-99123.0	-124236500.0	32751.0
1280.48	61367.2	50.6	-5259.8	-107029.0	-118017500.0	34727.0
1280.49	29642.8	33.1	1575.5	-69627.0	-51715920.0	22706.0
1280.50	60815.8	44.3	-2422.5	-93117.0	-116696800.0	31526.0
1280.51	55757.6	51.6	-3175.5	-108928.0	-104258800.0	35478.0
1280.52	21531.3	27.8	1150.9	-58790.0	-36684400.0	18457.0
1280.53	52704.3	39.0	-2847.2	-82279.0	-101705300.0	27277.0
1280.54	47646.0	46.3	-3600.2	-98091.0	-89267300.0	31229.0
1280.55	58286.7	47.9	-2799.0	-101023.0	-110477800.0	33502.0
1280.56	50175.1	42.6	-3223.6	-90185.0	-95486310.0	29253.0
1280.57	34399.1	26.2	2321.8	-54601.0	-63426860.0	18988.0
1280.58	31870.0	29.8	1944.5	-62515.0	-57197840.0	20963.0
1280.59	60513.8	44.7	-2430.3	-93913.0	-115949800.0	31759.0
1280.60	57984.7	48.3	-2806.9	-101819.0	-109730800.0	33735.0
1280.61	26287.6	20.9	1896.9	-43766.0	-48385330.0	14739.0
1280.62	23758.4	24.5	1519.7	-51679.0	-42166370.0	16715.0
1280.63	52402.3	39.4	-2855.0	-83075.0	-100958200.0	27511.0
1280.64	49873.2	43.0	-3231.5	-90981.0	-94739220.0	29487.0
1280.108	70411.2	-37.6	-30295.4	127113.0	-98036730.0	2972.0
1280.109	79832.9	-25.7	-32217.2	100025.0	-115264600.0	14582.0
1280.110	67996.7	33.8	-36963.2	-56391.0	-89759670.0	17383.0
1280.111	77418.9	45.5	-38931.7	-83217.0	-107087300.0	28993.0
1280.112	6510.7	13.1	36509.3	-38535.0	-53452330.0	13914.0
1280.113	15932.6	24.7	34557.3	-64833.0	-70740140.0	25524.0
1280.114	4098.7	81.1	29757.2	-213038.0	-45204010.0	28325.0
1280.115	13520.8	92.7	27707.9	-239359.0	-62481710.0	39935.0
1280.116	70249.5	-48.6	-30911.2	144573.0	-97618620.0	5684.0
1280.117	79670.9	-36.7	-32837.4	117310.0	-114946700.0	17294.0
1280.118	68158.3	44.8	-36312.1	-73893.0	-90177820.0	14671.0
1280.119	77580.4	56.6	-38281.7	-100758.0	-107405500.0	26281.0
1280.120	6348.5	2.3	35828.1	-21371.0	-53044490.0	16627.0
1280.121	15770.4	13.8	33885.5	-47616.0	-70322300.0	28236.0
1280.122	4260.4	92.1	30535.1	-230324.0	-45612110.0	25613.0

1280.123	13682.6	103.6	28488.4	-256571.0	-62899760.0	37222.0
1280.124	70220.7	-46.5	-30388.2	158455.0	-97833220.0	2379.0
1280.125	79642.2	-34.6	-32314.2	131246.0	-115161200.0	13989.0
1280.126	67805.8	24.7	-37071.9	-24711.0	-89556360.0	16791.0
1280.127	77228.3	36.4	-39026.8	-51401.0	-106883900.0	28400.0
1280.128	6700.6	20.1	36325.2	-64085.0	-53636140.0	14507.0
1280.129	16122.7	31.6	34366.8	-90301.0	-70923850.0	26117.0
1280.130	4289.1	87.9	29648.4	-238089.0	-45387570.0	28918.0
1280.131	13711.5	99.3	27660.6	-264234.0	-62675120.0	40527.0
1280.132	70058.3	-57.3	-31041.1	175380.0	-97415470.0	5092.0
1280.133	79480.3	-45.5	-33015.6	148417.0	-114743200.0	16701.0
1280.134	67967.9	35.6	-36397.5	-41950.0	-89974260.0	14078.0
1280.135	77390.1	47.4	-38380.8	-68817.0	-107301900.0	25688.0
1280.136	6538.7	9.1	35678.4	-46692.0	-53228150.0	17219.0
1280.137	15960.7	20.6	33753.9	-72945.0	-70515900.0	28829.0
1280.138	4449.4	99.2	30371.6	-256407.0	-45796380.0	26206.0
1280.139	13872.4	110.5	28428.6	-282058.0	-63083630.0	37815.0
1280.140	50863.8	-101.3	190.4	278401.0	-92037490.0	-10014.0
1280.141	60285.7	-89.6	-1697.7	251641.0	-109365300.0	1596.0
1280.142	42819.3	131.9	-22295.3	-320663.0	-64542020.0	38025.0
1280.143	52241.4	143.4	-24306.9	-346979.0	-81839730.0	49635.0
1280.144	31692.8	-85.3	20213.0	226687.0	-78687590.0	-6731.0
1280.145	41114.8	-73.5	18326.1	199789.0	-95975360.0	4879.0
1280.146	23650.0	145.2	-2262.1	-365299.0	-51171280.0	41307.0
1280.147	33072.1	156.8	-4272.8	-391607.0	-68458980.0	52917.0
1280.148	50806.8	-104.1	185.9	288160.0	-91966360.0	-10192.0
1280.149	60228.8	-92.4	-1702.6	261341.0	-109294100.0	1418.0
1280.150	42762.0	129.9	-22288.3	-313338.0	-64481040.0	37847.0
1280.151	52184.1	141.5	-24299.9	-339673.0	-81768750.0	49457.0
1280.152	31749.7	-82.6	20191.9	217127.0	-78748780.0	-6553.0
1280.153	41171.7	-70.8	18303.6	190212.0	-96046530.0	5057.0
1280.154	23707.3	147.2	-2272.4	-372632.0	-51222250.0	41485.0
1280.155	33129.4	158.7	-4283.1	-398938.0	-68509960.0	53095.0
1280.156	50325.3	-138.3	-1851.4	337279.0	-90710240.0	-972.0
1280.157	59747.3	-126.6	-3745.4	310461.0	-108038000.0	10637.0
1280.158	43357.2	168.7	-19836.8	-379276.0	-65899580.0	28984.0
1280.159	52779.4	180.3	-21845.0	-405536.0	-83167230.0	40594.0
1280.160	31154.3	-122.1	18110.7	284861.0	-77330350.0	2311.0
1280.161	40576.3	-110.3	16218.2	257911.0	-94648100.0	13920.0
1280.162	24188.0	182.1	262.7	-423909.0	-52528780.0	32266.0
1280.163	33610.2	193.6	-1746.3	-450178.0	-69816430.0	43876.0
1280.164	50268.4	-141.2	-1832.7	347171.0	-90639060.0	-1150.0
1280.165	59690.3	-129.4	-3726.7	320329.0	-107966900.0	10459.0
1280.166	43299.9	166.8	-19854.5	-371878.0	-65838600.0	28807.0
1280.167	52722.1	178.3	-21862.7	-398139.0	-83096260.0	40416.0
1280.168	31211.2	-119.3	18066.0	275232.0	-77381530.0	2489.0
1280.169	40633.1	-107.5	16173.4	248277.0	-94619340.0	14098.0
1280.170	24245.3	184.0	279.7	-431230.0	-52589760.0	32444.0
1280.171	33667.5	195.6	-1728.4	-457540.0	-69877420.0	44054.0
1280.268	37054.2	-32.7	-4582.9	98094.0	-62262050.0	-6743.0
1280.269	68460.4	6.6	-10913.0	8375.0	-119824800.0	31956.0
1280.270	34640.1	38.2	-11201.0	-84346.0	-53994790.0	7669.0
1280.271	66047.2	77.0	-17893.0	-172685.0	-111647100.0	46367.0
1280.272	17883.4	-16.5	15473.2	45809.0	-48882060.0	-3460.0
1280.273	49289.8	22.1	9111.6	-42174.0	-106534700.0	35239.0
1280.274	15470.7	52.0	8815.3	-130068.0	-40634090.0	10951.0
1280.275	46877.8	90.5	2117.2	-217592.0	-98256390.0	49650.0
1280.276	36892.7	-43.8	-5191.3	115760.0	-61853850.0	-4031.0
1280.277	68298.3	-4.3	-11556.3	25560.0	-119506900.0	34668.0
1280.278	34801.3	49.3	-10511.7	-101922.0	-54403140.0	4957.0

1280.279	66208.5	88.1	-17216.9	-190341.0	-112065400.0	43655.0
1280.280	17721.8	-27.5	14812.6	63219.0	-48473910.0	-748.0
1280.281	49128.6	10.9	8493.0	-24384.0	-106116400.0	37951.0
1280.282	15632.5	62.9	9598.7	-147309.0	-41042140.0	8239.0
1280.283	47039.7	101.4	2873.9	-234791.0	-98674390.0	46937.0
1280.284	36997.3	-35.5	-4588.1	107675.0	-62200870.0	-6921.0
1280.285	68403.3	3.8	-10933.8	17875.0	-119853700.0	31778.0
1280.286	34583.0	35.5	-11180.8	-74856.0	-53943710.0	7491.0
1280.287	65990.0	74.7	-17888.4	-164172.0	-111576100.0	46189.0
1280.288	17940.5	-14.3	15427.4	37679.0	-48943140.0	-3283.0
1280.289	49347.1	24.1	9066.1	-49660.0	-106605700.0	35417.0
1280.290	15528.0	54.0	8790.5	-137502.0	-40685070.0	11129.0
1280.291	46935.1	92.5	2098.0	-225215.0	-98327380.0	49827.0
1280.292	36835.6	-46.5	-5200.8	125259.0	-61792770.0	-4209.0
1280.293	68241.3	-7.1	-11614.0	35067.0	-119435800.0	34490.0
1280.294	34744.2	46.6	-10505.6	-92578.0	-54352060.0	4779.0
1280.295	66151.4	85.7	-17219.0	-181621.0	-111994300.0	43477.0
1280.296	17779.0	-25.4	14776.8	55251.0	-48534940.0	-570.0
1280.297	49185.7	13.0	8456.9	-31944.0	-106187400.0	38129.0
1280.298	15689.7	64.9	9584.0	-154856.0	-41093160.0	8416.0
1280.299	47096.9	103.4	2880.8	-242505.0	-98745420.0	47115.0
1281.1	74367.7	11.6	4227.1	-27114.0	-131332800.0	79013.0
1281.2	74603.6	14.1	4529.3	-33236.0	-130813300.0	83571.0
1281.3	148000.0	25.5	663.4	-60530.0	-265938000.0	154884.0
1281.4	148200.0	28.0	966.0	-66650.0	-265336700.0	159443.0
1281.5	57214.4	9.5	3560.8	-22358.0	-101020900.0	60786.0
1281.6	57450.3	12.0	3863.0	-28479.0	-100501400.0	65344.0
1281.7	130800.0	23.4	-2.7	-55773.0	-235649800.0	136657.0
1281.8	131000.0	26.0	299.9	-61892.0	-235148500.0	141216.0
1281.9	74839.4	16.6	4831.6	-39356.0	-130193800.0	88130.0
1281.10	125900.0	21.3	1732.4	-50506.0	-225531600.0	132123.0
1281.11	126400.0	26.4	2337.6	-62745.0	-224378400.0	141240.0
1281.12	57686.1	14.6	4165.5	-34599.0	-99981990.0	69903.0
1281.13	108700.0	19.3	1066.2	-45749.0	-195243500.0	113896.0
1281.14	109200.0	24.3	1671.4	-57988.0	-194190200.0	123013.0
1281.15	126100.0	23.8	2034.9	-56626.0	-225030400.0	136681.0
1281.16	109000.0	21.8	1368.8	-51869.0	-194691500.0	118454.0
1281.17	74259.5	10.7	4016.6	-24988.0	-131587600.0	76976.0
1281.18	74495.3	13.2	4318.7	-31109.0	-130968100.0	81534.0
1281.19	147900.0	24.6	452.7	-58404.0	-266088700.0	152847.0
1281.20	148100.0	27.2	755.3	-64524.0	-265587300.0	157406.0
1281.21	57106.2	8.6	3350.3	-20231.0	-101275700.0	58749.0
1281.22	57342.0	11.2	3652.4	-26353.0	-100756300.0	63307.0
1281.23	130700.0	22.6	-213.4	-53647.0	-235900400.0	134620.0
1281.24	130900.0	25.1	89.2	-59767.0	-235399200.0	139179.0
1281.25	74731.2	15.7	4621.0	-37230.0	-130448600.0	86093.0
1281.26	125800.0	20.4	1521.7	-48380.0	-225782300.0	130086.0
1281.27	126200.0	25.5	2126.8	-60619.0	-224679700.0	139203.0
1281.28	57577.9	13.7	3954.8	-32473.0	-100236800.0	67866.0
1281.29	108600.0	18.4	855.5	-43623.0	-195494100.0	111859.0
1281.30	109100.0	23.4	1460.7	-55862.0	-194440800.0	120976.0
1281.31	74187.3	10.1	3876.1	-23570.0	-131724100.0	75618.0
1281.32	74423.2	12.6	4178.3	-29691.0	-131204600.0	80176.0
1281.33	125700.0	19.9	1381.3	-46962.0	-225932900.0	128728.0
1281.34	125900.0	22.4	1683.7	-53083.0	-225431600.0	133287.0
1281.35	57034.0	8.1	3209.6	-18814.0	-101412300.0	57391.0
1281.36	57269.9	10.6	3512.1	-24935.0	-100892800.0	61949.0
1281.37	108500.0	17.8	715.1	-42206.0	-195644800.0	110501.0
1281.38	108800.0	20.3	1017.6	-48326.0	-195092800.0	115059.0
1281.39	126000.0	23.0	1824.2	-54500.0	-225181000.0	134644.0

1281.40	108900.0	20.9	1158.1	-49743.0	-194942100.0	116417.0
1281.41	74411.0	11.9	4311.3	-27965.0	-131210800.0	79828.0
1281.42	74646.9	14.4	4613.5	-34086.0	-130691400.0	84386.0
1281.43	148000.0	25.8	747.7	-61381.0	-265838000.0	155699.0
1281.44	148200.0	28.4	1050.3	-67500.0	-265336700.0	160258.0
1281.45	57257.7	9.9	3645.1	-23208.0	-100999000.0	61601.0
1281.46	57493.6	12.4	3947.3	-29330.0	-100379500.0	66159.0
1281.47	130800.0	23.8	81.6	-56624.0	-235549800.0	137472.0
1281.48	131100.0	26.3	384.2	-62743.0	-234997900.0	142031.0
1281.49	74882.7	17.0	4915.9	-40206.0	-130171900.0	88945.0
1281.50	125900.0	21.7	1816.6	-51357.0	-225431600.0	132938.0
1281.51	126400.0	26.7	2421.9	-63595.0	-224378400.0	142055.0
1281.52	57729.4	14.9	4249.8	-35449.0	-99860060.0	70717.0
1281.53	108800.0	19.6	1150.5	-46600.0	-195192800.0	114711.0
1281.54	109200.0	24.7	1755.7	-58838.0	-194090200.0	123828.0
1281.55	126200.0	24.2	2119.2	-57476.0	-224879700.0	137496.0
1281.56	109000.0	22.1	1453.1	-52719.0	-194591500.0	119269.0
1281.57	74439.9	12.1	4367.4	-28532.0	-131196200.0	80371.0
1281.58	74675.7	14.7	4669.6	-34653.0	-130576800.0	84929.0
1281.59	126000.0	21.9	1872.8	-51924.0	-225381000.0	133481.0
1281.60	126200.0	24.4	2175.4	-58043.0	-224879700.0	138039.0
1281.61	57286.6	10.1	3701.2	-23776.0	-100884300.0	62144.0
1281.62	57522.4	12.6	4003.4	-29897.0	-100364900.0	66702.0
1281.63	108800.0	19.8	1206.7	-47167.0	-195092800.0	115254.0
1281.64	109000.0	22.4	1509.3	-53286.0	-194591500.0	119812.0
1281.108	21918.5	-31.5	-60507.8	96146.0	-64758280.0	49565.0
1281.109	38032.2	-21.2	-56903.8	71468.0	-97836700.0	62554.0
1281.110	37802.2	32.7	-27273.0	-80443.0	-97753180.0	70198.0
1281.111	53916.2	42.9	-23739.6	-104957.0	-130791400.0	83188.0
1281.112	119400.0	-12.6	26926.6	32844.0	-178923900.0	99072.0
1281.113	135500.0	-2.4	30456.0	8388.0	-211969200.0	112062.0
1281.114	135300.0	51.5	59806.5	-143520.0	-211970500.0	119706.0
1281.115	151400.0	61.6	63215.5	-167801.0	-245015900.0	132695.0
1281.116	24037.3	-37.2	-54215.2	100272.0	-68035100.0	52810.0
1281.117	40150.8	-26.8	-50595.1	75395.0	-101063600.0	65800.0
1281.118	35683.5	38.6	-33479.2	-85053.0	-94426300.0	66953.0
1281.119	51797.5	48.8	-29943.3	-109604.0	-127564600.0	79943.0
1281.120	121500.0	-18.1	33180.8	36638.0	-182260300.0	102318.0
1281.121	137600.0	-7.9	36721.0	12180.0	-215305600.0	115308.0
1281.122	133100.0	57.2	53726.8	-148017.0	-208684800.0	116461.0
1281.123	149300.0	67.4	57138.9	-172304.0	-241679600.0	129450.0
1281.124	22197.0	-9.4	-56817.9	36230.0	-65057220.0	49581.0
1281.125	38310.5	0.9	-53207.7	11451.0	-98095730.0	62571.0
1281.126	38080.7	54.8	-23622.2	-140148.0	-98012130.0	70215.0
1281.127	54194.2	64.9	-20083.6	-164505.0	-131050600.0	83204.0
1281.128	119100.0	-33.9	22928.2	90708.0	-178675900.0	99058.0
1281.129	135200.0	-23.7	26458.4	66182.0	-211721200.0	112047.0
1281.130	135000.0	30.2	55910.8	-85838.0	-211622500.0	119690.0
1281.131	151100.0	40.3	59383.1	-110073.0	-244667900.0	132679.0
1281.132	24315.2	-14.9	-50509.9	39855.0	-68324350.0	52826.0
1281.133	40428.9	-4.7	-46994.0	15489.0	-101422800.0	65816.0
1281.134	35961.4	60.5	-29808.9	-144638.0	-94785550.0	66969.0
1281.135	52075.3	70.7	-26297.2	-169078.0	-127823900.0	79958.0
1281.136	121200.0	-39.4	29221.6	94513.0	-181912200.0	102302.0
1281.137	137300.0	-29.2	32791.7	69922.0	-215057600.0	115292.0
1281.138	132900.0	36.4	49882.9	-91396.0	-208386100.0	116446.0
1281.139	149000.0	46.3	53351.8	-115135.0	-241431500.0	129435.0
1281.140	37496.2	-100.1	-69383.6	281036.0	-66258180.0	42816.0
1281.141	53609.9	-90.0	-65765.7	256548.0	-99346580.0	55805.0
1281.142	90446.5	113.6	40686.1	-306899.0	-176188800.0	111596.0

1281.143	106600.0	123.7	44150.8	-331319.0	-209207100.0	124586.0
1281.144	66732.9	-94.4	-43101.1	261912.0	-100499800.0	57669.0
1281.145	82846.7	-84.2	-39480.8	237454.0	-133538200.0	70658.0
1281.146	119700.0	119.4	66815.9	-326382.0	-210472000.0	126448.0
1281.147	135800.0	129.6	70281.4	-350800.0	-243517300.0	139438.0
1281.148	37579.8	-93.6	-68267.2	263164.0	-66345830.0	42820.0
1281.149	53693.5	-83.4	-64648.9	238684.0	-99404240.0	55810.0
1281.150	90529.9	120.0	41838.9	-324301.0	-176246600.0	111601.0
1281.151	106600.0	130.2	45304.5	-348732.0	-209307100.0	124591.0
1281.152	66649.3	-100.9	-44237.8	279640.0	-100442100.0	57664.0
1281.153	82763.0	-90.7	-40617.5	255175.0	-133480500.0	70653.0
1281.154	119600.0	113.0	65660.3	-308988.0	-210322600.0	126443.0
1281.155	135700.0	123.1	69125.8	-333406.0	-243468000.0	139432.0
1281.156	44560.5	-119.3	-48494.9	295459.0	-77170100.0	53635.0
1281.157	60674.2	-109.1	-44878.8	270950.0	-110268500.0	66624.0
1281.158	83383.4	133.5	20454.3	-323553.0	-165266300.0	100779.0
1281.159	99497.3	143.6	23915.9	-347922.0	-198304600.0	113768.0
1281.160	73797.0	-113.5	-22255.6	276301.0	-111421800.0	68487.0
1281.161	89910.7	-103.3	-18637.0	251822.0	-144460200.0	81477.0
1281.162	112600.0	139.2	46641.4	-342812.0	-199568100.0	115631.0
1281.163	128700.0	149.3	50103.3	-367193.0	-232613500.0	128620.0
1281.164	44644.2	-112.7	-47359.9	277619.0	-77257710.0	53640.0
1281.165	60757.9	-102.5	-43743.6	253115.0	-110326100.0	66629.0
1281.166	83466.9	139.9	21576.0	-340936.0	-165324000.0	100784.0
1281.167	99580.8	150.0	25037.7	-365306.0	-198462300.0	113773.0
1281.168	73713.3	-120.0	-23411.2	293982.0	-111364200.0	68483.0
1281.169	89826.9	-109.8	-19792.1	269497.0	-144402700.0	81472.0
1281.170	112500.0	132.8	45512.2	-325392.0	-199518800.0	115626.0
1281.171	128700.0	142.9	48980.5	-349822.0	-232513500.0	128615.0
1281.268	37229.1	-37.2	-34009.0	103691.0	-66163460.0	51737.0
1281.269	90941.4	-3.1	-21951.7	21779.0	-176338200.0	95035.0
1281.270	53113.5	27.0	-765.3	-72761.0	-99098020.0	72371.0
1281.271	106800.0	60.9	10815.7	-154206.0	-209305800.0	115669.0
1281.272	66466.0	-31.5	-7690.2	84711.0	-100435000.0	66590.0
1281.273	120200.0	2.5	4271.3	2873.0	-210618700.0	109889.0
1281.274	82351.8	32.7	25351.7	-92058.0	-133388800.0	87224.0
1281.275	136100.0	66.6	36911.8	-173537.0	-243565300.0	130522.0
1281.276	39348.3	-42.9	-27737.1	108019.0	-69430090.0	54982.0
1281.277	93060.4	-8.7	-15675.8	25744.0	-179664900.0	98282.0
1281.278	50994.7	33.0	-6883.8	-77880.0	-95871180.0	69126.0
1281.279	104700.0	66.8	4655.7	-159003.0	-206069500.0	112425.0
1281.280	68585.1	-37.2	-1468.4	89051.0	-103661600.0	69835.0
1281.281	122300.0	-3.2	10528.4	7279.0	-213855100.0	113134.0
1281.282	80232.9	38.5	19287.7	-96608.0	-130162000.0	83978.0
1281.283	133900.0	72.4	30799.8	-177932.0	-240379600.0	127276.0
1281.284	37312.7	-30.6	-32891.2	85847.0	-66251120.0	51741.0
1281.285	91025.0	3.5	-20849.9	3926.0	-176395800.0	95040.0
1281.286	53197.1	33.5	370.2	-90461.0	-99255670.0	72376.0
1281.287	106900.0	67.4	11949.1	-171787.0	-209455200.0	115674.0
1281.288	66382.4	-38.0	-8880.3	102292.0	-100377300.0	66585.0
1281.289	120100.0	-3.9	3079.6	20258.0	-210569300.0	109884.0
1281.290	82268.4	26.3	24181.6	-74654.0	-133331000.0	87219.0
1281.291	136000.0	60.2	35748.9	-156088.0	-243516000.0	130517.0
1281.292	39431.8	-36.3	-26617.2	90146.0	-69527790.0	54987.0
1281.293	93143.9	-2.2	-14621.3	7975.0	-179722600.0	98286.0
1281.294	51078.3	39.5	-5767.2	-95495.0	-95928840.0	69131.0
1281.295	104800.0	73.2	5773.0	-176542.0	-206118800.0	112430.0
1281.296	68501.5	-43.7	-2647.1	106569.0	-103604000.0	69830.0
1281.297	122200.0	-9.6	9352.5	24618.0	-213805700.0	113129.0
1281.298	80149.5	32.1	18133.1	-79228.0	-130004300.0	83973.0

1281.299	133900.0	65.9	29674.3	-160553.0	-240179600.0	127271.0
1282.1	84949.7	33.4	466.4	-74470.0	-178973000.0	-47215.0
1282.2	83865.8	37.9	-595.6	-85019.0	-176722000.0	-50941.0
1282.3	170600.0	68.3	-9402.1	-152830.0	-363891100.0	-88371.0
1282.4	169500.0	72.8	-10462.8	-163394.0	-361748300.0	-92096.0
1282.5	65351.1	26.1	271.0	-58345.0	-137699700.0	-36330.0
1282.6	64267.3	30.6	-791.0	-68894.0	-135548600.0	-40056.0
1282.7	151000.0	61.0	-9597.2	-136708.0	-322718500.0	-77486.0
1282.8	149900.0	65.5	-10657.9	-147273.0	-320475600.0	-81211.0
1282.9	82782.0	42.5	-1657.0	-95576.0	-174570900.0	-54666.0
1282.10	144900.0	57.8	-6442.0	-129317.0	-308408200.0	-76024.0
1282.11	142800.0	66.9	-8563.5	-150443.0	-304071800.0	-83475.0
1282.12	63183.4	35.2	-1852.1	-79454.0	-133297600.0	-43781.0
1282.13	125300.0	50.5	-6637.3	-113194.0	-267135600.0	-65139.0
1282.14	123200.0	59.6	-8758.7	-134321.0	-262799200.0	-72590.0
1282.15	143800.0	62.4	-7502.9	-139879.0	-306265300.0	-79749.0
1282.16	124200.0	55.1	-7697.9	-123758.0	-264992700.0	-68864.0
1282.17	85429.6	31.6	736.2	-70255.0	-179829900.0	-45532.0
1282.18	84345.8	36.1	-326.1	-80802.0	-177678800.0	-49257.0
1282.19	171100.0	66.4	-9133.0	-148608.0	-364837900.0	-86687.0
1282.20	170000.0	71.0	-10193.7	-159172.0	-362695000.0	-90412.0
1282.21	65831.1	24.3	540.6	-54129.0	-138656500.0	-34647.0
1282.22	64747.2	28.8	-521.5	-64677.0	-136405500.0	-38372.0
1282.23	151500.0	59.2	-9328.1	-132487.0	-323565200.0	-75802.0
1282.24	150400.0	63.7	-10388.8	-143050.0	-321422400.0	-79527.0
1282.25	83262.0	40.7	-1387.7	-91355.0	-175527800.0	-52982.0
1282.26	145400.0	56.0	-6172.7	-125097.0	-309354900.0	-74340.0
1282.27	143200.0	65.1	-8294.4	-146221.0	-305069200.0	-81791.0
1282.28	63663.4	33.4	-1583.0	-75231.0	-134254500.0	-42097.0
1282.29	125800.0	48.7	-6368.1	-108973.0	-268082300.0	-63455.0
1282.30	123600.0	57.8	-8489.5	-130099.0	-263796600.0	-70906.0
1282.31	85749.6	30.4	915.8	-67444.0	-180467800.0	-44409.0
1282.32	84665.8	34.9	-146.3	-77991.0	-178316800.0	-48135.0
1282.33	145700.0	54.8	-5993.0	-122286.0	-310002900.0	-73218.0
1282.34	144600.0	59.3	-7054.3	-132842.0	-307860100.0	-76943.0
1282.35	66151.0	23.1	719.9	-51316.0	-139294500.0	-33524.0
1282.36	65067.2	27.6	-341.7	-61866.0	-137043500.0	-37250.0
1282.37	126100.0	47.5	-6188.5	-106160.0	-268730300.0	-62333.0
1282.38	125000.0	52.0	-7249.5	-116720.0	-266587500.0	-66058.0
1282.39	144300.0	60.5	-7233.8	-135657.0	-307212100.0	-78066.0
1282.40	124700.0	53.2	-7428.9	-119535.0	-265939500.0	-67181.0
1282.41	84757.7	34.1	358.5	-76157.0	-178570200.0	-47889.0
1282.42	83673.8	38.7	-703.4	-86706.0	-176419200.0	-51614.0
1282.43	170400.0	69.0	-9509.8	-154519.0	-363592400.0	-89044.0
1282.44	169300.0	73.5	-10570.5	-165083.0	-361349500.0	-92769.0
1282.45	65159.1	26.8	163.1	-60031.0	-137296900.0	-37004.0
1282.46	64075.3	31.4	-898.8	-70581.0	-135145900.0	-40729.0
1282.47	150800.0	61.7	-9704.9	-138397.0	-322319800.0	-78159.0
1282.48	149700.0	66.3	-10765.5	-148961.0	-320177000.0	-81884.0
1282.49	82590.0	43.2	-1764.7	-97264.0	-174268200.0	-55339.0
1282.50	144700.0	58.5	-6549.7	-131005.0	-308109400.0	-76697.0
1282.51	142600.0	67.6	-8671.1	-152132.0	-303673100.0	-84148.0
1282.52	62991.4	35.9	-1959.7	-81142.0	-132994800.0	-44454.0
1282.53	125100.0	51.2	-6744.9	-114883.0	-266836800.0	-65812.0
1282.54	123000.0	60.3	-8866.3	-136010.0	-262400500.0	-73263.0
1282.55	143600.0	63.1	-7610.5	-141568.0	-305866600.0	-80423.0
1282.56	124000.0	55.8	-7805.6	-125447.0	-264594000.0	-69538.0
1282.57	84629.7	34.6	286.6	-77281.0	-178335100.0	-48338.0
1282.58	83545.9	39.2	-775.3	-87831.0	-176184000.0	-52063.0
1282.59	144600.0	59.0	-6621.5	-132131.0	-307760100.0	-77146.0

1282.60	143500.0	63.6	-7682.3	-142694.0	-305617200.0	-80872.0
1282.61	65031.1	27.3	91.2	-61155.0	-137061700.0	-37453.0
1282.62	63947.3	31.9	-970.7	-71706.0	-134910700.0	-41178.0
1282.63	125000.0	51.7	-6816.7	-116009.0	-266487500.0	-66261.0
1282.64	123900.0	56.3	-7877.3	-126573.0	-264344700.0	-69987.0
1282.108	140300.0	161.8	-2499.7	-396279.0	-250338000.0	-65808.0
1282.109	155800.0	171.6	-6278.2	-419544.0	-280087300.0	-81216.0
1282.110	129900.0	216.9	-49131.9	-548312.0	-231105600.0	-52331.0
1282.111	145400.0	226.6	-52929.3	-571516.0	-260754900.0	-67739.0
1282.112	53863.0	-138.1	45034.2	369920.0	-162518400.0	-37835.0
1282.113	69286.3	-127.3	41256.4	343817.0	-192206500.0	-53242.0
1282.114	43472.5	-71.7	-1461.3	187550.0	-143281200.0	-24356.0
1282.115	58896.0	-61.1	-5312.4	162020.0	-172969200.0	-39763.0
1282.116	139300.0	161.0	-9209.6	-404441.0	-249144500.0	-63170.0
1282.117	154800.0	170.8	-13011.2	-427727.0	-278893800.0	-78578.0
1282.118	131000.0	217.8	-42425.1	-540489.0	-232148500.0	-54970.0
1282.119	146400.0	227.5	-46227.4	-563710.0	-261948400.0	-70377.0
1282.120	52848.9	-138.7	38229.9	361236.0	-161332000.0	-35197.0
1282.121	68272.2	-127.9	34462.4	335184.0	-191120100.0	-50604.0
1282.122	44486.0	-70.9	5375.4	195565.0	-144367800.0	-26994.0
1282.123	59909.6	-60.2	1526.6	169813.0	-174155800.0	-42401.0
1282.124	140200.0	271.0	-6642.6	-685233.0	-250088700.0	-66168.0
1282.125	155600.0	280.7	-10435.2	-708442.0	-279888600.0	-81576.0
1282.126	129800.0	327.1	-53294.7	-840011.1	-230856300.0	-52692.0
1282.127	145200.0	336.7	-57068.2	-862930.0	-260556200.0	-68098.0
1282.128	54044.0	-237.2	48906.1	632136.0	-162726700.0	-37476.0
1282.129	69467.4	-226.5	45122.5	606240.0	-192414800.0	-52883.0
1282.130	43653.6	-170.6	2475.0	449163.0	-143489500.0	-23997.0
1282.131	59077.3	-160.0	-1312.3	423749.0	-173177300.0	-39404.0
1282.132	139100.0	270.1	-13438.4	-693266.0	-248945900.0	-63531.0
1282.133	154600.0	279.8	-17238.2	-716281.0	-278695100.0	-78938.0
1282.134	130800.0	327.9	-46555.2	-832075.0	-231949800.0	-55329.0
1282.135	146200.0	337.5	-50360.5	-854941.0	-261749700.0	-70736.0
1282.136	53030.1	-237.8	42139.2	623517.0	-161540300.0	-34838.0
1282.137	68453.4	-227.1	38383.9	597600.0	-191328400.0	-50245.0
1282.138	44666.0	-169.7	9155.2	456959.0	-144576700.0	-26636.0
1282.139	60090.2	-159.1	5458.2	431588.0	-174364300.0	-42042.0
1282.140	122200.0	-14.8	67929.8	68934.0	-242005700.0	-71739.0
1282.141	137600.0	-4.9	64203.5	45283.0	-271805600.0	-87146.0
1282.142	87559.9	184.3	-87386.0	-479088.0	-177850900.0	-26815.0
1282.143	103000.0	194.9	-91212.9	-504633.0	-207630500.0	-42222.0
1282.144	96255.2	-106.9	82103.8	304600.0	-215746800.0	-63347.0
1282.145	111700.0	-97.3	78378.6	281547.0	-245424000.0	-78755.0
1282.146	61617.4	101.3	-73064.4	-267907.0	-151490800.0	-18422.0
1282.147	77040.9	111.9	-76890.3	-293460.0	-181278800.0	-33829.0
1282.148	122100.0	18.3	66722.4	-18579.0	-242056400.0	-71847.0
1282.149	137600.0	28.1	62995.4	-41993.0	-271705600.0	-87254.0
1282.150	87505.4	213.9	-88602.6	-557402.0	-177778500.0	-26923.0
1282.151	102900.0	224.5	-92430.7	-582952.0	-207581200.0	-42330.0
1282.152	96309.3	-139.5	83279.7	390953.0	-215719300.0	-63239.0
1282.153	111700.0	-129.9	79551.9	367925.0	-245524000.0	-78647.0
1282.154	61672.0	71.7	-71851.3	-189571.0	-151563100.0	-18314.0
1282.155	77095.4	82.3	-75677.1	-215130.0	-181351200.0	-33721.0
1282.156	118800.0	-17.3	45665.3	41592.0	-238227800.0	-62946.0
1282.157	134200.0	-7.5	41929.2	18033.0	-268027700.0	-78353.0
1282.158	90937.2	187.2	-64873.3	-452986.0	-181740300.0	-35608.0
1282.159	106400.0	197.9	-68690.9	-478571.0	-211408400.0	-51015.0
1282.160	92877.1	-110.4	59768.6	279740.0	-211857700.0	-54554.0
1282.161	108300.0	-100.8	56034.0	256761.0	-241646000.0	-69962.0
1282.162	64994.8	104.0	-50477.5	-241071.0	-155380100.0	-27215.0

1282.163	80418.3	114.6	-54297.2	-266667.0	-185068100.0	-42623.0
1282.164	118800.0	15.9	44484.0	-46321.0	-238127800.0	-63054.0
1282.165	134200.0	25.7	40747.8	-69778.0	-267927700.0	-78461.0
1282.166	90882.7	216.9	-66108.3	-531507.0	-181667900.0	-35716.0
1282.167	106300.0	227.6	-69926.1	-557092.0	-211359100.0	-51123.0
1282.168	92931.1	-143.1	60917.4	366190.0	-211930400.0	-54446.0
1282.169	108400.0	-133.4	57182.1	343205.0	-241695400.0	-69854.0
1282.170	65049.3	74.3	-49237.0	-162686.0	-155452500.0	-27108.0
1282.171	80472.8	85.0	-53060.7	-188291.0	-185140500.0	-42515.0
1282.268	92080.1	41.2	18626.6	-89490.0	-184861400.0	-38041.0
1282.269	143500.0	73.8	6139.7	-167446.0	-284017200.0	-89399.0
1282.270	81687.4	97.2	-27916.4	-244193.0	-165625300.0	-24564.0
1282.271	133100.0	131.6	-40670.1	-326904.0	-264784800.0	-75922.0
1282.272	66136.0	-52.1	32839.3	149128.0	-158502100.0	-29650.0
1282.273	117500.0	-17.2	20370.2	64938.0	-257686300.0	-81008.0
1282.274	55744.9	12.7	-13612.3	-28837.0	-139265200.0	-16172.0
1282.275	107200.0	48.3	-26365.5	-114851.0	-238403200.0	-67529.0
1282.276	91066.6	40.4	11949.3	-97772.0	-183774800.0	-35404.0
1282.277	142500.0	72.9	-610.1	-175494.0	-282823700.0	-86762.0
1282.278	82700.5	98.4	-21214.2	-237232.0	-166812200.0	-27203.0
1282.279	134100.0	132.6	-33958.4	-319124.0	-265878400.0	-78560.0
1282.280	65122.5	-53.1	26107.7	141534.0	-157415500.0	-27012.0
1282.281	116500.0	-18.0	13691.8	56899.0	-256492800.0	-78369.0
1282.282	56758.4	13.5	-6777.5	-20901.0	-140451900.0	-18810.0
1282.283	108200.0	49.2	-19539.6	-106862.0	-239596700.0	-70167.0
1282.284	92025.9	73.9	17417.6	-176271.0	-184788900.0	-38149.0
1282.285	143400.0	106.5	4914.5	-254144.0	-283967900.0	-89507.0
1282.286	81633.2	130.0	-29101.3	-330985.0	-165552800.0	-24672.0
1282.287	133000.0	163.0	-41879.1	-409987.0	-264735500.0	-76030.0
1282.288	66190.3	-82.7	34012.7	230118.0	-158574600.0	-29542.0
1282.289	117600.0	-46.9	21549.6	143712.0	-257735600.0	-80900.0
1282.290	55799.3	-17.1	-12413.4	49829.0	-139337600.0	-16064.0
1282.291	107200.0	18.3	-25161.2	-35327.0	-238503200.0	-67421.0
1282.292	91012.4	73.1	10729.9	-184423.0	-183702200.0	-35511.0
1282.293	142400.0	105.6	-1862.7	-262055.0	-282774400.0	-86870.0
1282.294	82646.3	130.9	-22407.6	-323252.0	-166739600.0	-27311.0
1282.295	134100.0	164.2	-35165.5	-402739.0	-265778400.0	-78668.0
1282.296	65176.9	-83.5	27291.8	222038.0	-157487900.0	-26904.0
1282.297	116600.0	-47.7	14872.4	135572.0	-256542100.0	-78261.0
1282.298	56812.9	-16.3	-5573.6	58060.0	-140524300.0	-18702.0
1282.299	108200.0	19.1	-18320.0	-27221.0	-239596700.0	-70059.0

Calcolo resistenze

Resistenza a trazione dei bulloni

$$F_{tb,Rd} = 0.9 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} = 417329.2 \text{ N}$$

Resistenza a punzonamento flangia

$$B_{pf,Rd} = 0.6 \cdot \pi \cdot d_m \cdot t_f \cdot f_{tk} / \gamma_{M2} = 1415074.0 \text{ N}$$

Bull.	$F_{t,Rd} \text{ [N]}$	$F_{t,Rd} \text{ [N]}$
1	414334.7	414334.7
2	396403.8	396403.8
3	134077.3	134077.3
4	151973.6	151973.6
5	151973.6	151973.6
6	134077.3	134077.3
7	396403.8	396403.8
8	414334.7	414334.7
9	396403.8	396403.8
10	134077.3	134077.3
11	151973.6	151973.6
12	151973.6	151973.6
13	134077.3	134077.3
14	396403.8	396403.8

Legenda

$F_{f,Rd} = M_{res,m} / (B_m \cdot R_m)$ resistenza a flessione flangia

$F_{t,Rd} = \min [F_{tb,Rd} , B_{pf,Rd} , F_{f,Rd}]$ resistenza a trazione di progetto

Resistenza a taglio dei bulloni

$$F_{vb,Rd} = 0.5 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} =$$

231849.5 N

Bull.	$F_{bf,x,Rd}$ [N]	$F_{v,x,Rd}$ [N]	$F_{bf,y,Rd}$ [N]	$F_{v,y,Rd}$ [N]
1	595809.5	231849.5	582857.1	231849.5
2	357485.8	231849.5	591600.1	231849.5
3	357485.8	231849.5	591600.1	231849.5
4	357485.8	231849.5	591600.1	231849.5
5	357485.8	231849.5	591600.1	231849.5
6	357485.8	231849.5	591600.1	231849.5
7	647619.1	231849.5	874285.8	231849.5
8	595809.5	231849.5	582857.1	231849.5
9	357485.8	231849.5	591600.1	231849.5
10	357485.8	231849.5	591600.1	231849.5
11	357485.8	231849.5	591600.1	231849.5
12	357485.8	231849.5	591600.1	231849.5
13	357485.8	231849.5	591600.1	231849.5
14	647619.1	231849.5	874285.8	231849.5

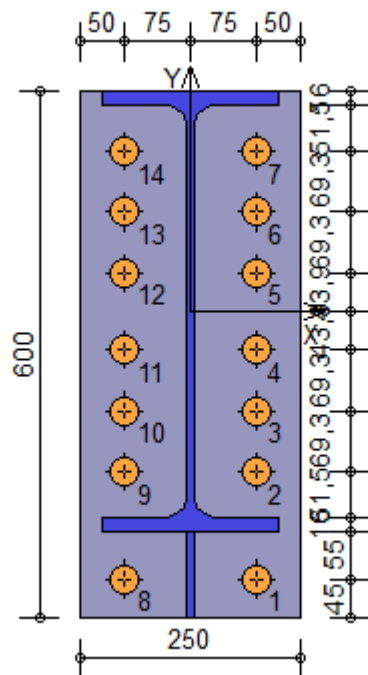
Legenda

$F_{bf,x,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \bar{\sigma} \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione x

$F_{v,x,Rd} = \min [F_{vb,Rd} , F_{bf,x,Rd}]$ resistenza a taglio di progetto in direzione x

$F_{bf,y,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \bar{\sigma} \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione y

$F_{v,y,Rd} = \min [F_{vb,Rd} , F_{bf,y,Rd}]$ resistenza a taglio di progetto in direzione y



Verifiche sui bulloni

1-Taglio e trazione (Nodo n. 1282, CMB n. 19)

Bull.	X [mm]	Y [mm]	$F_{v,Ed}$ [N]	$F_{v,Rd}$ [N]	$F_{t,Ed}$ [N]	$F_{t,Rd}$ [N]	FV_1	VER
1	75.00	-305.00	12236.6	231849.5	0.0	414334.7	0.052778	Ok
2	75.00	-182.50	12236.6	231849.5	17104.8	396403.8	0.083599	Ok
3	75.00	-113.20	12236.5	231849.5	40738.4	134077.3	0.269808	Ok
4	75.00	-43.90	12236.5	231849.5	64372.1	151973.6	0.355331	Ok
5	75.00	43.90	12236.6	231849.5	94314.8	151973.6	0.496064	Ok
6	75.00	113.20	12236.6	231849.5	117948.5	134077.3	0.681139	Ok
7	75.00	182.50	12236.6	231849.5	141582.1	396403.8	0.307897	Ok
8	-75.00	-305.00	12206.4	231849.5	0.0	414334.7	0.052648	Ok

9	-75.00	-182.50	12206.4	231849.5	17174.5	396403.8	0.083595	Ok
10	-75.00	-113.20	12206.3	231849.5	40808.1	134077.3	0.270050	Ok
11	-75.00	-43.90	12206.3	231849.5	64441.8	151973.6	0.355528	Ok
12	-75.00	43.90	12206.3	231849.5	94384.6	151973.6	0.496261	Ok
13	-75.00	113.20	12206.4	231849.5	118018.2	134077.3	0.681380	Ok
14	-75.00	182.50	12206.4	231849.5	141651.8	396403.8	0.307893	Ok

2-Trazione (Nodo n. 1282, CMB n. 19)

Bull.	X [mm]	Y [mm]	F _{t,Ed} [N]	F _{t,Rd} [N]	FV ₂	VER
1	75.00	-305.00	0.0	414334.7	0.000000	Ok
2	75.00	-182.50	17104.8	396403.8	0.043150	Ok
3	75.00	-113.20	40738.4	134077.3	0.303843	Ok
4	75.00	-43.90	64372.1	151973.6	0.423574	Ok
5	75.00	43.90	94314.8	151973.6	0.620600	Ok
6	75.00	113.20	117948.5	134077.3	0.879705	Ok
7	75.00	182.50	141582.1	396403.8	0.357166	Ok
8	-75.00	-305.00	0.0	414334.7	0.000000	Ok
9	-75.00	-182.50	17174.5	396403.8	0.043326	Ok
10	-75.00	-113.20	40808.1	134077.3	0.304363	Ok
11	-75.00	-43.90	64441.8	151973.6	0.424033	Ok
12	-75.00	43.90	94384.6	151973.6	0.621059	Ok
13	-75.00	113.20	118018.2	134077.3	0.880225	Ok
14	-75.00	182.50	141651.8	396403.8	0.357342	Ok

Legenda

F_{v,Ed} forza di taglio agente sul bullone

F_{v,Rd} resistenza a taglio di progetto del bullone

F_{t,Ed} forza di trazione agente sul bullone

F_{t,Rd} resistenza a trazione di progetto del bullone

$FV_1 = F_{v,Ed} / F_{v,Rd} + F_{t,Ed} / (1.4 \cdot F_{t,Rd})$

$FV_2 = F_{t,Ed} / F_{t,Rd}$

VER $\rightarrow FV_i \leq 1$

Verifiche sulle saldature profilo-flangia (versione beta)

Si considera la sezione di gola (avente altezza $a = s_c / 2^{0.5} = 14.142$) in posizione ribaltata: vengono considerate positive le tensioni normali di trazione e le tensioni tangenziali agenti verso destra e verso il basso. Tutte le tensioni sono espresse in N/mm².

Verifica formula (4.2.84) (Nodo n. 1282, CMB n. 19)

Cordoni	n _⊥	t _⊥	τ	FV ₁	VER ₁
Nervatura inferiore lato destro	-159.41	0.00	11.96	159.86	Ok
Nervatura inferiore lato sinistro	-159.41	0.00	11.96	159.86	Ok
Ala inferiore esterno	-117.20	0.00	0.01	117.20	Ok
Ala inferiore interno lato destro	-104.04	0.00	0.01	104.04	Ok
Ala inferiore interno lato sinistro	-103.37	0.00	0.01	103.37	Ok
Anima lato destro	-97.18	0.00	11.96	97.91	Ok
Anima lato sinistro	-97.18	0.00	11.96	97.91	Ok
Ala superiore interno lato destro	102.51	0.00	0.01	102.51	Ok
Ala superiore interno lato sinistro	103.18	0.00	0.01	103.18	Ok

Verifica formula (4.2.85) (Nodo n. 1282, CMB n. 19)

Cordoni	n _⊥	t _⊥	τ	FV ₂	VER ₂
Nervatura inferiore lato destro	-159.41	0.00	11.96	159.41	Ok
Nervatura inferiore lato sinistro	-159.41	0.00	11.96	159.41	Ok
Ala inferiore esterno	-117.20	0.00	0.01	117.20	Ok
Ala inferiore interno lato destro	-104.04	0.00	0.01	104.04	Ok
Ala inferiore interno lato sinistro	-103.37	0.00	0.01	103.37	Ok
Anima lato destro	-97.18	0.00	11.96	97.18	Ok
Anima lato sinistro	-97.18	0.00	11.96	97.18	Ok
Ala superiore interno lato destro	102.51	0.00	0.01	102.51	Ok
Ala superiore interno lato sinistro	103.18	0.00	0.01	103.18	Ok

Legenda

n_⊥ tensione normale perpendicolare all'asse del cordone

t_⊥ tensione tangenziale perpendicolare all'asse del cordone

$\tau_{||}$ tensione tangenziale parallela all'asse del cordone

$$FV_1 = (n_{\perp}^2 + t_{\perp}^2 + \tau_{||}^2)^{0.5}$$

$$FV_2 = |n_{\perp}| + |t_{\perp}|$$

$$VER_i \rightarrow FV_i \leq \beta_i \cdot f_{yk} \quad (\beta_1 \cdot f_{yk} = 248.50 \text{ N/mm}^2 \quad \beta_2 \cdot f_{yk} = 301.75 \text{ N/mm}^2)$$

Verifica del momento di progetto del giunto (Nodo n. 1282, CMB n. 19)

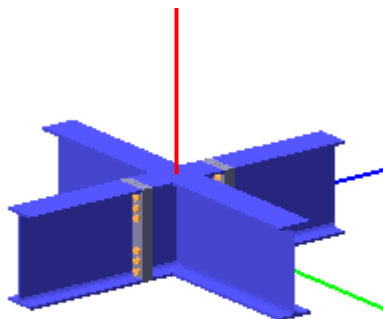
Momento resistente del giunto $M_{j,Rd} = 848753200.0 \text{ N mm}$

Momento di progetto $M_{j,Ed} = 361998200.0 \text{ N mm}$

$$M_{j,Ed} / M_{j,Rd} = 0.426506 \quad \text{Ok}$$

COLLEGAMENTO IPE 500 – IPE 500

Verifica secondo il D.M. 17/01/2018 dei nodi: 497, 677, 734, 1201, 1215, 1226, 1292, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1313, 1316



Trave 2

Tipo di profilo: IPE 500

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Coefficienti di sicurezza utilizzati

$\gamma_{M0} = 1.05$

$\gamma_{M1} = 1.10$

$\gamma_{M2} = 1.25$

Trave lato 3+

Tipo di profilo: IPE 500

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Flangia:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Dimensioni (B x H x Sp): 200.0 x 500.0 x 30.0 mm

Bullonature:

Viti cl. 10.9 Dadi 10 o 12 ($f_{yb} = 900 \text{ N/mm}^2$, $f_{tb} = 1000 \text{ N/mm}^2$)

Diametro gambo $\varnothing = 24 \text{ mm}$ $A_{res} = 352.9 \text{ mm}^2$ (ridotta per filettatura)

Diametro dado/testa $d_m = 36 \text{ mm}$

Diametro foro $\varnothing_0 = 25.5 \text{ mm}$

Saldature:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\beta_1 = 0.70$ $\beta_2 = 0.85$

Spessore cordoni d'angolo $s_c = 10 \text{ mm}$

Sollecitazioni nella sezione d'attacco dell'elemento:

Nodo.CMB	V2 [N]	V3 [N]	N [N]	M2 [N mm]	M3 [N mm]	T [N mm]
497.1	58133.6	-85.4	-3993.8	103298.0	35639880.0	30510.0
497.2	59112.0	-97.7	-4316.0	117585.0	42329470.0	31867.0
497.3	120200.0	-170.3	-6037.6	204492.0	69213020.0	58216.0
497.4	121200.0	-182.7	-6359.8	218757.0	75898120.0	59572.0
497.5	44720.4	-66.6	-3106.8	80494.0	27418180.0	23476.0
497.6	45698.8	-79.0	-3429.0	94787.0	34097760.0	24832.0
497.7	106800.0	-151.6	-5150.5	181691.0	60984680.0	51181.0
497.8	107800.0	-163.9	-5472.8	195949.0	67679780.0	52537.0
497.9	60090.3	-110.1	-4638.1	131904.0	49009040.0	33223.0

497.10	101600.0	-144.8	-5424.4	174137.0	59148160.0	49904.0
497.11	103600.0	-169.6	-6068.9	202733.0	72528360.0	52616.0
497.12	46677.0	-91.4	-3751.2	109116.0	40787300.0	26188.0
497.13	88191.5	-126.1	-4537.4	151329.0	50917650.0	42869.0
497.14	90148.1	-150.9	-5182.0	179934.0	64286780.0	45582.0
497.15	102600.0	-157.2	-5746.6	188418.0	65833260.0	51260.0
497.16	89169.9	-138.5	-4859.7	165611.0	57607240.0	44226.0
497.17	57692.5	-80.3	-3832.1	97367.0	32657360.0	29890.0
497.18	58671.1	-92.6	-4154.2	111628.0	39337000.0	31246.0
497.19	119800.0	-165.2	-5875.8	198573.0	66240980.0	57595.0
497.20	120800.0	-177.5	-6198.0	212804.0	72926080.0	58952.0
497.21	44279.3	-61.5	-2945.1	74565.0	24425650.0	22855.0
497.22	45257.9	-73.9	-3267.2	88829.0	31115290.0	24212.0
497.23	106400.0	-146.5	-4988.8	175756.0	58012640.0	50561.0
497.24	107400.0	-158.8	-5311.0	189992.0	64697740.0	51917.0
497.25	59649.5	-105.0	-4476.4	125939.0	46026590.0	32602.0
497.26	101200.0	-139.7	-5262.6	168209.0	56166120.0	49284.0
497.27	103100.0	-164.5	-5907.1	196774.0	69520820.0	51996.0
497.28	46236.2	-86.3	-3589.4	103145.0	37794860.0	25568.0
497.29	87750.4	-121.0	-4375.7	145409.0	47935130.0	42249.0
497.30	89707.2	-145.8	-5020.2	173967.0	61304310.0	44961.0
497.31	57398.4	-76.9	-3724.3	93418.0	30662330.0	29476.0
497.32	58377.2	-89.2	-4046.4	107660.0	37352020.0	30833.0
497.33	100900.0	-136.3	-5154.8	164268.0	54179590.0	48870.0
497.34	101800.0	-148.7	-5477.0	178504.0	60839180.0	50226.0
497.35	43985.2	-58.2	-2837.3	70613.0	22430620.0	22442.0
497.36	44963.9	-70.5	-3159.4	84858.0	29120290.0	23798.0
497.37	87456.4	-117.6	-4267.8	141447.0	45940130.0	41835.0
497.38	88435.0	-130.0	-4590.0	155689.0	52629770.0	43192.0
497.39	102100.0	-152.1	-5584.8	182464.0	62835710.0	50640.0
497.40	88729.0	-133.4	-4697.9	159649.0	54614770.0	43605.0
497.41	58310.0	-87.4	-4058.5	105672.0	36834880.0	30758.0
497.42	59288.4	-99.8	-4380.7	119969.0	43524470.0	32115.0
497.43	120400.0	-172.3	-6102.3	206859.0	70414040.0	58464.0
497.44	121400.0	-184.7	-6424.5	221141.0	77099140.0	59820.0
497.45	44896.8	-68.7	-3171.5	82868.0	28603180.0	23724.0
497.46	45875.2	-81.1	-3493.7	97170.0	35292760.0	25080.0
497.47	107000.0	-153.6	-5215.2	184051.0	62185700.0	51429.0
497.48	108000.0	-166.0	-5537.6	198336.0	68880800.0	52785.0
497.49	60266.6	-112.2	-4702.9	134294.0	50204010.0	33471.0
497.50	101800.0	-146.9	-5489.1	176513.0	60349180.0	50152.0
497.51	103700.0	-171.6	-6133.7	205117.0	73703870.0	52864.0
497.52	46853.3	-93.5	-3815.9	111500.0	41982280.0	26436.0
497.53	88367.9	-128.1	-4602.1	153698.0	52112650.0	43117.0
497.54	90324.4	-152.9	-5246.7	182326.0	65481760.0	45830.0
497.55	102800.0	-159.2	-5811.4	190803.0	67034280.0	51508.0
497.56	89346.3	-140.5	-4924.4	167994.0	58802240.0	44474.0
497.57	58427.6	-88.8	-4101.6	107255.0	37634880.0	30924.0
497.58	59406.0	-101.1	-4423.8	121558.0	44314470.0	32280.0
497.59	101900.0	-148.2	-5532.3	178097.0	61134690.0	50317.0
497.60	102900.0	-160.6	-5854.5	192393.0	67829780.0	51674.0
497.61	45014.4	-70.0	-3214.7	84451.0	29403170.0	23889.0
497.62	45992.7	-82.4	-3536.8	98759.0	36092740.0	25245.0
497.63	88485.5	-129.5	-4645.3	155281.0	52912650.0	43283.0
497.64	89463.8	-141.9	-4967.5	169583.0	59592210.0	44639.0
497.108	52797.8	-124.2	2427.3	214197.0	45908720.0	30991.0
497.109	58969.7	-147.7	1641.0	239790.0	60483170.0	38591.0
497.110	54655.0	-271.7	424.0	362225.0	50552490.0	17177.0
497.111	60827.4	-295.0	-351.5	387666.0	65127070.0	24776.0
497.112	78227.7	89.5	-7330.8	-136979.0	16677890.0	44297.0

497.113	84399.8	65.9	-8112.6	-111115.0	31249390.0	51898.0
497.114	80027.0	-65.9	-9315.3	25431.0	21418890.0	30449.0
497.115	86197.9	-89.4	-10086.3	51147.0	35989080.0	38049.0
497.116	52890.8	-118.3	3522.9	207780.0	46192440.0	28629.0
497.117	59062.7	-141.8	2737.4	233426.0	60766890.0	36230.0
497.118	54573.8	-278.2	-666.2	369554.0	50261780.0	19545.0
497.119	60745.9	-301.5	-1438.8	394896.0	64826280.0	27145.0
497.120	78320.2	95.2	-6236.7	-143078.0	16958480.0	41935.0
497.121	84491.8	71.7	-7017.7	-117236.0	31530860.0	49535.0
497.122	79947.4	-71.7	-10412.0	31688.0	21111350.0	32817.0
497.123	86118.0	-95.2	-11186.6	57393.0	35688700.0	40416.0
497.124	52766.6	-222.3	2900.9	371348.0	46270760.0	30847.0
497.125	58937.9	-245.7	2111.3	396930.0	60845060.0	38447.0
497.126	54619.4	-370.7	879.8	520894.0	50923410.0	17031.0
497.127	60791.7	-394.2	106.1	546435.0	65487960.0	24631.0
497.128	78163.4	176.4	-7756.8	-274116.0	16484480.0	44386.0
497.129	84336.7	152.8	-8530.7	-248246.0	31054290.0	51987.0
497.130	79964.8	21.5	-9729.9	-112323.0	21221690.0	30540.0
497.131	86135.6	-2.1	-10500.6	-86576.0	35793190.0	38139.0
497.132	52856.9	-216.5	3992.1	364999.0	46553790.0	28485.0
497.133	59027.4	-239.9	3210.4	390573.0	61127890.0	36084.0
497.134	54537.4	-377.0	-203.3	527732.0	50622490.0	19399.0
497.135	60709.8	-400.2	-975.5	553053.0	65197070.0	26998.0
497.136	78252.8	181.8	-6654.7	-279806.0	16776290.0	42025.0
497.137	84425.3	158.3	-7438.0	-254044.0	31345890.0	49624.0
497.138	79883.9	15.6	-10838.7	-105965.0	20918580.0	32907.0
497.139	86055.2	-7.9	-11610.4	-80284.0	35492680.0	40506.0
497.140	59544.1	127.3	1470.8	-89450.0	30229700.0	51771.0
497.141	65722.6	104.5	684.8	-64981.0	44795840.0	59375.0
497.142	65671.3	-375.3	-5155.5	423405.0	45842750.0	5693.0
497.143	71837.7	-399.2	-5928.1	449955.0	60415800.0	13289.0
497.144	67193.7	193.1	-1458.9	-198101.0	21433110.0	55776.0
497.145	73372.3	170.3	-2244.8	-173655.0	35997280.0	63380.0
497.146	73259.8	-315.6	-8079.4	326082.0	37138580.0	9661.0
497.147	79426.3	-339.6	-8852.1	352632.0	51711650.0	17257.0
497.148	59531.7	97.7	1609.5	-41955.0	30346540.0	51726.0
497.149	65703.8	74.2	821.5	-16319.0	44921040.0	59326.0
497.150	65695.4	-401.4	-5022.7	464550.0	45888900.0	5670.0
497.151	71861.2	-425.4	-5795.9	491129.0	60471790.0	13265.0
497.152	67205.4	222.5	-1594.2	-245108.0	21324100.0	55821.0
497.153	73384.7	199.7	-2379.9	-220684.0	35880440.0	63426.0
497.154	73238.2	-289.4	-8210.4	284753.0	37083060.0	9686.0
497.155	79405.9	-313.2	-8983.2	311069.0	51656440.0	17283.0
497.156	59856.0	147.2	5124.3	-111042.0	31159270.0	43900.0
497.157	66035.5	124.4	4338.8	-86625.0	45725660.0	51504.0
497.158	65417.6	-394.8	-8800.3	444310.0	44798030.0	13593.0
497.159	71583.1	-418.7	-9573.5	470907.0	59380850.0	21188.0
497.160	67507.2	213.0	2200.3	-219668.0	22359090.0	47906.0
497.161	73686.8	190.2	1414.8	-195251.0	36917500.0	55511.0
497.162	73005.9	-335.0	-11729.5	346792.0	36093800.0	17561.0
497.163	79171.4	-358.9	-12502.7	373383.0	50676620.0	25156.0
497.164	59839.6	117.4	5257.1	-63141.0	31275080.0	43852.0
497.165	66013.0	94.0	4469.9	-37600.0	45849920.0	51453.0
497.166	65440.4	-421.0	-8664.7	485669.0	44853850.0	13568.0
497.167	71605.8	-445.0	-9437.8	512294.0	59426640.0	21164.0
497.168	67521.7	242.4	2070.1	-266707.0	22245790.0	47953.0
497.169	73701.3	219.6	1284.6	-242290.0	36801200.0	55558.0
497.170	72980.8	-308.8	-11865.2	305606.0	36047400.0	17583.0
497.171	79147.3	-332.7	-12637.8	332127.0	50620480.0	25179.0
497.268	54517.3	-19.5	-86.7	56968.0	18643360.0	26791.0

497.269	75089.9	-97.8	-2708.7	142436.0	67215430.0	52124.0
497.270	56375.1	-168.2	-2094.6	206928.0	23294290.0	12980.0
497.271	76937.7	-247.1	-4667.5	293749.0	71876810.0	38305.0
497.272	62157.1	45.7	-3021.7	-50514.0	9856276.0	30790.0
497.273	82744.6	-31.5	-5632.5	33157.0	58408150.0	56132.0
497.274	63970.5	-107.8	-5017.9	108338.0	14577870.0	16952.0
497.275	84538.4	-186.3	-7587.4	194450.0	63155740.0	42280.0
497.276	54608.9	-13.6	1007.0	50637.0	18924730.0	24429.0
497.277	75183.0	-91.9	-1611.9	136035.0	67499180.0	49764.0
497.278	56295.2	-174.4	-3187.8	213847.0	22987910.0	15348.0
497.279	76859.5	-253.1	-5757.7	300157.0	71566860.0	40674.0
497.280	62252.0	51.7	-1922.4	-56993.0	10132490.0	28430.0
497.281	82836.2	-25.7	-4536.7	27005.0	58691510.0	53770.0
497.282	63893.7	-113.5	-6114.3	114470.0	14266280.0	19321.0
497.283	84458.5	-192.2	-8687.7	200776.0	62845360.0	44648.0
497.284	54507.4	-48.9	53.4	104110.0	18750840.0	26748.0
497.285	75079.8	-127.2	-2569.1	189588.0	67322860.0	52081.0
497.286	56365.8	-197.5	-1963.4	253925.0	23399920.0	12937.0
497.287	76941.5	-275.3	-4538.2	338525.0	71957780.0	38269.0
497.288	62151.8	73.2	-3149.9	-94166.0	9774925.0	30825.0
497.289	82725.6	-5.4	-5756.1	-7977.0	58343300.0	56159.0
497.290	63948.5	-81.9	-5147.4	67532.0	14524260.0	16977.0
497.291	84520.0	-160.1	-7712.4	153046.0	63091050.0	42308.0
497.292	54600.6	-43.0	1147.5	97716.0	19029610.0	24387.0
497.293	75171.6	-121.3	-1469.8	183153.0	67606270.0	49719.0
497.294	56286.1	-203.8	-3056.6	260881.0	23094580.0	15305.0
497.295	76859.3	-281.5	-5624.1	345491.0	71666810.0	40637.0
497.296	62244.6	78.9	-2050.3	-100279.0	10055600.0	28463.0
497.297	82816.7	0.4	-4663.5	-14093.0	58626540.0	53796.0
497.298	63870.8	-87.7	-6243.4	73790.0	14214440.0	19346.0
497.299	84440.4	-165.9	-8817.8	159344.0	62790740.0	44676.0
677.1	7102.3	-26.1	554.7	23799.0	39411800.0	-57974.0
677.2	5477.1	-30.6	294.4	27442.0	42307210.0	-63278.0
677.3	17305.5	-53.0	1886.5	47897.0	80824630.0	-112473.0
677.4	15680.3	-57.4	1626.3	51538.0	83730040.0	-117777.0
677.5	5466.3	-20.6	306.7	18668.0	30304450.0	-44595.0
677.6	3841.1	-25.1	46.5	22311.0	33209870.0	-49899.0
677.7	15669.5	-47.5	1638.4	42767.0	71727290.0	-99095.0
677.8	14044.4	-51.9	1378.7	46406.0	74632730.0	-104398.0
677.9	3852.0	-35.0	34.6	31087.0	45212640.0	-68581.0
677.10	14244.5	-44.9	1486.7	40668.0	68403770.0	-96123.0
677.11	10994.3	-53.8	967.5	47955.0	74214640.0	-106731.0
677.12	2216.0	-29.5	-213.0	25958.0	36115300.0	-55203.0
677.13	12608.5	-39.4	1238.9	35537.0	59306430.0	-82745.0
677.14	9358.3	-48.3	719.9	42824.0	65107300.0	-93352.0
677.15	12619.4	-49.4	1226.8	44310.0	71309210.0	-101427.0
677.16	10983.4	-43.9	978.9	39179.0	62211860.0	-88049.0
677.17	7829.1	-24.3	656.9	22317.0	38107200.0	-55607.0
677.18	6203.9	-28.8	396.3	25957.0	41012620.0	-60911.0
677.19	18032.4	-51.2	1988.4	46417.0	79530060.0	-110107.0
677.20	16407.2	-55.7	1728.2	50054.0	82435470.0	-115410.0
677.21	6193.1	-18.8	408.9	17187.0	29009860.0	-42229.0
677.22	4567.9	-23.3	148.3	20827.0	31915270.0	-47532.0
677.23	16396.3	-45.7	1740.4	41285.0	70432700.0	-96728.0
677.24	14771.1	-50.1	1480.1	44922.0	73338100.0	-102032.0
677.25	4578.8	-33.3	136.3	29602.0	43918050.0	-66215.0
677.26	14971.4	-43.1	1588.6	39187.0	67099210.0	-93757.0
677.27	11721.1	-52.1	1069.0	46471.0	72910050.0	-104364.0
677.28	2942.8	-27.7	-111.6	24473.0	34820710.0	-52836.0
677.29	13335.4	-37.6	1340.7	34056.0	58001860.0	-80378.0

677.30	10085.1	-46.5	821.4	41340.0	63812710.0	-90986.0
677.31	8313.7	-23.1	724.9	21330.0	37240820.0	-54029.0
677.32	6688.5	-27.6	464.2	24968.0	40146240.0	-59333.0
677.33	15455.9	-41.9	1656.7	38200.0	66232800.0	-92179.0
677.34	13830.7	-46.4	1396.4	41838.0	69138220.0	-97483.0
677.35	6677.7	-17.6	476.9	16199.0	28143480.0	-40651.0
677.36	5052.5	-22.1	216.2	19838.0	31048890.0	-45955.0
677.37	13819.9	-36.4	1408.7	33068.0	57135460.0	-78800.0
677.38	12194.7	-40.9	1148.5	36706.0	60040870.0	-84104.0
677.39	13346.2	-47.6	1328.5	42826.0	70004620.0	-99061.0
677.40	11710.2	-42.1	1080.7	37694.0	60907280.0	-85682.0
677.41	6811.6	-26.8	513.9	24392.0	39927640.0	-58921.0
677.42	5186.4	-31.3	253.7	28035.0	42833050.0	-64224.0
677.43	17014.8	-53.7	1845.7	48489.0	81350470.0	-113420.0
677.44	15389.6	-58.2	1585.7	52131.0	84255890.0	-118724.0
677.45	5175.5	-21.3	265.9	19261.0	30830270.0	-45542.0
677.46	3550.4	-25.8	5.8	22905.0	33735710.0	-50846.0
677.47	15378.8	-48.2	1597.6	43358.0	72253130.0	-100041.0
677.48	13753.6	-52.6	1338.1	47000.0	75148540.0	-105345.0
677.49	3561.3	-35.8	-6.0	31681.0	45738490.0	-69528.0
677.50	13953.8	-45.6	1446.0	41261.0	68919620.0	-97070.0
677.51	10703.6	-54.6	927.0	48549.0	74730490.0	-107678.0
677.52	1925.3	-30.2	-253.6	26551.0	36641140.0	-56149.0
677.53	12317.8	-40.1	1198.1	36129.0	59822270.0	-83692.0
677.54	9067.6	-49.0	679.3	43419.0	65633140.0	-94299.0
677.55	12328.7	-50.1	1186.2	44904.0	71825050.0	-102374.0
677.56	10692.7	-44.6	938.4	39772.0	62727710.0	-88995.0
677.57	6617.7	-27.3	486.7	24787.0	40268180.0	-59552.0
677.58	4992.6	-31.8	226.6	28431.0	43173610.0	-64855.0
677.59	13760.0	-46.1	1418.8	41656.0	69270180.0	-97701.0
677.60	12134.9	-50.6	1159.1	45300.0	72175620.0	-103005.0
677.61	4981.7	-21.8	238.7	19656.0	31170830.0	-46173.0
677.62	3356.6	-26.2	-21.4	23301.0	34076270.0	-51477.0
677.63	12124.0	-40.6	1170.9	36524.0	60172830.0	-84323.0
677.64	10498.9	-45.0	911.3	40168.0	63068270.0	-89626.0
677.108	24742.3	0.6	15538.3	11605.0	19671760.0	-39885.0
677.109	18528.7	-9.4	16647.5	19313.0	30806670.0	-49674.0
677.110	21684.2	-64.0	5083.9	61723.0	25131640.0	-50106.0
677.111	15470.9	-74.0	6204.3	69423.0	36256620.0	-59895.0
677.112	3629.5	11.4	-4188.3	-12184.0	57485890.0	-72880.0
677.113	-2584.3	1.3	-3078.8	-4426.0	68610740.0	-82671.0
677.114	579.8	-54.0	-14553.9	39480.0	62927910.0	-83087.0
677.115	-5633.6	-64.1	-13438.2	47210.0	74052870.0	-92876.0
677.116	24432.8	5.8	13136.1	7065.0	20222810.0	-41321.0
677.117	18218.8	-4.2	14234.7	14794.0	31357620.0	-51112.0
677.118	21991.7	-69.5	7434.3	66526.0	24590080.0	-48674.0
677.119	15778.4	-79.5	8563.8	74201.0	35715070.0	-58463.0
677.120	3320.1	16.6	-6589.1	-16696.0	58036960.0	-74317.0
677.121	-2893.7	6.5	-5482.3	-8949.0	69161820.0	-84107.0
677.122	888.3	-59.4	-12190.8	44097.0	62376610.0	-81652.0
677.123	-5325.0	-69.4	-11074.7	51823.0	73501590.0	-91441.0
677.124	24641.1	-18.0	14340.1	34854.0	19855950.0	-39928.0
677.125	18427.6	-28.0	15447.1	42559.0	30980880.0	-49717.0
677.126	21582.9	-82.7	3823.2	85140.0	25315800.0	-50149.0
677.127	15369.2	-92.8	4936.9	92865.0	36440680.0	-59939.0
677.128	3744.0	28.7	-2838.9	-33234.0	57275090.0	-72815.0
677.129	-2470.0	18.6	-1731.9	-25470.0	68409900.0	-82606.0
677.130	694.1	-36.6	-13166.0	18331.0	62717060.0	-83022.0
677.131	-5519.3	-46.6	-12051.1	26063.0	73852020.0	-92811.0
677.132	24331.4	-12.8	11914.2	30329.0	20406940.0	-41365.0

677.133	18117.7	-22.8	13022.5	38039.0	31531820.0	-51154.0
677.134	21890.9	-88.1	6209.3	89831.0	24764370.0	-48716.0
677.135	15677.6	-98.1	7341.0	97501.0	35889360.0	-58505.0
677.136	3433.6	33.8	-5266.6	-37668.0	57825910.0	-74253.0
677.137	-2780.0	23.8	-4160.3	-29936.0	68960820.0	-84043.0
677.138	1002.5	-41.9	-10809.0	22973.0	62175740.0	-81588.0
677.139	-5210.8	-52.0	-9689.4	30693.0	73300730.0	-91377.0
677.140	20920.5	80.4	21000.1	-56234.0	26536820.0	-39507.0
677.141	14705.8	70.5	22101.9	-48640.0	37671450.0	-49298.0
677.142	10731.7	-136.2	-13791.7	113048.0	44727660.0	-73572.0
677.143	4519.2	-146.3	-12668.6	120864.0	55852850.0	-83360.0
677.144	14582.6	83.8	15043.8	-63717.0	37890020.0	-49413.0
677.145	8367.9	73.8	16145.5	-56125.0	49024650.0	-59205.0
677.146	4404.1	-133.4	-19663.1	106764.0	56053490.0	-83459.0
677.147	-1808.4	-143.5	-18539.9	114581.0	67178670.0	-93247.0
677.148	20890.7	74.9	20641.0	-49232.0	26589220.0	-39518.0
677.149	14677.1	64.8	21748.1	-41514.0	37724130.0	-49308.0
677.150	10696.1	-141.4	-14210.1	119368.0	44788580.0	-73595.0
677.151	4483.8	-151.5	-13084.5	127189.0	55913820.0	-83382.0
677.152	14612.4	89.3	15412.9	-70658.0	37837620.0	-49402.0
677.153	8397.5	79.4	16510.8	-63072.0	48962200.0	-59194.0
677.154	4439.1	-128.1	-19252.0	100419.0	55992410.0	-83438.0
677.155	-1773.7	-138.2	-18129.4	108212.0	67117530.0	-93226.0
677.156	19889.3	98.0	13006.3	-71362.0	28373760.0	-44295.0
677.157	13674.3	88.0	14102.9	-63778.0	39498320.0	-54087.0
677.158	11758.3	-154.1	-5896.9	128517.0	42899540.0	-68794.0
677.159	5546.0	-164.2	-4770.6	136342.0	54024790.0	-78581.0
677.160	13551.0	101.3	7050.0	-78843.0	39726860.0	-54202.0
677.161	7336.0	91.4	8146.6	-71258.0	50851410.0	-63994.0
677.162	5430.6	-151.3	-11775.5	122211.0	54235340.0	-78681.0
677.163	-781.7	-161.4	-10648.9	130035.0	65360590.0	-88468.0
677.164	19860.4	92.4	12649.1	-64316.0	28426390.0	-44305.0
677.165	13646.4	82.3	13750.8	-56613.0	39551200.0	-54095.0
677.166	11723.1	-159.3	-6303.9	134865.0	42960560.0	-68816.0
677.167	5510.8	-169.4	-5179.6	142697.0	54085810.0	-78603.0
677.168	13580.0	106.9	7410.8	-85795.0	39674260.0	-54193.0
677.169	7365.0	96.9	8507.4	-78211.0	50798810.0	-63985.0
677.170	5466.5	-146.0	-11356.4	115890.0	54164510.0	-78658.0
677.171	-746.1	-156.1	-10233.3	123703.0	65289670.0	-88445.0
677.268	24600.3	16.4	7325.8	-6244.0	19925540.0	-40015.0
677.269	3888.0	-17.1	11008.0	19495.0	57021830.0	-72646.0
677.270	21540.3	-48.3	-3152.9	44108.0	25384930.0	-50240.0
677.271	831.0	-81.9	590.3	70001.0	62481990.0	-82866.0
677.272	18264.5	19.7	1382.5	-13598.0	31269280.0	-49917.0
677.273	-2450.2	-13.7	5062.3	11969.0	68374960.0	-82554.0
677.274	15211.8	-45.5	-9026.2	37698.0	36720530.0	-60129.0
677.275	-5498.6	-79.0	-5289.4	63511.0	73817300.0	-92757.0
677.276	24291.4	21.7	4931.6	-10763.0	20476740.0	-41450.0
677.277	3578.0	-11.9	8598.5	14966.0	57572750.0	-74084.0
677.278	21848.9	-53.7	-778.0	48821.0	24843650.0	-48806.0
677.279	1138.8	-87.3	2964.2	74662.0	61930510.0	-81433.0
677.280	17954.8	25.0	-1017.9	-18139.0	31820270.0	-51354.0
677.281	-2759.4	-8.4	2664.9	7429.0	68926070.0	-83990.0
677.282	15520.0	-50.8	-6658.5	42326.0	36179150.0	-58695.0
677.283	-5190.0	-84.3	-2915.5	68134.0	73266030.0	-91322.0
677.284	24570.0	10.9	6964.5	722.0	19977810.0	-40027.0
677.285	3857.7	-22.6	10646.3	26466.0	57074100.0	-72659.0
677.286	21510.1	-53.9	-3532.7	51064.0	25447230.0	-50253.0
677.287	798.7	-87.3	199.9	76716.0	62533750.0	-82883.0
677.288	18296.6	25.1	1767.7	-20186.0	31217460.0	-49901.0

677.289	-2415.9	-8.5	5465.8	5649.0	68313700.0	-82534.0
677.290	15246.6	-40.3	-8608.3	31410.0	36659410.0	-60109.0
677.291	-5464.4	-73.8	-4873.9	57162.0	73756030.0	-92738.0
677.292	24260.6	16.1	4560.7	-3811.0	20528880.0	-41464.0
677.293	3548.2	-17.4	8245.0	21924.0	57625140.0	-74096.0
677.294	21818.3	-59.3	-1165.9	55787.0	24895850.0	-48819.0
677.295	1107.0	-92.7	2585.0	81420.0	61992390.0	-81448.0
677.296	17987.2	30.3	-630.6	-24687.0	31768530.0	-51338.0
677.297	-2725.1	-3.2	3064.0	1122.0	68864820.0	-83970.0
677.298	15554.9	-45.6	-6241.0	36047.0	36108060.0	-58674.0
677.299	-5156.1	-79.1	-2515.5	61799.0	73204680.0	-91304.0
734.1	19183.2	5.9	-1617.3	442.0	21773630.0	-22402.0
734.2	17486.1	5.5	-1729.9	1247.0	27760700.0	-24800.0
734.3	43358.7	8.4	-1523.7	3871.0	42780800.0	-41548.0
734.4	41661.6	8.0	-1635.8	4691.0	48767880.0	-43946.0
734.5	14754.4	4.4	-1287.7	448.0	16743850.0	-17238.0
734.6	13057.3	3.9	-1400.3	1250.0	22720920.0	-19636.0
734.7	38930.0	6.9	-1194.0	3876.0	37751040.0	-36385.0
734.8	37232.9	6.5	-1306.2	4698.0	43738110.0	-38783.0
734.9	15789.0	5.0	-1842.4	2044.0	33737780.0	-27198.0
734.10	36106.1	7.7	-1552.0	2838.0	36480660.0	-35804.0
734.11	32711.9	6.8	-1776.2	4458.0	48444810.0	-40600.0
734.12	11360.2	3.5	-1512.8	2047.0	28707990.0	-22034.0
734.13	31677.3	6.2	-1222.4	2846.0	31450880.0	-30641.0
734.14	28283.1	5.3	-1446.5	4464.0	43415020.0	-35437.0
734.15	34409.0	7.2	-1664.1	3654.0	42457740.0	-38202.0
734.16	29980.2	5.7	-1334.5	3661.0	37427950.0	-33039.0
734.17	19943.3	6.0	-1548.0	158.0	19097540.0	-21324.0
734.18	18246.2	5.6	-1660.7	969.0	25084610.0	-23722.0
734.19	44118.9	8.5	-1454.7	3579.0	40104730.0	-40470.0
734.20	42421.8	8.1	-1566.9	4408.0	46091800.0	-42868.0
734.21	15514.6	4.5	-1218.5	163.0	14067780.0	-16161.0
734.22	13817.5	4.0	-1331.2	973.0	20054840.0	-18559.0
734.23	39690.2	7.0	-1125.0	3589.0	35074970.0	-35307.0
734.24	37993.1	6.6	-1237.2	4416.0	41062040.0	-37705.0
734.25	16549.2	5.1	-1773.3	1768.0	31061700.0	-26120.0
734.26	36866.2	7.8	-1482.9	2549.0	33804570.0	-34726.0
734.27	33472.0	6.9	-1707.3	4178.0	45768710.0	-39522.0
734.28	12120.4	3.6	-1443.7	1770.0	26031910.0	-20957.0
734.29	32437.5	6.3	-1153.3	2554.0	28774810.0	-29563.0
734.30	29043.3	5.4	-1377.6	4186.0	40738950.0	-34359.0
734.31	20450.1	6.1	-1501.8	-33.0	17316820.0	-20606.0
734.32	18753.0	5.6	-1614.6	784.0	23293890.0	-23004.0
734.33	37373.0	7.9	-1436.9	2354.0	32023850.0	-34008.0
734.34	35675.9	7.4	-1549.2	3181.0	38000920.0	-36406.0
734.35	16021.4	4.5	-1172.3	-28.0	12286060.0	-15442.0
734.36	14324.3	4.1	-1285.1	788.0	18264130.0	-17840.0
734.37	32944.3	6.3	-1107.3	2365.0	26994090.0	-28845.0
734.38	31247.2	5.9	-1219.6	3190.0	32971160.0	-31243.0
734.39	35169.1	7.3	-1595.2	3371.0	39781640.0	-37124.0
734.40	30740.4	5.8	-1265.6	3381.0	34751880.0	-31961.0
734.41	18879.1	5.9	-1644.9	556.0	22846060.0	-22833.0
734.42	17182.0	5.4	-1757.5	1358.0	28823130.0	-25231.0
734.43	43054.6	8.4	-1551.3	3987.0	43853230.0	-41979.0
734.44	41357.6	7.9	-1663.4	4803.0	49830320.0	-44377.0
734.45	14450.3	4.3	-1315.4	561.0	17816270.0	-17669.0
734.46	12753.3	3.9	-1428.0	1361.0	23793370.0	-20067.0
734.47	38625.9	6.9	-1221.6	3995.0	38823470.0	-36816.0
734.48	36928.8	6.4	-1333.7	4810.0	44800540.0	-39214.0
734.49	15484.9	5.0	-1870.0	2154.0	34810200.0	-27629.0

734.50	35802.0	7.6	-1579.6	2952.0	37553090.0	-36235.0
734.51	32407.8	6.7	-1803.8	4570.0	49517230.0	-41031.0
734.52	11056.2	3.5	-1540.4	2158.0	29780440.0	-22465.0
734.53	31373.2	6.1	-1250.0	2962.0	32523300.0	-31072.0
734.54	27979.1	5.2	-1474.2	4573.0	44477470.0	-35868.0
734.55	34104.9	7.2	-1691.7	3765.0	43530160.0	-38633.0
734.56	29676.1	5.7	-1362.1	3773.0	38500370.0	-33470.0
734.57	18676.4	5.8	-1663.4	632.0	23554350.0	-23120.0
734.58	16979.3	5.4	-1776.0	1431.0	29541420.0	-25518.0
734.59	35599.3	7.6	-1598.0	3029.0	38261380.0	-36522.0
734.60	33902.2	7.2	-1710.1	3840.0	44248450.0	-38920.0
734.61	14247.6	4.3	-1333.8	637.0	18524560.0	-17957.0
734.62	12550.5	3.9	-1446.4	1435.0	24511630.0	-20355.0
734.63	31170.5	6.1	-1268.4	3039.0	33231590.0	-31359.0
734.64	29473.4	5.6	-1380.4	3848.0	39218660.0	-33757.0
734.108	19805.1	24.2	-4650.8	-26164.0	-17947720.0	-30263.0
734.109	13269.4	26.4	-5228.3	-22494.0	1924024.0	-45815.0
734.110	15684.5	72.6	-6894.8	-68908.0	-8248885.0	-37338.0
734.111	9148.9	74.8	-7460.1	-65246.0	11625880.0	-52889.0
734.112	39706.1	-61.2	5068.6	64249.0	38619020.0	3088.0
734.113	33170.3	-58.9	4490.1	67622.0	58491740.0	-12463.0
734.114	35588.2	-10.1	2807.5	16705.0	48278550.0	-4003.0
734.115	29053.0	-7.6	2240.1	19923.0	68151420.0	-19553.0
734.116	20212.3	62.4	-4991.7	-61742.0	-17963840.0	-30037.0
734.117	13676.6	64.7	-5573.7	-58151.0	1910901.0	-45589.0
734.118	15275.5	34.2	-6512.9	-33292.0	-8223220.0	-37562.0
734.119	8740.0	36.4	-7075.6	-29619.0	11651570.0	-53113.0
734.120	40113.3	-23.0	4729.6	28654.0	38602900.0	3315.0
734.121	33577.8	-20.6	4150.3	31981.0	58475690.0	-12236.0
734.122	35180.3	-48.5	3181.5	52483.0	48304490.0	-4223.0
734.123	28645.1	-46.1	2609.1	55731.0	68177360.0	-19774.0
734.124	19913.2	-37.2	-3804.5	34142.0	-17780140.0	-30122.0
734.125	13377.7	-35.0	-4385.3	37831.0	2093651.0	-45673.0
734.126	15793.3	12.0	-6081.7	-9435.0	-8081129.0	-37197.0
734.127	9257.6	14.2	-6646.9	-5791.0	11789610.0	-52749.0
734.128	39601.6	4.2	4235.7	-3281.0	38382370.0	2924.0
734.129	33066.1	6.6	3669.2	6.8	58245160.0	-12626.0
734.130	35484.2	55.0	2000.6	-50430.0	48042020.0	-4165.0
734.131	28949.0	57.5	1431.5	-47235.0	67904890.0	-19716.0
734.132	20321.3	1.2	-4158.9	-1603.0	-17796040.0	-29896.0
734.133	13785.7	3.5	-4734.5	1996.0	2073732.0	-45448.0
734.134	15384.6	-26.4	-5691.9	26246.0	-8055389.0	-37421.0
734.135	8849.0	-24.3	-6253.6	29950.0	11814380.0	-52972.0
734.136	40009.4	42.7	3893.9	-39166.0	38356400.0	3148.0
734.137	33474.0	45.1	3314.0	-35833.0	58229220.0	-12402.0
734.138	35076.0	16.4	2356.8	-14522.0	48067890.0	-4387.0
734.139	28540.8	18.9	1789.9	-11273.0	67930760.0	-19938.0
734.140	31578.1	-63.3	1493.6	57237.0	-9454427.0	-10333.0
734.141	25042.2	-61.3	917.0	61173.0	10415270.0	-25883.0
734.142	17845.0	102.2	-6028.6	-91827.0	22832260.0	-33936.0
734.143	11310.0	104.7	-6599.8	-88718.0	42695180.0	-49488.0
734.144	37547.7	-89.5	4411.5	85439.0	7521418.0	-321.0
734.145	31011.8	-87.4	3834.8	89380.0	27401110.0	-15871.0
734.146	23817.7	78.2	-3123.4	-67533.0	39775900.0	-23941.0
734.147	17282.7	80.7	-3694.5	-64420.0	59638820.0	-39493.0
734.148	31610.9	-81.7	1743.8	75254.0	-9406059.0	-10291.0
734.149	25075.3	-79.5	1167.9	78952.0	10460710.0	-25843.0
734.150	17876.0	82.8	-5787.8	-71813.0	22900170.0	-33885.0
734.151	11340.9	85.3	-6356.8	-68672.0	42773060.0	-49437.0
734.152	37514.9	-71.1	4171.6	67406.0	7471051.0	-363.0

734.153	30979.0	-69.0	3591.3	71285.0	27342740.0	-15912.0
734.154	23786.7	97.6	-3370.3	-87612.0	39697990.0	-23991.0
734.155	17251.6	100.1	-3941.7	-84446.0	59560880.0	-39543.0
734.156	32934.9	63.7	378.9	-60846.0	-9498307.0	-9579.0
734.157	26399.1	65.9	-202.6	-56986.0	10373410.0	-25128.0
734.158	16481.7	-26.6	-4753.4	28021.0	22934480.0	-34673.0
734.159	9946.7	-24.1	-5321.4	31173.0	42797400.0	-50226.0
734.160	38904.5	37.6	3297.1	-32608.0	7479538.0	434.0
734.161	32368.7	39.7	2715.6	-28748.0	27357260.0	-15115.0
734.162	22454.4	-50.6	-1854.8	52224.0	39868120.0	-24679.0
734.163	15919.4	-48.1	-2422.8	55379.0	59741040.0	-40231.0
734.164	32967.9	45.4	628.8	-42944.0	-9449888.0	-9538.0
734.165	26432.3	47.6	48.0	-39313.0	10416880.0	-25090.0
734.166	16512.6	-46.1	-4502.3	48177.0	23002360.0	-34623.0
734.167	9977.5	-43.6	-5070.6	51319.0	42865260.0	-50175.0
734.168	38871.8	56.1	3049.6	-50745.0	7429196.0	393.0
734.169	32335.9	58.2	2468.1	-46885.0	27298890.0	-15156.0
734.170	22423.4	-31.2	-2095.0	32220.0	39800210.0	-24730.0
734.171	15888.4	-28.7	-2666.1	35337.0	59663130.0	-40282.0
734.268	34394.6	-9.3	-575.0	2904.0	-21315940.0	-442.0
734.269	12609.3	-2.0	-2494.0	15126.0	44916630.0	-52280.0
734.270	30273.5	39.6	-2834.5	-40310.0	-11617230.0	-7519.0
734.271	8489.5	47.4	-4722.7	-29124.0	54615670.0	-59356.0
734.272	40364.4	-35.5	2349.3	31055.0	-4333042.0	9566.0
734.273	18578.0	-28.2	429.3	43265.0	61909250.0	-42268.0
734.274	36245.6	15.1	78.9	-15338.0	5334253.0	2478.0
734.275	14461.1	23.2	-1817.9	-4524.0	71559020.0	-49358.0
734.276	34801.6	28.8	-906.2	-32503.0	-21332110.0	-216.0
734.277	13016.3	36.4	-2841.3	-20541.0	44910460.0	-52055.0
734.278	29864.6	1.0	-2448.6	-4515.0	-11581540.0	-7741.0
734.279	8080.5	8.8	-4337.8	6843.0	54641340.0	-59579.0
734.280	40771.5	2.7	2012.9	-4387.0	-4349191.0	9793.0
734.281	18985.6	10.2	80.4	7596.0	61893220.0	-42041.0
734.282	35836.6	-23.6	461.2	20628.0	5364917.0	2256.0
734.283	14052.8	-15.4	-1443.3	31377.0	71584870.0	-49580.0
734.284	34427.3	-27.6	-324.9	20978.0	-21267600.0	-399.0
734.285	12641.9	-20.4	-2244.7	33200.0	44974950.0	-52238.0
734.286	30306.1	21.2	-2586.7	-22254.0	-11558910.0	-7476.0
734.287	8521.2	28.6	-4479.0	-10190.0	54673760.0	-59311.0
734.288	40332.6	-16.3	2099.9	11697.0	-4401154.0	9521.0
734.289	18546.9	-8.5	181.1	22941.0	61831310.0	-42316.0
734.290	36214.5	34.6	-165.2	-35497.0	5260319.0	2428.0
734.291	14429.9	42.7	-2057.1	-24617.0	71491070.0	-49407.0
734.292	34834.4	10.6	-665.0	-14578.0	-21283750.0	-173.0
734.293	13049.1	18.0	-2586.0	-2440.0	44958820.0	-52013.0
734.294	29897.3	-17.3	-2203.4	13474.0	-11533200.0	-7698.0
734.295	8112.6	-9.9	-4090.7	25490.0	54699520.0	-59534.0
734.296	40739.8	21.9	1763.1	-23880.0	-4417277.0	9747.0
734.297	18954.4	29.9	-171.0	-12706.0	61815270.0	-42090.0
734.298	35805.8	-4.0	216.9	415.0	5289060.0	2206.0
734.299	14021.6	4.1	-1690.9	11284.0	71516910.0	-49629.0
1201.1	29646.9	70.0	-1271.6	-66408.0	11054920.0	-1419.0
1201.2	30082.2	81.1	-1361.6	-77034.0	10530970.0	-303.0
1201.3	62120.8	141.1	-1378.4	-135050.0	27837020.0	-2840.0
1201.4	62556.2	152.2	-1468.3	-145678.0	27308090.0	-1724.0
1201.5	22808.2	54.9	-994.8	-52130.0	8493372.0	-1093.0
1201.6	23243.6	66.0	-1084.8	-62756.0	7970443.0	23.0
1201.7	55282.2	126.1	-1101.5	-120771.0	25272490.0	-2514.0
1201.8	55717.5	137.2	-1191.5	-131401.0	24743530.0	-1398.0
1201.9	30517.6	92.1	-1451.6	-87660.0	10008040.0	813.0

1201.10	52378.6	119.8	-1346.3	-114456.0	22799780.0	-2414.0
1201.11	53249.3	142.0	-1526.3	-135712.0	21752900.0	-182.0
1201.12	23678.9	77.1	-1174.8	-73383.0	7446488.0	1139.0
1201.13	45540.0	104.7	-1069.5	-100179.0	20238250.0	-2088.0
1201.14	46410.7	126.9	-1249.5	-121435.0	19191370.0	144.0
1201.15	52814.0	130.9	-1436.3	-125084.0	22275850.0	-1298.0
1201.16	45975.3	115.8	-1159.4	-110807.0	19715300.0	-972.0
1201.17	29452.2	65.5	-1211.4	-62095.0	11288260.0	-1904.0
1201.18	29887.6	76.5	-1301.3	-72722.0	10765330.0	-788.0
1201.19	61926.2	136.6	-1318.2	-130735.0	28067380.0	-3325.0
1201.20	62361.5	147.7	-1408.1	-141365.0	27538420.0	-2209.0
1201.21	22613.6	50.4	-934.5	-47817.0	8727730.0	-1578.0
1201.22	23048.9	61.5	-1024.5	-58444.0	8203774.0	-462.0
1201.23	55087.5	121.6	-1041.2	-116457.0	25502820.0	-2999.0
1201.24	55522.9	132.6	-1131.1	-127087.0	24983890.0	-1883.0
1201.25	30322.9	87.6	-1391.3	-83347.0	10241370.0	328.0
1201.26	52184.0	115.3	-1286.1	-110142.0	23033140.0	-2899.0
1201.27	53054.7	137.4	-1466.0	-131399.0	21986250.0	-666.0
1201.28	23484.3	72.6	-1114.5	-69069.0	7679845.0	654.0
1201.29	45345.3	100.2	-1009.3	-95864.0	20472590.0	-2573.0
1201.30	46216.0	122.4	-1189.2	-117122.0	19424700.0	-341.0
1201.31	29322.5	62.5	-1171.2	-59219.0	11444170.0	-2228.0
1201.32	29757.8	73.5	-1261.1	-69847.0	10921220.0	-1111.0
1201.33	52054.2	112.3	-1245.9	-107266.0	23189030.0	-3222.0
1201.34	52489.6	123.4	-1335.8	-117895.0	22665100.0	-2106.0
1201.35	22483.8	47.4	-894.3	-44941.0	8882617.0	-1902.0
1201.36	22919.2	58.5	-984.3	-55569.0	8359688.0	-785.0
1201.37	45215.6	97.2	-969.1	-92988.0	20627500.0	-2896.0
1201.38	45650.9	108.3	-1059.0	-103618.0	20104540.0	-1780.0
1201.39	52619.3	126.4	-1376.0	-120771.0	22510180.0	-1783.0
1201.40	45780.7	111.3	-1099.2	-106494.0	19948660.0	-1457.0
1201.41	29724.7	71.8	-1295.7	-68133.0	10961770.0	-1225.0
1201.42	30160.1	82.9	-1385.7	-78759.0	10437840.0	-109.0
1201.43	62198.7	142.9	-1402.5	-136775.0	27736890.0	-2646.0
1201.44	62634.0	154.0	-1492.4	-147403.0	27217930.0	-1530.0
1201.45	22886.1	56.7	-1018.9	-53855.0	8400245.0	-899.0
1201.46	23321.4	67.8	-1108.9	-64481.0	7876289.0	217.0
1201.47	55360.0	127.9	-1125.6	-122497.0	25182340.0	-2320.0
1201.48	55795.4	139.0	-1215.6	-133126.0	24653410.0	-1204.0
1201.49	30595.5	93.9	-1475.8	-89385.0	9913912.0	1007.0
1201.50	52456.5	121.6	-1370.4	-116181.0	22706650.0	-2220.0
1201.51	53327.2	143.8	-1550.5	-137438.0	21658770.0	12.0
1201.52	23756.8	78.9	-1199.0	-75108.0	7352360.0	1333.0
1201.53	45617.8	106.5	-1093.6	-101905.0	20145100.0	-1894.0
1201.54	46488.6	128.7	-1273.6	-123160.0	19097240.0	338.0
1201.55	52891.8	132.7	-1460.4	-126810.0	22182700.0	-1104.0
1201.56	46053.2	117.6	-1183.6	-112532.0	19621170.0	-778.0
1201.57	29776.6	73.0	-1311.8	-69284.0	10899010.0	-1096.0
1201.58	30212.0	84.1	-1401.8	-79909.0	10376080.0	20.0
1201.59	52508.4	122.8	-1386.5	-117332.0	22643890.0	-2091.0
1201.60	52943.7	133.9	-1476.5	-127960.0	22120940.0	-974.0
1201.61	22938.0	57.9	-1034.9	-55005.0	8337484.0	-770.0
1201.62	23373.4	69.0	-1125.0	-65631.0	7814555.0	346.0
1201.63	45669.7	107.7	-1109.7	-103055.0	20082340.0	-1765.0
1201.64	46105.1	118.8	-1199.7	-113683.0	19559410.0	-649.0
1201.108	34287.2	-51.7	2188.9	52700.0	-6793335.0	-4821.0
1201.109	36554.8	-25.9	1506.7	28112.0	7465130.0	-10095.0
1201.110	35733.8	156.8	-831.6	-145999.0	-9574308.0	3662.0
1201.111	38001.4	182.7	-1501.7	-170603.0	4689157.0	-1612.0
1201.112	33596.8	-17.2	-447.2	13054.0	25710540.0	-1764.0

1201.113	35864.6	8.6	-1132.4	-11558.0	39969060.0	-7040.0
1201.114	35047.4	191.4	-3507.8	-185380.0	22920590.0	6680.0
1201.115	37315.1	217.1	-4172.1	-209839.0	37179080.0	1403.0
1201.116	34053.7	-51.2	2514.8	51551.0	-6772901.0	-7338.0
1201.117	36321.4	-25.4	1832.7	26929.0	7488589.0	-12612.0
1201.118	35966.9	156.3	-1132.4	-144784.0	-9594844.0	6185.0
1201.119	38234.4	182.1	-1799.1	-169386.0	4667596.0	911.0
1201.120	33363.4	-16.7	-120.3	11920.0	25731000.0	-4282.0
1201.121	35631.2	9.0	-800.1	-12577.0	39999520.0	-9558.0
1201.122	35279.9	190.5	-3810.9	-183827.0	22899900.0	9204.0
1201.123	37547.7	216.2	-4482.6	-208343.0	37158420.0	3928.0
1201.124	34293.4	-78.9	2976.8	80558.0	-6631753.0	-5301.0
1201.125	36561.0	-53.1	2290.0	55959.0	7628712.0	-10575.0
1201.126	35740.3	129.4	-54.8	-117882.0	-9412649.0	3180.0
1201.127	38007.9	155.2	-722.0	-142524.0	4851815.0	-2094.0
1201.128	33598.9	10.2	-1242.7	-14362.0	25521080.0	-1359.0
1201.129	35866.6	35.8	-1909.2	-38811.0	39779570.0	-6635.0
1201.130	35049.4	218.6	-4277.1	-212634.0	22731100.0	7084.0
1201.131	37317.2	244.3	-4941.5	-237089.0	36989620.0	1808.0
1201.132	34060.0	-78.6	3301.6	79535.0	-6611294.0	-7819.0
1201.133	36327.8	-52.7	2625.4	54913.0	7651222.0	-13094.0
1201.134	35973.3	128.8	-347.6	-116629.0	-9433211.0	5702.0
1201.135	38240.8	154.6	-1013.4	-141238.0	4830228.0	428.0
1201.136	33365.9	10.6	-898.8	-15416.0	25541640.0	-3879.0
1201.137	35633.6	36.2	-1580.4	-39852.0	39800130.0	-9155.0
1201.138	35282.1	218.1	-4610.5	-211430.0	22710460.0	9609.0
1201.139	37549.8	243.7	-5275.9	-235882.0	36968950.0	4333.0
1201.140	32356.2	-283.3	4970.7	270881.0	7824066.0	-13636.0
1201.141	34623.5	-257.5	4289.9	246289.0	22082450.0	-18907.0
1201.142	37184.0	412.3	-5137.4	-391434.0	-1454362.0	14588.0
1201.143	39452.0	438.0	-5808.4	-415930.0	12810210.0	9310.0
1201.144	32148.0	-273.0	4194.6	258917.0	17579950.0	-12708.0
1201.145	34415.3	-247.2	3513.9	234325.0	31839340.0	-17980.0
1201.146	36979.4	422.5	-5948.9	-403003.0	8292445.0	15480.0
1201.147	39247.4	448.3	-6620.2	-427506.0	22552010.0	10202.0
1201.148	32358.1	-291.5	5203.7	279299.0	7873014.0	-13781.0
1201.149	34625.7	-265.8	4520.4	254721.0	22133020.0	-19055.0
1201.150	37183.4	404.1	-4896.4	-383229.0	-1394515.0	14467.0
1201.151	39451.4	429.8	-5567.9	-407735.0	12868050.0	9188.0
1201.152	32146.4	-264.7	3966.7	250479.0	17529550.0	-12566.0
1201.153	34413.7	-239.0	3286.1	225904.0	31788930.0	-17837.0
1201.154	36979.9	430.7	-6188.1	-411182.0	8235573.0	15602.0
1201.155	39247.8	456.4	-6860.3	-435710.0	22492110.0	10324.0
1201.156	31577.8	-281.6	6061.1	266987.0	7901897.0	-22025.0
1201.157	33845.0	-255.8	5380.7	242418.0	22163860.0	-27296.0
1201.158	37959.0	410.0	-6154.1	-387092.0	-1516659.0	23009.0
1201.159	40227.0	435.8	-6825.6	-411604.0	12744910.0	17730.0
1201.160	31369.5	-271.3	5291.3	255027.0	17657360.0	-21097.0
1201.161	33636.8	-245.5	4610.9	230458.0	31920750.0	-26368.0
1201.162	37754.4	420.3	-6972.6	-398649.0	8228148.0	23901.0
1201.163	40022.4	446.0	-7644.2	-423160.0	22489710.0	18622.0
1201.164	31579.8	-289.8	6287.3	275406.0	7950447.0	-22172.0
1201.165	33847.4	-264.0	5604.7	250851.0	22214470.0	-27445.0
1201.166	37958.5	401.9	-5909.0	-378921.0	-1456786.0	22887.0
1201.167	40226.5	427.6	-6580.3	-403439.0	12801780.0	17608.0
1201.168	31367.8	-263.1	5068.9	246631.0	17607930.0	-20954.0
1201.169	33635.1	-237.3	4388.4	222062.0	31870310.0	-26225.0
1201.170	37755.0	428.5	-7217.3	-406866.0	8170301.0	24022.0
1201.171	40023.0	454.2	-7888.3	-431363.0	22429870.0	18744.0
1201.268	31398.0	-69.8	2059.5	67476.0	-12050370.0	2419.0

1201.269	38956.8	16.1	-209.2	-14413.0	35487880.0	-15161.0
1201.270	32844.9	138.9	-974.3	-131362.0	-14831270.0	10901.0
1201.271	40404.3	224.7	-3202.2	-213113.0	32707140.0	-6688.0
1201.272	31190.1	-59.4	1276.6	55479.0	-2293406.0	3345.0
1201.273	38748.4	26.5	-992.4	-26498.0	45244720.0	-14232.0
1201.274	32639.8	149.2	-1782.0	-143044.0	-5083587.0	11798.0
1201.275	40199.2	235.0	-4011.3	-224769.0	42454820.0	-5791.0
1201.276	31164.6	-69.3	2384.0	66291.0	-12029910.0	-98.0
1201.277	38723.4	16.7	113.9	-15663.0	35508340.0	-17678.0
1201.278	33077.7	138.2	-1279.6	-130046.0	-14851880.0	13425.0
1201.279	40637.0	224.1	-3505.6	-211910.0	32686500.0	-4163.0
1201.280	30956.5	-58.9	1607.2	54325.0	-2272997.0	828.0
1201.281	38515.0	26.9	-666.2	-27546.0	45265180.0	-16751.0
1201.282	32872.3	148.5	-2090.5	-141743.0	-5104276.0	14324.0
1201.283	40431.8	234.3	-4325.8	-223424.0	42434150.0	-3266.0
1201.284	31399.9	-78.0	2294.4	75893.0	-11999890.0	2275.0
1201.285	38958.7	7.9	23.4	-6047.0	35538360.0	-15306.0
1201.286	32846.6	130.6	-743.8	-122913.0	-14780830.0	10758.0
1201.287	40405.1	216.6	-2974.3	-204892.0	32757340.0	-6822.0
1201.288	31189.7	-51.3	1046.5	47221.0	-2353508.0	3475.0
1201.289	38749.0	34.6	-1222.1	-34613.0	45184870.0	-14111.0
1201.290	32640.6	157.4	-2020.8	-151281.0	-5143383.0	11918.0
1201.291	40199.8	243.2	-4241.2	-232942.0	42394970.0	-5669.0
1201.292	31166.3	-77.5	2619.0	74747.0	-11979480.0	-242.0
1201.293	38725.3	8.5	352.1	-7254.0	35558820.0	-17823.0
1201.294	33079.4	129.9	-1048.1	-121604.0	-14801450.0	13282.0
1201.295	40638.0	215.9	-3270.6	-203580.0	32736750.0	-4300.0
1201.296	30956.3	-50.8	1376.5	46085.0	-2323048.0	957.0
1201.297	38515.7	35.1	-901.9	-35709.0	45205360.0	-16630.0
1201.298	32873.1	156.7	-2326.9	-149920.0	-5164072.0	14444.0
1201.299	40432.4	242.5	-4563.5	-231650.0	42374310.0	-3144.0
1215.1	23830.6	48.7	865.5	-55306.0	12922190.0	-1916.0
1215.2	24049.5	58.0	621.1	-66596.0	11894030.0	-1690.0
1215.3	51991.5	97.5	1083.6	-112878.0	30643030.0	-4299.0
1215.4	52210.5	106.8	839.3	-124167.0	29608900.0	-4074.0
1215.5	18328.4	38.7	564.7	-44181.0	9933575.0	-1479.0
1215.6	18547.4	48.0	320.4	-55472.0	8906441.0	-1254.0
1215.7	46489.3	87.5	782.9	-101753.0	27649420.0	-3863.0
1215.8	46708.3	96.9	538.5	-113044.0	26625290.0	-3637.0
1215.9	24268.4	67.3	376.7	-77891.0	10866870.0	-1465.0
1215.10	43543.2	82.8	1018.2	-95605.0	25327870.0	-3584.0
1215.11	43981.1	101.5	529.4	-118194.0	23269580.0	-3133.0
1215.12	18766.3	57.4	75.9	-66769.0	7879283.0	-1028.0
1215.13	38041.1	72.9	717.4	-84481.0	22334280.0	-3148.0
1215.14	38478.9	91.6	228.6	-107071.0	20285970.0	-2697.0
1215.15	43762.2	92.2	773.9	-106897.0	24293740.0	-3359.0
1215.16	38260.0	82.2	473.1	-95772.0	21310130.0	-2922.0
1215.17	23733.0	45.0	950.7	-50903.0	13380290.0	-2007.0
1215.18	23952.0	54.3	706.4	-62190.0	12353160.0	-1782.0
1215.19	51893.8	93.8	1168.9	-108475.0	31098110.0	-4391.0
1215.20	52112.9	103.1	924.6	-119762.0	30074000.0	-4166.0
1215.21	18230.8	35.0	650.0	-39778.0	10391680.0	-1571.0
1215.22	18449.8	44.4	405.7	-51066.0	9364544.0	-1345.0
1215.23	46391.7	83.9	868.2	-97348.0	28114520.0	-3955.0
1215.24	46610.8	93.2	623.9	-108636.0	27080420.0	-3729.0
1215.25	24170.9	63.7	462.0	-73483.0	11325000.0	-1557.0
1215.26	43445.6	79.2	1103.5	-91201.0	25782970.0	-3676.0
1215.27	43883.5	97.8	614.7	-113786.0	23724680.0	-3225.0
1215.28	18668.7	53.7	161.3	-62360.0	8337385.0	-1120.0
1215.29	37943.5	69.2	802.7	-80077.0	22799390.0	-3240.0

1215.30	38381.4	87.9	313.9	-102663.0	20741100.0	-2789.0
1215.31	23667.9	42.5	1007.6	-47967.0	13685680.0	-2069.0
1215.32	23886.9	51.9	763.3	-59253.0	12658550.0	-1843.0
1215.33	43380.5	76.7	1160.3	-88266.0	26086370.0	-3737.0
1215.34	43599.5	86.0	916.0	-99553.0	25062230.0	-3512.0
1215.35	18165.8	32.6	706.9	-36841.0	10698100.0	-1632.0
1215.36	18384.8	41.9	462.5	-48128.0	9669962.0	-1407.0
1215.37	37878.4	66.8	859.6	-77140.0	23102780.0	-3301.0
1215.38	38097.4	76.1	615.2	-88429.0	22078650.0	-3075.0
1215.39	43664.6	88.5	859.2	-102490.0	24758840.0	-3451.0
1215.40	38162.5	78.5	558.4	-91366.0	21765250.0	-3014.0
1215.41	23869.6	50.1	831.4	-57067.0	12738140.0	-1879.0
1215.42	24088.6	59.5	587.0	-68359.0	11711000.0	-1653.0
1215.43	52030.5	99.0	1049.5	-114640.0	30452980.0	-4263.0
1215.44	52249.5	108.3	805.2	-125930.0	29428850.0	-4037.0
1215.45	18367.5	40.2	530.6	-45943.0	9750549.0	-1442.0
1215.46	18586.4	49.5	286.3	-57235.0	8723391.0	-1217.0
1215.47	46528.4	89.0	748.9	-103513.0	27469390.0	-3826.0
1215.48	46747.3	98.3	504.4	-114808.0	26445240.0	-3601.0
1215.49	24307.5	68.8	342.6	-79654.0	10683840.0	-1428.0
1215.50	43582.2	84.3	984.1	-97367.0	25137820.0	-3548.0
1215.51	44020.1	103.0	495.2	-119957.0	23089530.0	-3097.0
1215.52	18805.3	58.9	41.8	-68532.0	7696232.0	-991.0
1215.53	38080.1	74.4	683.3	-86243.0	22154230.0	-3111.0
1215.54	38518.0	93.0	194.5	-108834.0	20095940.0	-2660.0
1215.55	43801.2	93.6	739.7	-108660.0	24113690.0	-3322.0
1215.56	38299.1	83.7	439.0	-97536.0	21130100.0	-2885.0
1215.57	23895.6	51.1	808.7	-58242.0	12616770.0	-1854.0
1215.58	24114.6	60.5	564.3	-69534.0	11588630.0	-1629.0
1215.59	43608.3	85.3	961.4	-98542.0	25024480.0	-3523.0
1215.60	43827.2	94.6	717.0	-109835.0	23990320.0	-3298.0
1215.61	18393.5	41.2	507.9	-47117.0	9628182.0	-1418.0
1215.62	18612.4	50.5	263.5	-58410.0	8601023.0	-1192.0
1215.63	38106.1	75.3	660.6	-87417.0	22030870.0	-3086.0
1215.64	38325.1	84.7	416.2	-98712.0	21006730.0	-2861.0
1215.108	28828.6	18.6	1377.9	-18208.0	24884180.0	-574.0
1215.109	24766.5	42.0	2374.5	-46889.0	29427930.0	-5473.0
1215.110	27915.8	213.0	-7984.4	-261581.0	22651320.0	6756.0
1215.111	23853.9	236.4	-6979.0	-290305.0	27205130.0	1858.0
1215.112	35311.8	-120.4	8475.5	156266.0	6865040.0	-6739.0
1215.113	31249.0	-96.9	9471.7	127450.0	11415620.0	-11639.0
1215.114	34383.5	75.0	-901.6	-88833.0	4651231.0	574.0
1215.115	30320.6	98.3	109.5	-117501.0	9201785.0	-4326.0
1215.116	28847.4	12.6	929.8	-13313.0	25018970.0	-2811.0
1215.117	24785.2	36.0	1925.2	-42031.0	29562700.0	-7710.0
1215.118	27899.2	218.9	-7522.5	-266423.0	22517090.0	8995.0
1215.119	23837.2	242.3	-6514.3	-295146.0	27060870.0	4097.0
1215.120	35330.2	-126.4	8027.6	161166.0	7001735.0	-8977.0
1215.121	31267.3	-103.1	9027.9	132488.0	11552290.0	-13876.0
1215.122	34368.0	80.5	-435.4	-93198.0	4511277.0	2814.0
1215.123	30305.1	103.9	570.2	-121929.0	9062831.0	-2085.0
1215.124	28805.1	-5.9	1731.8	7575.0	24778180.0	-6941.0
1215.125	24742.9	17.4	2725.0	-21112.0	29331910.0	-11840.0
1215.126	27891.5	188.2	-7639.8	-235600.0	22555120.0	389.0
1215.127	23829.4	211.7	-6633.9	-264359.0	27108880.0	-4510.0
1215.128	35304.1	-94.3	8118.0	127810.0	6987076.0	-405.0
1215.129	31241.5	-71.0	9127.8	99177.0	11537710.0	-5305.0
1215.130	34375.7	100.9	-1241.3	-117058.0	4773242.0	6908.0
1215.131	30312.8	124.3	-230.2	-145723.0	9323795.0	2009.0
1215.132	28823.3	-12.1	1281.7	12629.0	24922820.0	-9178.0

1215.133	24760.8	11.3	2281.3	-16099.0	29466480.0	-14077.0
1215.134	27874.7	194.1	-7169.8	-240407.0	22420840.0	2628.0
1215.135	23812.7	217.6	-6161.1	-269131.0	26964620.0	-2271.0
1215.136	35321.6	-100.4	7678.3	132787.0	7124540.0	-2643.0
1215.137	31258.8	-77.1	8678.7	104188.0	11675120.0	-7542.0
1215.138	34360.1	106.8	-798.4	-121810.0	4634262.0	9148.0
1215.139	30297.3	130.2	212.4	-150469.0	9184841.0	4248.0
1215.140	32167.1	-257.4	14916.3	327759.0	21165830.0	-11279.0
1215.141	28106.2	-234.1	15914.7	299199.0	25719890.0	-16176.0
1215.142	29103.1	392.2	-16305.9	-486050.0	13763200.0	13133.0
1215.143	25039.4	415.6	-15299.7	-514839.0	18317550.0	8233.0
1215.144	34116.3	-299.4	17052.7	380558.0	15761070.0	-13123.0
1215.145	30055.4	-276.1	18051.1	352000.0	20307130.0	-18021.0
1215.146	31038.0	350.9	-14186.1	-434533.0	8366891.0	11273.0
1215.147	26974.3	374.3	-13180.1	-463330.0	12918140.0	6373.0
1215.148	32159.7	-264.8	15020.5	335532.0	21143940.0	-13189.0
1215.149	28097.7	-241.4	16016.4	306865.0	25687720.0	-18088.0
1215.150	29105.5	384.3	-16196.4	-477534.0	13725810.0	11233.0
1215.151	25041.7	407.8	-15190.7	-506344.0	18278140.0	6333.0
1215.152	34122.5	-291.9	16950.8	372698.0	15790650.0	-11214.0
1215.153	30061.7	-268.6	17949.6	344166.0	20338740.0	-16112.0
1215.154	31036.0	358.7	-14293.7	-442985.0	8403390.0	13174.0
1215.155	26972.6	382.1	-13288.4	-471790.0	12954710.0	8273.0
1215.156	32229.9	-277.4	13425.0	344068.0	21621850.0	-18735.0
1215.157	28169.1	-254.1	14424.1	315544.0	26175940.0	-23632.0
1215.158	29053.2	411.5	-14760.4	-501484.0	13297470.0	20602.0
1215.159	24989.3	434.9	-13754.9	-530302.0	17844770.0	15702.0
1215.160	34179.3	-319.4	15566.3	396908.0	16216140.0	-20579.0
1215.161	30118.5	-296.1	16565.4	368385.0	20763230.0	-25477.0
1215.162	30988.3	370.2	-12645.5	-449966.0	7901617.0	18742.0
1215.163	26924.4	393.7	-11640.0	-478783.0	12453410.0	13842.0
1215.164	32222.0	-284.7	13523.8	351767.0	21599830.0	-20646.0
1215.165	28160.2	-261.4	14520.6	323141.0	26143670.0	-25544.0
1215.166	29055.2	403.7	-14648.5	-493016.0	13260980.0	18702.0
1215.167	24991.3	427.2	-13643.1	-521841.0	17815280.0	13801.0
1215.168	34185.8	-312.0	15469.4	389137.0	16245800.0	-18670.0
1215.169	30125.1	-288.7	16468.5	360614.0	20794910.0	-23567.0
1215.170	30985.9	378.0	-12758.0	-458511.0	7938642.0	20642.0
1215.171	26922.1	401.5	-11751.8	-487299.0	12489830.0	15742.0
1215.268	35844.0	-57.8	2699.1	76975.0	13260810.0	2991.0
1215.269	22303.6	20.1	6023.7	-18540.0	28429650.0	-13339.0
1215.270	34930.6	136.8	-6672.9	-166665.0	11033800.0	10320.0
1215.271	21387.2	214.9	-3313.7	-262478.0	26205880.0	-6012.0
1215.272	37792.3	-99.6	4829.7	129617.0	7852816.0	1145.0
1215.273	24253.6	-21.7	8159.1	34062.0	23017090.0	-15183.0
1215.274	36867.5	95.5	-4551.3	-115048.0	5635899.0	8462.0
1215.275	23324.2	173.6	-1190.7	-210882.0	20810000.0	-7870.0
1215.276	35862.5	-63.7	2249.3	81818.0	13397520.0	753.0
1215.277	22322.3	14.2	5572.5	-13763.0	28564420.0	-15576.0
1215.278	34914.7	142.7	-6209.7	-171375.0	10894740.0	12560.0
1215.279	21371.6	220.8	-2850.6	-267239.0	26061900.0	-3772.0
1215.280	37811.3	-105.6	4385.3	134549.0	7989663.0	-1092.0
1215.281	24271.8	-27.8	7712.6	39064.0	23151740.0	-17420.0
1215.282	36852.6	101.3	-4090.3	-119687.0	5496099.0	10703.0
1215.283	23308.6	179.3	-733.4	-215497.0	20666020.0	-5630.0
1215.284	35836.9	-65.2	2804.8	84784.0	13230990.0	1080.0
1215.285	22296.4	12.7	6127.3	-10794.0	28397810.0	-15249.0
1215.286	34924.1	129.3	-6571.0	-158787.0	11004140.0	8411.0
1215.287	21384.2	207.4	-3214.7	-254493.0	26175110.0	-7918.0
1215.288	37793.8	-92.0	4728.3	121459.0	7886199.0	3049.0

1215.289	24251.4	-14.0	8058.8	25657.0	23056530.0	-13283.0
1215.290	36864.7	103.4	-4659.7	-123624.0	5673185.0	10362.0
1215.291	23321.9	181.3	-1292.2	-219335.0	20839420.0	-5970.0
1215.292	35855.7	-71.2	2355.8	89684.0	13367790.0	-1156.0
1215.293	22315.0	6.8	5680.3	-5974.0	28532560.0	-17486.0
1215.294	34908.1	135.2	-6107.9	-163501.0	10865060.0	10651.0
1215.295	21367.6	213.2	-2746.0	-259241.0	26030880.0	-5679.0
1215.296	37812.2	-98.0	4283.5	126353.0	8023892.0	812.0
1215.297	24269.4	-20.0	7607.5	30604.0	23191120.0	-15520.0
1215.298	36849.6	109.1	-4196.8	-128207.0	5533333.0	12602.0
1215.299	23306.4	187.1	-841.5	-223987.0	20705460.0	-3730.0
1226.1	1086.3	-59.2	-2294.0	56425.0	87927110.0	-47782.0
1226.2	-1411.7	-70.4	-2512.0	66754.0	95729870.0	-52014.0
1226.3	7693.6	-120.3	-3245.1	113700.0	174762600.0	-93140.0
1226.4	5195.6	-131.5	-3463.2	124037.0	182525400.0	-97373.0
1226.5	832.0	-46.9	-1819.3	44720.0	67642240.0	-36758.0
1226.6	-1666.0	-58.2	-2037.3	55046.0	75445010.0	-40990.0
1226.7	7439.3	-108.0	-2770.4	101995.0	154497800.0	-82116.0
1226.8	4941.4	-119.3	-2988.5	112330.0	162260500.0	-86348.0
1226.9	-3909.7	-81.6	-2730.0	77067.0	103502600.0	-56246.0
1226.10	5711.4	-102.0	-2959.8	96518.0	148757000.0	-79533.0
1226.11	715.4	-124.4	-3395.9	117157.0	164282500.0	-87997.0
1226.12	-4164.0	-69.4	-2255.4	65352.0	83237760.0	-45222.0
1226.13	5457.1	-89.7	-2485.1	84813.0	128392100.0	-68509.0
1226.14	461.2	-112.1	-2921.3	105446.0	144017600.0	-76973.0
1226.15	3213.4	-113.2	-3177.9	106847.0	156519700.0	-83765.0
1226.16	2959.2	-100.9	-2703.2	95142.0	136254900.0	-72741.0
1226.17	2205.1	-54.7	-2187.1	52316.0	84442520.0	-45894.0
1226.18	-292.9	-66.0	-2405.2	62658.0	92235280.0	-50126.0
1226.19	8812.4	-115.8	-3138.3	109588.0	171248000.0	-91253.0
1226.20	6314.4	-127.1	-3356.4	119939.0	179110800.0	-95485.0
1226.21	1950.8	-42.5	-1712.5	40610.0	64147650.0	-34870.0
1226.22	-547.2	-53.7	-1930.5	50950.0	71950410.0	-39102.0
1226.23	8558.1	-103.6	-2663.6	97889.0	150983200.0	-80228.0
1226.24	6060.2	-114.8	-2881.7	108237.0	158746000.0	-84461.0
1226.25	-2790.9	-77.2	-2623.2	72975.0	100088000.0	-54358.0
1226.26	6830.2	-97.5	-2853.0	92410.0	145242400.0	-77645.0
1226.27	1834.2	-119.9	-3289.1	113064.0	160867900.0	-86109.0
1226.28	-3045.2	-64.9	-2148.6	61265.0	79753170.0	-43334.0
1226.29	6575.9	-85.3	-2378.3	80703.0	124877500.0	-66621.0
1226.30	1580.0	-107.7	-2814.4	101357.0	140503100.0	-75085.0
1226.31	2950.9	-51.8	-2115.9	49575.0	82112780.0	-44635.0
1226.32	453.0	-63.0	-2334.0	59926.0	89915560.0	-48868.0
1226.33	7576.0	-94.5	-2781.8	89667.0	142932600.0	-76386.0
1226.34	5078.1	-105.8	-2999.8	100016.0	150695400.0	-80619.0
1226.35	2696.6	-39.5	-1641.3	37871.0	61817900.0	-33611.0
1226.36	198.7	-50.8	-1859.3	48219.0	69620690.0	-37843.0
1226.37	7321.8	-82.3	-2307.1	77968.0	122567800.0	-65362.0
1226.38	4823.8	-93.5	-2525.2	88313.0	130430600.0	-69594.0
1226.39	4332.2	-108.7	-3071.1	102751.0	153005200.0	-81877.0
1226.40	4078.0	-96.5	-2596.4	91049.0	132740300.0	-70853.0
1226.41	638.8	-61.0	-2336.7	58068.0	89322960.0	-48537.0
1226.42	-1859.2	-72.2	-2554.7	68392.0	97125720.0	-52769.0
1226.43	7246.1	-122.1	-3287.9	115345.0	176148500.0	-93896.0
1226.44	4748.1	-133.3	-3505.9	125674.0	183911200.0	-98128.0
1226.45	384.5	-48.7	-1862.0	46362.0	69038090.0	-37513.0
1226.46	-2113.5	-59.9	-2080.1	56684.0	76840840.0	-41745.0
1226.47	6991.8	-109.8	-2813.1	103643.0	155883600.0	-82871.0
1226.48	4493.8	-121.0	-3031.2	113966.0	163646400.0	-87103.0
1226.49	-4357.2	-83.4	-2772.8	78701.0	104888500.0	-57001.0

1226.50	5263.9	-103.7	-3002.5	98160.0	150142800.0	-80288.0
1226.51	267.9	-126.2	-3438.7	118792.0	165668300.0	-88752.0
1226.52	-4611.5	-71.1	-2298.1	66988.0	84633610.0	-45977.0
1226.53	5009.6	-91.5	-2527.9	86457.0	129778000.0	-69264.0
1226.54	13.7	-113.9	-2964.0	107080.0	145403500.0	-77728.0
1226.55	2765.9	-115.0	-3220.6	108484.0	157905600.0	-84520.0
1226.56	2511.6	-102.7	-2745.9	96779.0	137640700.0	-73496.0
1226.57	340.4	-62.1	-2365.2	59163.0	90256840.0	-49040.0
1226.58	-2157.6	-73.4	-2583.2	69484.0	98059590.0	-53272.0
1226.59	4965.5	-104.9	-3031.0	99254.0	151066700.0	-80791.0
1226.60	2467.6	-116.1	-3249.1	109575.0	158829500.0	-85023.0
1226.61	86.1	-49.9	-1890.5	47457.0	69971960.0	-38016.0
1226.62	-2411.8	-61.1	-2108.5	57776.0	77764750.0	-42248.0
1226.63	4711.3	-92.7	-2556.3	87552.0	130701800.0	-69767.0
1226.64	2213.3	-103.9	-2774.4	97870.0	138564600.0	-73999.0
1226.108	17993.6	103.4	5906.8	-129152.0	49660170.0	-26571.0
1226.109	11963.5	74.8	5275.6	-101804.0	70461890.0	-34828.0
1226.110	15944.8	-86.2	2240.2	50249.0	53457520.0	-42015.0
1226.111	9915.1	-114.9	1621.9	77667.0	74259340.0	-50271.0
1226.112	-2966.9	-23.3	-5809.4	51559.0	130443200.0	-59511.0
1226.113	-8997.2	-51.8	-6434.2	78850.0	151304800.0	-67768.0
1226.114	-5021.4	-208.7	-9447.0	224659.0	134219000.0	-74940.0
1226.115	-11051.3	-237.3	-10061.8	251982.0	155080800.0	-83196.0
1226.116	17965.9	114.1	5608.9	-141494.0	50003100.0	-28879.0
1226.117	11935.2	85.3	4978.0	-113989.0	70804670.0	-37136.0
1226.118	15973.1	-97.4	2550.8	63000.0	53124740.0	-39711.0
1226.119	9943.4	-126.0	1935.2	90382.0	73926560.0	-47968.0
1226.120	-2994.6	-12.5	-6109.7	39077.0	130836100.0	-61819.0
1226.121	-9024.8	-41.0	-6734.3	66333.0	151597800.0	-70076.0
1226.122	-4991.1	-219.6	-9144.8	237208.0	133926800.0	-72635.0
1226.123	-11021.0	-248.2	-9763.1	264523.0	154688500.0	-80891.0
1226.124	17883.1	101.7	6232.0	-148347.0	50071980.0	-26580.0
1226.125	11852.9	73.1	5597.3	-121002.0	70873670.0	-34836.0
1226.126	15833.5	-87.9	2537.0	30857.0	53869120.0	-42022.0
1226.127	9803.3	-116.7	1920.3	58394.0	74670820.0	-50279.0
1226.128	-2865.2	-16.1	-6062.3	62295.0	130069100.0	-59479.0
1226.129	-8895.3	-44.8	-6679.5	89617.0	150830800.0	-67737.0
1226.130	-4919.4	-201.3	-9684.3	235242.0	133845100.0	-74909.0
1226.131	-10949.3	-229.9	-10299.0	262561.0	154606800.0	-83165.0
1226.132	17854.6	112.3	5927.4	-160565.0	50414710.0	-28887.0
1226.133	11824.0	83.5	5300.1	-133084.0	71216300.0	-37143.0
1226.134	15862.1	-98.8	2854.2	43411.0	53536420.0	-39718.0
1226.135	9832.4	-127.4	2238.9	70789.0	74338240.0	-47974.0
1226.136	-2894.7	-5.7	-6356.6	50100.0	130361600.0	-61787.0
1226.137	-8924.4	-34.2	-6984.0	77294.0	151223400.0	-70044.0
1226.138	-4889.9	-212.3	-9393.7	247918.0	133552600.0	-72604.0
1226.139	-10919.5	-240.9	-10008.9	275185.0	154314400.0	-80860.0
1226.140	13051.2	279.1	6207.9	-272887.0	73509360.0	-20083.0
1226.141	7021.7	250.2	5577.0	-245066.0	94311240.0	-28342.0
1226.142	6210.6	-348.5	-5950.5	317860.0	86184330.0	-71551.0
1226.143	180.4	-376.9	-6565.8	344793.0	106946000.0	-79805.0
1226.144	6764.0	239.9	2684.0	-216995.0	97755500.0	-29972.0
1226.145	734.5	211.0	2053.1	-189164.0	118587400.0	-38230.0
1226.146	-80.9	-384.1	-9455.5	368462.0	110379400.0	-81421.0
1226.147	-6111.0	-412.5	-10070.8	395398.0	131241100.0	-89676.0
1226.148	13018.0	278.8	6301.8	-278871.0	73630900.0	-20084.0
1226.149	6987.9	250.2	5669.3	-251540.0	94432620.0	-28341.0
1226.150	6180.1	-350.9	-5873.1	314841.0	86306540.0	-71562.0
1226.151	150.0	-379.2	-6488.1	341741.0	107138300.0	-79817.0
1226.152	6797.1	240.4	2595.4	-211224.0	97633940.0	-29971.0

1226.153	767.6	211.5	1963.7	-183357.0	118395800.0	-38229.0
1226.154	-50.4	-381.9	-9533.3	371617.0	110287100.0	-81411.0
1226.155	-6080.4	-410.3	-10148.7	398656.0	131048900.0	-89666.0
1226.156	12959.4	314.8	5222.0	-314047.0	74635940.0	-27775.0
1226.157	6929.8	285.8	4590.0	-286168.0	95437790.0	-36034.0
1226.158	6311.2	-385.3	-4927.7	360257.0	85049980.0	-63872.0
1226.159	281.1	-413.6	-5542.4	387148.0	105871700.0	-72126.0
1226.160	6672.3	275.5	1703.0	-258121.0	98882100.0	-37665.0
1226.161	642.7	246.6	1071.1	-230242.0	119664000.0	-45923.0
1226.162	19.6	-420.9	-8438.8	410943.0	109305000.0	-73743.0
1226.163	-6010.5	-449.2	-9053.5	437831.0	130066700.0	-81997.0
1226.164	12926.0	314.6	5310.7	-320242.0	74747420.0	-27775.0
1226.165	6895.8	285.9	4677.4	-292833.0	95549120.0	-36033.0
1226.166	6280.9	-387.5	-4845.0	357098.0	85182260.0	-63883.0
1226.167	250.6	-415.8	-5459.7	384013.0	105963900.0	-72138.0
1226.168	6705.4	275.9	1616.6	-252243.0	98760550.0	-37664.0
1226.169	675.8	246.9	984.7	-224364.0	119572400.0	-45923.0
1226.170	50.1	-418.5	-8518.3	413952.0	109112800.0	-73731.0
1226.171	-5980.0	-446.9	-9133.6	440894.0	129974500.0	-81986.0
1226.268	17695.5	91.6	2521.0	-96284.0	53674120.0	-28472.0
1226.269	-2405.4	-3.9	416.5	-5032.0	122986400.0	-55994.0
1226.270	15644.4	-97.9	-1154.6	82747.0	57480890.0	-43918.0
1226.271	-4455.2	-192.8	-3200.7	173224.0	126763500.0	-71435.0
1226.272	11407.8	52.8	-1005.2	-40969.0	77920130.0	-38357.0
1226.273	-8691.8	-43.2	-3096.9	51054.0	147282700.0	-65884.0
1226.274	9353.5	-133.9	-4658.3	133901.0	81716070.0	-53790.0
1226.275	-10745.7	-229.0	-6702.8	224712.0	151058800.0	-81310.0
1226.276	17667.9	102.3	2224.1	-108731.0	54017080.0	-30779.0
1226.277	-2433.7	6.6	118.7	-17193.0	123379200.0	-58302.0
1226.278	15674.3	-108.8	-846.1	95168.0	57148510.0	-41613.0
1226.279	-4425.8	-203.9	-2890.0	185976.0	126471000.0	-69132.0
1226.280	11380.3	63.4	-1298.8	-53277.0	78263110.0	-40665.0
1226.281	-8719.3	-32.3	-3396.3	38455.0	147575700.0	-68190.0
1226.282	9383.7	-144.9	-4353.9	146649.0	81383780.0	-51486.0
1226.283	-10715.6	-239.8	-6403.2	237226.0	150666400.0	-79005.0
1226.284	17662.4	91.1	2615.9	-102103.0	53795680.0	-28474.0
1226.285	-2438.6	-4.4	511.0	-10811.0	123177900.0	-55996.0
1226.286	15611.5	-98.5	-1071.3	77097.0	57602490.0	-43920.0
1226.287	-4487.2	-194.1	-3121.7	168599.0	126955300.0	-71441.0
1226.288	11439.5	54.2	-1085.0	-36636.0	77798220.0	-38351.0
1226.289	-8661.2	-41.0	-3169.5	54254.0	147090500.0	-65874.0
1226.290	9383.8	-131.5	-4734.3	136864.0	81593810.0	-53780.0
1226.291	-10715.1	-226.8	-6774.4	227924.0	150966600.0	-81300.0
1226.292	17634.7	101.8	2316.9	-114452.0	54138610.0	-30781.0
1226.293	-2466.8	6.2	216.2	-23048.0	123470700.0	-58303.0
1226.294	15641.1	-109.5	-763.8	89624.0	57270040.0	-41615.0
1226.295	-4458.2	-204.9	-2806.5	181012.0	126562700.0	-69136.0
1226.296	11411.8	65.0	-1377.9	-49108.0	78141150.0	-40659.0
1226.297	-8688.9	-30.2	-3471.6	41688.0	147483500.0	-68181.0
1226.298	9414.0	-142.5	-4429.8	149536.0	81251510.0	-51476.0
1226.299	-10685.3	-237.8	-6480.3	240612.0	150574200.0	-78996.0
1292.1	50552.5	7.0	169.9	-10272.0	-21214060.0	75206.0
1292.2	51847.5	8.4	451.7	-12256.0	-17123700.0	78048.0
1292.3	104100.0	15.3	2332.3	-22519.0	-42244090.0	149463.0
1292.4	105400.0	16.7	2614.6	-24526.0	-38152460.0	152305.0
1292.5	38885.4	5.5	147.2	-8004.0	-16320330.0	57853.0
1292.6	40180.4	6.9	429.0	-9982.0	-12229980.0	60694.0
1292.7	92458.7	13.8	2309.7	-20249.0	-37343780.0	132110.0
1292.8	93753.9	15.2	2592.1	-22254.0	-33253380.0	134952.0
1292.9	53142.3	9.8	733.7	-14206.0	-13033400.0	80889.0

1292.10	88053.8	12.8	1683.4	-18846.0	-35937480.0	127186.0
1292.11	90643.7	15.6	2248.1	-22784.0	-27746790.0	132869.0
1292.12	41475.1	8.3	711.1	-11923.0	-8139703.0	63536.0
1292.13	76386.7	11.3	1660.8	-16579.0	-31043750.0	109833.0
1292.14	78976.5	14.1	2225.6	-20506.0	-22853100.0	115516.0
1292.15	89348.9	14.2	1965.7	-20839.0	-31837100.0	130028.0
1292.16	77681.8	12.7	1943.1	-18568.0	-26953370.0	112674.0
1292.17	49972.1	6.4	85.2	-9447.0	-23042120.0	73932.0
1292.18	51267.3	7.8	366.9	-11462.0	-18951710.0	76774.0
1292.19	103500.0	14.7	2247.4	-21688.0	-44077150.0	148189.0
1292.20	104800.0	16.2	2529.6	-23725.0	-39985520.0	151031.0
1292.21	38305.0	4.9	62.5	-7180.0	-18148390.0	56579.0
1292.22	39600.1	6.3	344.2	-9189.0	-14058010.0	59421.0
1292.23	91878.3	13.2	2224.8	-19430.0	-39181850.0	130836.0
1292.24	93173.7	14.7	2507.0	-21463.0	-35081390.0	133678.0
1292.25	52562.1	9.2	648.9	-13418.0	-14861410.0	79615.0
1292.26	87473.4	12.2	1598.5	-18022.0	-37765540.0	125912.0
1292.27	90063.5	15.1	2163.1	-21996.0	-29574800.0	131595.0
1292.28	40894.9	7.7	626.2	-11141.0	-9967711.0	62262.0
1292.29	75806.3	10.7	1575.9	-15750.0	-32871810.0	108559.0
1292.30	78396.3	13.5	2140.6	-19723.0	-24681100.0	114242.0
1292.31	49585.1	6.0	28.8	-8896.0	-24260840.0	73083.0
1292.32	50880.5	7.5	310.4	-10929.0	-20170380.0	75925.0
1292.33	87086.4	11.9	1542.0	-17464.0	-38984260.0	125063.0
1292.34	88381.7	13.3	1824.1	-19498.0	-34883830.0	127905.0
1292.35	37918.0	4.5	6.1	-6631.0	-19367120.0	55729.0
1292.36	39213.3	5.9	287.7	-8660.0	-15276690.0	58571.0
1292.37	75419.4	10.3	1519.3	-15209.0	-34090510.0	107709.0
1292.38	76714.7	11.8	1801.5	-17237.0	-30000080.0	110551.0
1292.39	88768.6	13.7	1880.7	-20041.0	-33665130.0	128754.0
1292.40	77101.6	12.2	1858.1	-17780.0	-28781380.0	111401.0
1292.41	50784.7	7.2	203.7	-10600.0	-20484820.0	75716.0
1292.42	52079.6	8.6	485.6	-12573.0	-16394490.0	78557.0
1292.43	104400.0	15.6	2366.3	-22851.0	-41497560.0	149973.0
1292.44	105700.0	17.0	2648.6	-24841.0	-37405930.0	152814.0
1292.45	39117.5	5.7	181.0	-8332.0	-15591130.0	58362.0
1292.46	40412.4	7.1	462.9	-10299.0	-11500800.0	61204.0
1292.47	92690.9	14.0	2343.6	-20587.0	-36614550.0	132620.0
1292.48	93985.9	15.4	2626.1	-22568.0	-32524200.0	135461.0
1292.49	53374.3	10.0	767.7	-14517.0	-12294220.0	81399.0
1292.50	88286.0	13.1	1717.4	-19172.0	-35198240.0	127696.0
1292.51	90875.7	15.8	2282.1	-23098.0	-27017610.0	133379.0
1292.52	41707.1	8.5	745.1	-12238.0	-7410519.0	64045.0
1292.53	76618.9	11.5	1694.7	-16910.0	-30304520.0	110342.0
1292.54	79208.5	14.3	2259.5	-20817.0	-22123910.0	116025.0
1292.55	89581.0	14.5	1999.7	-21154.0	-31107890.0	130537.0
1292.56	77913.8	12.9	1977.1	-18883.0	-26214190.0	113184.0
1292.57	50939.4	7.4	226.3	-10819.0	-19995360.0	76055.0
1292.58	52234.3	8.8	508.2	-12784.0	-15905030.0	78897.0
1292.59	88440.7	13.2	1740.0	-19389.0	-34708780.0	128035.0
1292.60	89735.7	14.6	2022.3	-21364.0	-30618420.0	130877.0
1292.61	39272.3	5.8	203.6	-8551.0	-15101640.0	58702.0
1292.62	40567.2	7.2	485.5	-10510.0	-11011310.0	61544.0
1292.63	76773.7	11.7	1717.4	-17128.0	-29825030.0	110682.0
1292.64	78068.6	13.1	1999.8	-19093.0	-25724700.0	113524.0
1292.108	47812.8	-75.3	-4378.7	99247.0	-13712960.0	66894.0
1292.109	52032.5	-68.7	-3691.1	88714.0	-35586510.0	85504.0
1292.110	49781.7	-0.6	599.9	12028.0	-630688.5	73558.0
1292.111	54002.3	5.9	1298.5	1706.0	-22504010.0	92169.0
1292.112	66518.6	3.0	774.4	-13141.0	-26811110.0	82855.0

1292.113	70735.9	9.0	1462.3	-22698.0	-48675270.0	101465.0
1292.114	68407.5	68.1	5753.5	-84552.0	-13629250.0	89455.0
1292.115	72622.9	74.1	6445.8	-93986.0	-35493900.0	108062.0
1292.116	47561.9	-48.7	-5185.3	70579.0	-14386960.0	66702.0
1292.117	51781.0	-42.0	-4499.5	59969.0	-36250660.0	85312.0
1292.118	50048.6	-27.6	1434.2	41351.0	17397.5	73765.0
1292.119	54268.6	-21.1	2135.3	31007.0	-21856080.0	92376.0
1292.120	66266.0	29.6	-30.4	-41751.0	-27485540.0	82663.0
1292.121	70482.0	35.7	652.0	-51415.0	-49350040.0	101271.0
1292.122	68677.5	41.5	6563.4	-55817.0	-12990370.0	89663.0
1292.123	72892.3	47.4	7253.9	-65270.0	-34855180.0	108269.0
1292.124	47638.3	-122.6	-4191.9	172506.0	-13717470.0	66648.0
1292.125	51856.8	-116.0	-3506.8	161928.0	-35581330.0	85257.0
1292.126	49600.1	-48.0	751.7	85842.0	-627015.1	73304.0
1292.127	53820.0	-41.5	1452.6	75395.0	-22500520.0	91915.0
1292.128	66542.8	35.6	628.3	-62094.0	-26614930.0	82986.0
1292.129	70760.2	41.6	1319.6	-71635.0	-48479070.0	101595.0
1292.130	68431.5	100.9	5622.0	-133959.0	-13433130.0	89586.0
1292.131	72646.7	106.9	6312.8	-143404.0	-35297830.0	108193.0
1292.132	47381.5	-95.7	-5014.8	143596.0	-14382980.0	66450.0
1292.133	51599.2	-89.1	-4322.9	133045.0	-36247040.0	85059.0
1292.134	49866.1	-75.1	1592.1	115186.0	20841.8	73511.0
1292.135	54086.3	-68.6	2294.5	104779.0	-21842590.0	92122.0
1292.136	66283.3	62.4	-179.7	-90866.0	-27281130.0	82787.0
1292.137	70500.1	68.5	498.8	-100521.0	-49145420.0	101395.0
1292.138	68700.3	74.3	6431.6	-105307.0	-12784550.0	89793.0
1292.139	72916.3	80.2	7123.7	-114731.0	-34649050.0	108401.0
1292.140	52086.7	-131.4	-8289.3	155604.0	-33592680.0	64722.0
1292.141	56313.1	-124.3	-7603.6	144201.0	-55474520.0	83339.0
1292.142	58544.5	105.7	8304.3	-115414.0	10142700.0	86857.0
1292.143	62755.1	111.3	8996.0	-124296.0	-11721170.0	105459.0
1292.144	57720.4	-105.3	-6744.6	117629.0	-37555520.0	69529.0
1292.145	61946.9	-98.1	-6058.9	106208.0	-59427340.0	88146.0
1292.146	64102.5	123.6	9843.8	-139841.0	6282548.0	91600.0
1292.147	68313.2	129.2	10535.8	-148721.0	-15583300.0	110203.0
1292.148	52031.5	-145.7	-8238.7	177805.0	-33586760.0	64645.0
1292.149	56251.4	-139.2	-7550.7	167308.0	-55460270.0	83256.0
1292.150	58539.2	96.0	8342.3	-100818.0	10082350.0	86820.0
1292.151	62749.3	101.6	9036.3	-109615.0	-11772650.0	105423.0
1292.152	57770.9	-91.3	-6784.7	95917.0	-37542640.0	69604.0
1292.153	61997.8	-84.1	-6102.6	84423.0	-59424360.0	88221.0
1292.154	64109.7	133.5	9799.5	-154759.0	6334385.0	91638.0
1292.155	68321.8	139.2	10492.0	-163781.0	-15521110.0	110242.0
1292.156	51253.0	-42.6	-10960.4	59734.0	-35825360.0	64087.0
1292.157	55480.1	-35.3	-10279.5	48211.0	-57707020.0	82705.0
1292.158	59462.4	17.0	11063.2	-19973.0	12283860.0	87569.0
1292.159	63672.3	22.6	11758.1	-28744.0	-9577196.0	106172.0
1292.160	56887.7	-16.2	-9415.7	21391.0	-39787950.0	68895.0
1292.161	61114.8	-9.0	-8734.8	9868.0	-61669610.0	87513.0
1292.162	65020.9	34.8	12596.6	-44250.0	8420831.0	92313.0
1292.163	69230.9	40.4	13291.5	-53020.0	-13439200.0	110915.0
1292.164	51194.7	-57.3	-10909.1	82580.0	-35820230.0	64008.0
1292.165	55415.5	-50.6	-10226.1	71920.0	-57693510.0	82619.0
1292.166	59455.7	7.3	11111.2	-5296.0	12225150.0	87532.0
1292.167	63665.5	12.8	11806.2	-14072.0	-9628931.0	106134.0
1292.168	56939.9	-1.9	-9463.7	-779.0	-39784630.0	68971.0
1292.169	61167.0	5.4	-8782.8	-12302.0	-61666300.0	87588.0
1292.170	65025.9	44.4	12559.3	-58658.0	8482107.0	92349.0
1292.171	69236.5	50.0	13251.1	-67553.0	-13377770.0	110952.0
1292.268	49471.7	-52.4	-3386.5	66964.0	7170231.0	50794.0

1292.269	63536.1	-30.5	-1093.4	31881.0	-65731940.0	112828.0
1292.270	51438.4	21.9	1587.8	-19539.0	20253940.0	57458.0
1292.271	65486.3	41.7	3906.1	-51069.0	-52624440.0	119478.0
1292.272	55099.7	-27.0	-1833.7	29957.0	3215934.0	55595.0
1292.273	69176.5	-4.9	458.5	-5266.0	-69693070.0	117643.0
1292.274	57007.0	40.7	3135.2	-45714.0	16378490.0	62210.0
1292.275	71057.7	60.3	5445.7	-76745.0	-56503180.0	124235.0
1292.276	49220.2	-26.0	-4184.2	38493.0	6502073.0	50603.0
1292.277	63285.0	-3.8	-1900.1	3145.0	-66395990.0	112637.0
1292.278	51708.8	-5.2	2419.1	9845.0	20902910.0	57668.0
1292.279	65758.5	15.0	4741.1	-22395.0	-51985010.0	119690.0
1292.280	54850.3	-0.1	-2637.3	951.0	2552311.0	55405.0
1292.281	68922.2	21.8	-358.3	-34003.0	-70357940.0	117448.0
1292.282	57282.5	14.1	3962.3	-16968.0	17020770.0	62424.0
1292.283	71328.3	33.6	6265.3	-47868.0	-55854150.0	124444.0
1292.284	49418.2	-66.6	-3336.4	88887.0	7170582.0	50719.0
1292.285	63482.5	-44.6	-1041.7	53833.0	-65725610.0	112753.0
1292.286	51387.4	7.8	1634.5	2213.0	20250930.0	57384.0
1292.287	65454.1	29.4	3954.0	-32223.0	-52652660.0	119420.0
1292.288	55125.6	-15.2	-1881.7	12024.0	3252541.0	55649.0
1292.289	69183.6	5.0	411.7	-20050.0	-69631260.0	117681.0
1292.290	57011.1	50.4	3097.2	-60233.0	16440530.0	62247.0
1292.291	71065.3	70.2	5408.2	-91611.0	-56451240.0	124274.0
1292.292	49167.6	-40.0	-4142.8	60240.0	6500655.0	50528.0
1292.293	63230.1	-18.0	-1844.9	25152.0	-66400000.0	112561.0
1292.294	51657.2	-19.1	2464.4	31511.0	20900750.0	57593.0
1292.295	65720.5	2.3	4789.5	-2734.0	-51994700.0	119627.0
1292.296	54873.4	11.3	-2685.5	-16533.0	2588204.0	55457.0
1292.297	68928.6	31.6	-406.2	-48762.0	-70296310.0	117486.0
1292.298	57285.1	23.7	3922.0	-31420.0	17084430.0	62459.0
1292.299	71335.6	43.6	6222.6	-62927.0	-55802290.0	124483.0
1298.1	7053.2	26.8	627.0	-24504.0	39429270.0	58006.0
1298.2	5428.9	31.3	368.7	-28214.0	42334910.0	63308.0
1298.3	17190.6	54.1	1951.3	-49173.0	80895330.0	112566.0
1298.4	15566.3	58.6	1693.1	-52885.0	83800960.0	117867.0
1298.5	5428.6	21.1	362.6	-19214.0	30324830.0	44621.0
1298.6	3804.2	25.6	104.3	-22922.0	33230450.0	49922.0
1298.7	15566.0	48.4	1687.1	-43882.0	71790890.0	99180.0
1298.8	13941.6	52.9	1428.4	-47594.0	74696500.0	104481.0
1298.9	3804.5	35.8	110.2	-31920.0	45240530.0	68609.0
1298.10	14149.4	45.9	1554.3	-41772.0	68459510.0	96198.0
1298.11	10900.6	54.9	1036.9	-49189.0	74260740.0	106801.0
1298.12	2179.8	30.1	-154.4	-26628.0	36136060.0	55223.0
1298.13	12524.7	40.2	1289.7	-36482.0	59355050.0	82812.0
1298.14	9276.0	49.2	772.2	-43898.0	65156310.0	93415.0
1298.15	12525.0	50.4	1295.8	-45483.0	71355130.0	101499.0
1298.16	10900.4	44.7	1031.3	-40192.0	62250690.0	88113.0
1298.17	7779.6	25.0	727.6	-22991.0	38134580.0	55641.0
1298.18	6155.3	29.5	469.6	-26704.0	41040220.0	60942.0
1298.19	17917.0	52.3	2052.2	-47659.0	79600620.0	110200.0
1298.20	16292.7	56.8	1793.9	-51375.0	82496270.0	115502.0
1298.21	6155.0	19.3	463.2	-17700.0	29030140.0	42255.0
1298.22	4530.7	23.8	205.2	-21412.0	31935780.0	47556.0
1298.23	16292.4	46.6	1787.9	-42370.0	70486190.0	96814.0
1298.24	14668.1	51.1	1529.6	-46084.0	73391830.0	102116.0
1298.25	4530.9	34.0	211.2	-30411.0	43935830.0	66244.0
1298.26	14875.8	44.1	1655.1	-40259.0	67154820.0	93832.0
1298.27	11627.1	53.1	1137.9	-47680.0	72966070.0	104435.0
1298.28	2906.3	28.3	-53.3	-25119.0	34831400.0	52858.0
1298.29	13251.2	38.4	1390.6	-34968.0	58050380.0	80447.0

1298.30	10002.4	47.4	873.3	-42389.0	63861610.0	91049.0
1298.31	8263.9	23.8	794.8	-21982.0	37268120.0	54064.0
1298.32	6639.6	28.3	536.8	-25697.0	40173760.0	59365.0
1298.33	15360.1	42.9	1722.3	-39250.0	66288360.0	92255.0
1298.34	13735.8	47.4	1464.0	-42964.0	69194000.0	97557.0
1298.35	6639.3	18.1	530.5	-16691.0	28163680.0	40678.0
1298.36	5015.0	22.6	272.4	-20406.0	31069320.0	45979.0
1298.37	13735.5	37.2	1457.9	-33960.0	57183920.0	78870.0
1298.38	12111.1	41.7	1199.4	-37675.0	60089540.0	84171.0
1298.39	13251.5	48.6	1396.8	-43972.0	70060460.0	99134.0
1298.40	11626.9	42.9	1132.2	-38683.0	60956020.0	85748.0
1298.41	6762.6	27.5	586.7	-25109.0	39955140.0	58953.0
1298.42	5138.3	32.0	328.4	-28818.0	42850780.0	64254.0
1298.43	16900.0	54.8	1911.0	-49779.0	81411180.0	113512.0
1298.44	15275.7	59.3	1652.7	-53489.0	84316830.0	118813.0
1298.45	5138.0	21.8	322.3	-19819.0	30850700.0	45567.0
1298.46	3513.6	26.4	63.9	-23526.0	33746320.0	50868.0
1298.47	15275.4	49.1	1646.8	-44488.0	72306760.0	100126.0
1298.48	13651.0	53.6	1388.0	-48198.0	75212370.0	105428.0
1298.49	3513.9	36.5	69.8	-32524.0	45756400.0	69555.0
1298.50	13858.8	46.6	1513.9	-42377.0	68975380.0	97144.0
1298.51	10610.0	55.6	996.4	-49793.0	74776620.0	107747.0
1298.52	1889.2	30.9	-194.9	-27232.0	36651940.0	56170.0
1298.53	12234.2	40.9	1249.4	-37088.0	59870940.0	83758.0
1298.54	8985.4	50.0	731.9	-44501.0	65672180.0	94361.0
1298.55	12234.4	51.1	1255.4	-46087.0	71880990.0	102446.0
1298.56	10609.8	45.5	990.8	-40796.0	62776560.0	89060.0
1298.57	6568.9	28.0	559.8	-25513.0	40295720.0	59583.0
1298.58	4944.6	32.5	301.5	-29220.0	43201370.0	64885.0
1298.59	13665.1	47.1	1487.0	-42781.0	69325970.0	97775.0
1298.60	12040.7	51.6	1228.4	-46490.0	72221580.0	103076.0
1298.61	4944.3	22.3	295.4	-20222.0	31191290.0	46198.0
1298.62	3319.9	26.8	37.0	-23929.0	34096910.0	51499.0
1298.63	12040.5	41.4	1222.5	-37491.0	60211530.0	84389.0
1298.64	10416.1	45.9	963.8	-41199.0	63117150.0	89691.0
1298.108	3145.1	-7.7	-6074.3	6352.0	58262310.0	74474.0
1298.109	-3056.4	2.7	-4924.0	-1904.0	69370310.0	84218.0
1298.110	711.5	70.5	-11683.2	-57887.0	62611510.0	81861.0
1298.111	-5489.8	80.9	-10525.2	-66133.0	73719550.0	91604.0
1298.112	24436.9	-18.0	12479.1	9652.0	20133850.0	41319.0
1298.113	18234.6	-7.6	13624.2	1464.0	31241650.0	51065.0
1298.114	21991.0	59.4	6790.8	-53145.0	24509900.0	48730.0
1298.115	15789.4	69.7	7962.6	-61269.0	35617880.0	58475.0
1298.116	3450.0	-2.2	-3709.5	1527.0	57720090.0	73035.0
1298.117	-2751.5	8.2	-2557.6	-6747.0	68828100.0	82779.0
1298.118	406.9	64.9	-14014.3	-52915.0	63153800.0	83300.0
1298.119	-5794.5	75.3	-12854.5	-61165.0	74261820.0	93044.0
1298.120	24741.5	-12.6	14845.3	4844.0	19601560.0	39881.0
1298.121	18539.7	-2.2	16001.8	-3315.0	30699480.0	49626.0
1298.122	21688.5	53.7	4472.3	-48127.0	25042740.0	50164.0
1298.123	15486.8	64.1	5633.8	-56275.0	36150680.0	59909.0
1298.124	3244.6	-26.6	-4834.7	25383.0	58087700.0	74444.0
1298.125	-2956.8	-16.2	-3689.1	17120.0	69195720.0	84188.0
1298.126	811.6	51.4	-10422.1	-38697.0	62437040.0	81830.0
1298.127	-5389.8	61.8	-9261.2	-46962.0	73545060.0	91574.0
1298.128	24312.4	-0.2	11144.4	-7152.0	20362090.0	41402.0
1298.129	18110.9	10.1	12316.8	-15273.0	31470090.0	51146.0
1298.130	21867.0	77.2	5474.3	-69937.0	24728270.0	48812.0
1298.131	15665.4	87.5	6646.7	-78062.0	35836240.0	58556.0
1298.132	3550.2	-21.2	-2459.1	20580.0	57545660.0	73004.0

1298.133	-2651.4	-10.8	-1303.6	12312.0	68653620.0	82749.0
1298.134	507.0	45.8	-12750.7	-33725.0	62979340.0	83269.0
1298.135	-5694.4	56.2	-11590.8	-41983.0	74087360.0	93013.0
1298.136	24617.2	5.2	13537.9	-11939.0	19819850.0	39964.0
1298.137	18415.6	15.5	14696.3	-20075.0	30927820.0	49708.0
1298.138	21563.8	71.7	3111.0	-65051.0	25270920.0	50247.0
1298.139	15362.2	81.9	4281.0	-73173.0	36378900.0	59991.0
1298.140	13441.2	-102.3	7131.9	81936.0	39838850.0	54242.0
1298.141	7240.6	-91.9	8288.1	73601.0	50947080.0	63984.0
1298.142	5311.9	157.5	-11648.0	-130519.0	54365070.0	78900.0
1298.143	-890.3	167.8	-10489.0	-138610.0	65472890.0	88646.0
1298.144	19832.5	-105.2	12732.1	82548.0	28399270.0	44288.0
1298.145	13631.9	-94.8	13888.4	74211.0	39497500.0	54030.0
1298.146	11692.2	153.9	-6122.3	-128620.0	42942680.0	68968.0
1298.147	5489.9	164.2	-4964.0	-136713.0	54050480.0	78714.0
1298.148	13471.1	-108.0	7502.0	87686.0	39786480.0	54232.0
1298.149	7269.7	-97.6	8651.7	79441.0	50894500.0	63976.0
1298.150	5349.3	152.2	-11237.2	-125498.0	54294610.0	78876.0
1298.151	-853.1	162.5	-10081.1	-133584.0	65402380.0	88622.0
1298.152	19801.5	-99.5	12359.7	76840.0	28451360.0	44300.0
1298.153	13601.2	-89.1	13519.5	68500.0	39559660.0	54042.0
1298.154	11655.4	159.3	-6524.6	-133664.0	43003290.0	68992.0
1298.155	5453.2	169.6	-5367.7	-141780.0	54111110.0	78737.0
1298.156	14457.1	-84.0	15007.7	65817.0	38038010.0	49445.0
1298.157	8256.8	-73.6	16168.6	57476.0	49136310.0	59187.0
1298.158	4300.8	138.9	-19421.2	-114083.0	56157130.0	83687.0
1298.159	-1901.7	149.2	-18265.9	-122168.0	67264870.0	93433.0
1298.160	20848.7	-86.9	20616.8	66395.0	26588500.0	39491.0
1298.161	14648.4	-76.5	21777.8	58055.0	37696810.0	49233.0
1298.162	10681.2	135.3	-13900.1	-112168.0	44734780.0	73754.0
1298.163	4478.8	145.6	-12744.9	-120253.0	55842540.0	83500.0
1298.164	14486.4	-89.8	15367.3	71627.0	37985480.0	49437.0
1298.165	8285.4	-79.4	16522.2	63373.0	49083610.0	59180.0
1298.166	4337.6	133.6	-19013.3	-109062.0	56096520.0	83663.0
1298.167	-1864.9	143.9	-17857.7	-117148.0	67204260.0	93409.0
1298.168	20818.5	-81.2	20259.1	60655.0	26640800.0	39502.0
1298.169	14618.2	-70.8	21420.1	52315.0	37749100.0	49243.0
1298.170	10643.6	140.6	-14317.0	-117176.0	44805180.0	73779.0
1298.171	4441.4	150.9	-13158.1	-125268.0	55913000.0	83524.0
1298.268	17837.8	-23.2	-908.2	16679.0	31950420.0	51490.0
1298.269	-2833.5	11.4	2936.9	-10798.0	68977180.0	83970.0
1298.270	15403.3	55.0	-6525.5	-47530.0	36299380.0	58879.0
1298.271	-5269.6	89.4	-2656.4	-74694.0	73325730.0	91361.0
1298.272	24228.0	-26.1	4674.1	17375.0	20510560.0	41538.0
1298.273	3557.3	8.5	8522.0	-10171.0	57527470.0	74017.0
1298.274	21784.7	51.5	-997.8	-45817.0	24877280.0	48944.0
1298.275	1111.8	85.9	2876.8	-72944.0	61903620.0	81427.0
1298.276	18142.2	-17.7	1447.6	11866.0	31418080.0	50052.0
1298.277	-2528.8	16.9	5297.8	-15666.0	68434900.0	82531.0
1298.278	15099.1	49.4	-8862.0	-42527.0	36841780.0	60316.0
1298.279	-5573.4	83.9	-4993.8	-69794.0	73868220.0	92798.0
1298.280	24533.1	-20.7	7043.8	12520.0	19968390.0	40099.0
1298.281	3862.2	13.9	10891.9	-14977.0	56985250.0	72578.0
1298.282	21481.3	45.9	-3334.4	-40876.0	25419880.0	50380.0
1298.283	808.5	80.3	534.2	-67985.0	62436250.0	82863.0
1298.284	17867.9	-28.9	-534.4	22402.0	31898100.0	51480.0
1298.285	-2803.6	5.7	3306.1	-5090.0	68924800.0	83960.0
1298.286	15434.0	49.3	-6148.2	-41795.0	36247210.0	58868.0
1298.287	-5236.6	83.9	-2280.4	-69292.0	73264140.0	91346.0
1298.288	24193.8	-20.7	4295.6	12044.0	20571840.0	41556.0

1298.289	3520.5	13.8	8136.9	-15183.0	57598080.0	74041.0
1298.290	21747.1	56.8	-1405.8	-50843.0	24947680.0	48969.0
1298.291	1074.6	91.2	2482.8	-77980.0	61964130.0	81452.0
1298.292	18172.9	-23.4	1829.3	17582.0	31355910.0	50041.0
1298.293	-2498.9	11.2	5671.8	-9938.0	68382530.0	82522.0
1298.294	15129.9	43.6	-8481.1	-36800.0	36789640.0	60306.0
1298.295	-5541.0	78.3	-4610.5	-64288.0	73806500.0	92784.0
1298.296	24498.5	-15.2	6663.5	7233.0	20029570.0	40118.0
1298.297	3825.1	19.2	10498.9	-20003.0	57055780.0	72602.0
1298.298	21443.8	51.2	-3737.3	-45876.0	25480310.0	50405.0
1298.299	771.5	85.6	134.0	-73054.0	62506810.0	82887.0
1299.1	23934.0	-8.0	-1301.7	4568.0	9602563.0	33843.0
1299.2	22493.7	-8.6	-1774.4	5253.0	12178140.0	36576.0
1299.3	51342.6	-15.2	-1604.6	9098.0	20621500.0	64279.0
1299.4	49902.3	-15.8	-2077.2	9782.0	23200080.0	67012.0
1299.5	18415.1	-6.1	-1131.9	3569.0	7378692.0	26036.0
1299.6	16974.8	-6.8	-1604.6	4254.0	9954271.0	28768.0
1299.7	45823.7	-13.3	-1434.9	8100.0	18397630.0	56472.0
1299.8	44383.5	-14.0	-1907.2	8783.0	20972230.0	59204.0
1299.9	21053.3	-9.3	-2246.8	5941.0	14753700.0	39308.0
1299.10	43120.0	-13.0	-1514.0	7739.0	17315910.0	55149.0
1299.11	40239.4	-14.3	-2458.3	9113.0	22465070.0	60613.0
1299.12	15534.4	-7.4	-2076.8	4943.0	12529830.0	31501.0
1299.13	37601.2	-11.2	-1344.1	6739.0	15092070.0	47341.0
1299.14	34720.5	-12.5	-2288.3	8115.0	20247200.0	52806.0
1299.15	41679.7	-13.7	-1986.4	8424.0	19890490.0	57881.0
1299.16	36160.8	-11.8	-1816.5	7425.0	17667620.0	50074.0
1299.17	24577.3	-7.7	-1109.2	4283.0	8452670.0	32617.0
1299.18	23137.0	-8.3	-1582.2	4965.0	11027250.0	35349.0
1299.19	51985.9	-14.9	-1412.4	8813.0	19470600.0	63053.0
1299.20	50545.6	-15.5	-1885.0	9494.0	22046180.0	65785.0
1299.21	19058.4	-5.8	-939.5	3284.0	6228798.0	24810.0
1299.22	17618.1	-6.5	-1412.5	3966.0	8803377.0	27542.0
1299.23	46467.0	-13.0	-1242.7	7813.0	17247730.0	55246.0
1299.24	45026.8	-13.7	-1715.3	8494.0	19822340.0	57978.0
1299.25	21696.6	-9.0	-2054.7	5652.0	13602800.0	38081.0
1299.26	43763.3	-12.7	-1321.8	7453.0	16165020.0	53922.0
1299.27	40882.7	-14.0	-2266.4	8825.0	21319180.0	59386.0
1299.28	16177.7	-7.1	-1884.9	4654.0	11378930.0	30274.0
1299.29	38244.4	-10.9	-1151.9	6454.0	13942150.0	46115.0
1299.30	35363.8	-12.2	-2096.4	7826.0	19091300.0	51579.0
1299.31	25006.1	-7.5	-981.0	4093.0	7686056.0	31799.0
1299.32	23565.9	-8.1	-1454.1	4773.0	10260660.0	34531.0
1299.33	44192.1	-12.5	-1193.6	7264.0	15398410.0	53104.0
1299.34	42751.9	-13.2	-1666.3	7945.0	17974010.0	55836.0
1299.35	19487.2	-5.6	-811.3	3094.0	5461836.0	23992.0
1299.36	18047.0	-6.3	-1284.4	3774.0	8036790.0	26724.0
1299.37	38673.3	-10.7	-1023.8	6263.0	13174560.0	45297.0
1299.38	37233.0	-11.3	-1496.4	6945.0	15750140.0	48029.0
1299.39	42323.0	-13.4	-1794.4	8136.0	18740600.0	56654.0
1299.40	36804.2	-11.5	-1624.5	7136.0	16516750.0	48847.0
1299.41	23676.7	-8.1	-1378.6	4682.0	10062930.0	34334.0
1299.42	22236.4	-8.7	-1851.3	5368.0	12637510.0	37066.0
1299.43	51085.3	-15.3	-1681.5	9212.0	21080860.0	64770.0
1299.44	49645.0	-15.9	-2153.9	9898.0	23654440.0	67502.0
1299.45	18157.8	-6.2	-1208.9	3683.0	7839055.0	26527.0
1299.46	16717.5	-6.9	-1681.5	4369.0	10414630.0	29259.0
1299.47	45566.4	-13.4	-1511.8	8213.0	18857990.0	56963.0
1299.48	44126.1	-14.1	-1983.9	8899.0	21436570.0	59695.0
1299.49	20796.0	-9.4	-2323.5	6057.0	15213060.0	39798.0

1299.50	42862.7	-13.1	-1590.9	7853.0	17775280.0	55639.0
1299.51	39982.0	-14.5	-2535.0	9229.0	22929410.0	61104.0
1299.52	15277.1	-7.6	-2153.5	5059.0	12989190.0	31991.0
1299.53	37343.9	-11.3	-1421.0	6853.0	15552430.0	47832.0
1299.54	34463.1	-12.6	-2365.1	8231.0	20701540.0	53296.0
1299.55	41422.4	-13.8	-2063.2	8540.0	20350850.0	58371.0
1299.56	35903.5	-11.9	-1893.2	7541.0	18126980.0	50564.0
1299.57	23505.2	-8.2	-1429.9	4758.0	10369180.0	34661.0
1299.58	22064.8	-8.8	-1902.5	5445.0	12944730.0	37393.0
1299.59	42691.2	-13.2	-1642.1	7930.0	18082520.0	55966.0
1299.60	41250.9	-13.9	-2114.4	8617.0	20653100.0	58699.0
1299.61	17986.3	-6.3	-1260.2	3759.0	8145306.0	26854.0
1299.62	16545.9	-7.0	-1732.7	4446.0	10720860.0	29586.0
1299.63	37172.3	-11.4	-1472.2	6930.0	15858650.0	48159.0
1299.64	35732.0	-12.0	-1944.4	7618.0	18434230.0	50891.0
1299.108	30388.8	1.1	8272.5	13003.0	9955183.0	9193.0
1299.109	25928.3	-0.4	6551.2	14615.0	17954310.0	22755.0
1299.110	27524.2	-4.7	-4112.7	17395.0	15075420.0	11826.0
1299.111	23064.4	-6.2	-5819.8	19002.0	23073730.0	25387.0
1299.112	35666.1	-12.4	3681.3	-7376.0	550422.4	51013.0
1299.113	31205.2	-14.0	1965.4	-5735.0	8546592.0	64574.0
1299.114	32784.7	-19.2	-8605.3	-1534.0	5700377.0	53635.0
1299.115	28323.8	-20.7	-10313.2	74.0	13697400.0	67196.0
1299.116	30023.1	10.8	7231.1	5733.0	10607890.0	8797.0
1299.117	25561.9	9.3	5498.4	7326.0	18600840.0	22360.0
1299.118	27893.0	-14.6	-3100.4	24861.0	14417510.0	12223.0
1299.119	23433.0	-16.1	-4800.0	26455.0	22407760.0	25784.0
1299.120	35300.2	-2.7	2638.7	-14615.0	1203081.0	50617.0
1299.121	30839.1	-4.3	922.2	-12982.0	9200054.0	64178.0
1299.122	33155.8	-29.0	-7573.2	5852.0	5038045.0	54030.0
1299.123	28694.8	-30.5	-9282.9	7458.0	13035040.0	67591.0
1299.124	30355.7	-24.0	8054.0	32661.0	10014740.0	9368.0
1299.125	25895.0	-25.5	6329.7	34272.0	18015810.0	22930.0
1299.126	27489.2	-29.7	-4398.9	37084.0	15138500.0	12001.0
1299.127	23028.7	-31.2	-6113.9	38686.0	23134620.0	25563.0
1299.128	35669.2	11.2	4061.7	-25012.0	544212.7	50812.0
1299.129	31208.4	9.7	2348.0	-23370.0	8540677.0	64373.0
1299.130	32788.0	4.4	-8182.5	-19167.0	5694219.0	53434.0
1299.131	28327.0	2.9	-9891.3	-17561.0	13691220.0	66995.0
1299.132	29988.3	-14.3	6990.3	25360.0	10671020.0	8974.0
1299.133	25527.0	-15.7	5265.4	26945.0	18671940.0	22536.0
1299.134	27858.1	-39.6	-3355.4	44502.0	14480600.0	12398.0
1299.135	23398.2	-41.1	-5053.4	46094.0	22478880.0	25959.0
1299.136	35300.3	21.0	2992.7	-32275.0	1203107.0	50418.0
1299.137	30839.8	19.5	1277.6	-30641.0	9198233.0	63978.0
1299.138	33158.3	-5.4	-7165.4	-11782.0	5033683.0	53830.0
1299.139	28697.8	-6.9	-8869.2	-10170.0	13029810.0	67390.0
1299.140	35584.0	3.7	21282.4	-92.0	679478.1	20761.0
1299.141	31125.1	2.2	19557.1	1413.0	8671918.0	34323.0
1299.142	26009.6	-16.8	-19924.6	16377.0	17795050.0	29530.0
1299.143	21547.8	-18.3	-21626.3	18079.0	25786840.0	43089.0
1299.144	37171.3	-0.1	19861.9	-6584.0	-2147602.0	33311.0
1299.145	32712.4	-1.5	18136.6	-5081.0	5842933.0	46874.0
1299.146	27581.8	-21.4	-21249.7	11080.0	14991120.0	42068.0
1299.147	23120.0	-22.9	-22951.5	12781.0	22987910.0	55628.0
1299.148	35573.6	-3.9	21217.5	5845.0	697825.6	20813.0
1299.149	31113.2	-5.4	19495.5	7473.0	8693356.0	34375.0
1299.150	26009.0	-23.8	-20053.9	21607.0	17794900.0	29590.0
1299.151	21547.1	-25.4	-21752.8	23323.0	25796670.0	43149.0
1299.152	37181.1	7.4	19937.7	-12445.0	-2165101.0	33257.0

1299.153	32722.1	6.0	18208.0	-10962.0	5825408.0	46820.0
1299.154	27582.6	-14.3	-21128.4	5798.0	14989320.0	42009.0
1299.155	23121.1	-15.9	-22830.8	7477.0	22988190.0	55568.0
1299.156	34366.2	35.9	17831.5	-24245.0	2851818.0	19440.0
1299.157	29907.2	34.4	16100.4	-22769.0	10845330.0	33003.0
1299.158	27249.2	-49.6	-16481.7	41031.0	15580270.0	30849.0
1299.159	22787.4	-51.2	-18179.8	42753.0	23583070.0	44408.0
1299.160	35953.7	32.1	16411.6	-30749.0	22789.2	31991.0
1299.161	31494.7	30.7	14680.5	-29272.0	8015749.0	45553.0
1299.162	28821.4	-54.2	-17814.6	35704.0	12779340.0	43388.0
1299.163	24359.5	-55.8	-19512.3	37426.0	20774110.0	56947.0
1299.164	34355.1	28.2	17767.1	-18254.0	2871986.0	19492.0
1299.165	29894.7	26.8	16039.1	-16659.0	10867140.0	33054.0
1299.166	27248.6	-56.6	-16598.4	46317.0	15582120.0	30908.0
1299.167	22786.6	-58.2	-18298.6	48040.0	23582860.0	44468.0
1299.168	35963.5	39.7	16478.4	-36662.0	5289.1	31938.0
1299.169	31504.6	38.3	14747.3	-35185.0	7997971.0	45500.0
1299.170	28822.0	-47.2	-17684.3	30483.0	12777490.0	43327.0
1299.171	24360.2	-48.8	-19386.0	32183.0	20774290.0	56887.0
1299.268	37447.6	-1.6	8655.0	3571.0	-2677117.0	8012.0
1299.269	22578.6	-6.7	2906.9	8974.0	23969800.0	53219.0
1299.270	34580.5	-7.4	-3761.7	8091.0	2446486.0	10649.0
1299.271	19710.6	-12.6	-9430.6	13649.0	29098180.0	55848.0
1299.272	39033.6	-5.5	7246.3	-2755.0	-5502529.0	20562.0
1299.273	24167.8	-10.4	1505.2	2457.0	21145210.0	65768.0
1299.274	36154.9	-12.0	-5088.1	2696.0	-359885.0	23189.0
1299.275	21285.6	-17.1	-10762.8	8131.0	26289960.0	68388.0
1299.276	37082.1	8.0	7623.7	-3639.0	-2030357.0	7615.0
1299.277	22212.3	3.1	1854.3	1670.0	24626360.0	52824.0
1299.278	34951.5	-17.3	-2721.9	15567.0	1784127.0	11043.0
1299.279	20081.2	-22.5	-8395.9	21050.0	28442720.0	56245.0
1299.280	38668.4	4.2	6208.7	-10019.0	-4855691.0	20166.0
1299.281	23801.7	-0.7	467.9	-4804.0	21791810.0	65372.0
1299.282	36526.8	-21.8	-4055.5	10089.0	-1022014.0	23584.0
1299.283	21656.7	-26.9	-9726.4	15535.0	25634620.0	68783.0
1299.284	37437.6	-9.1	8588.6	9467.0	-2659668.0	8064.0
1299.285	22568.4	-14.2	2838.6	14867.0	23997200.0	53272.0
1299.286	34571.0	-14.9	-3849.2	13959.0	2463062.0	10701.0
1299.287	19704.6	-19.9	-9534.5	19276.0	29116640.0	55904.0
1299.288	39038.3	1.8	7340.7	-8310.0	-5511330.0	20504.0
1299.289	24168.7	-3.3	1620.3	-2843.0	21145440.0	65708.0
1299.290	36155.1	-5.0	-4962.7	-2532.0	-359834.0	23128.0
1299.291	21286.7	-10.0	-10636.4	2841.0	26290240.0	68328.0
1299.292	37072.0	0.5	7546.3	2207.0	-2012933.0	7669.0
1299.293	22202.0	-4.5	1794.7	7570.0	24643730.0	52876.0
1299.294	34941.6	-24.8	-2818.9	21417.0	1801602.0	11097.0
1299.295	20074.1	-29.8	-8488.1	26728.0	28450900.0	56300.0
1299.296	38672.5	11.4	6305.8	-15536.0	-4864646.0	20108.0
1299.297	23802.3	6.4	578.5	-10096.0	21791970.0	65311.0
1299.298	36526.8	-14.8	-3929.7	4870.0	-1022014.0	23524.0
1299.299	21657.5	-19.8	-9616.1	10229.0	25634830.0	68724.0
1300.1	19618.3	-24.8	362.6	13381.0	17064630.0	-8677.0
1300.2	19497.1	-28.5	610.5	15389.0	17283710.0	-10666.0
1300.3	41340.6	-49.8	2461.4	26682.0	37915990.0	-17451.0
1300.4	41219.4	-53.5	2709.2	28690.0	38135070.0	-19440.0
1300.5	15093.5	-19.4	275.1	10512.0	13118350.0	-6674.0
1300.6	14972.2	-23.1	523.0	12520.0	13338410.0	-8663.0
1300.7	36815.7	-44.4	2373.8	23813.0	33971680.0	-15448.0
1300.8	36694.5	-48.1	2621.7	25821.0	34190760.0	-17437.0
1300.9	19375.9	-32.1	858.5	17396.0	17502790.0	-12655.0

1300.10	34823.9	-42.3	1831.8	22692.0	31653580.0	-14819.0
1300.11	34581.4	-49.6	2327.6	26706.0	32101720.0	-18797.0
1300.12	14851.0	-26.8	771.1	14526.0	13559490.0	-10652.0
1300.13	30299.0	-36.9	1744.3	19823.0	27719280.0	-12816.0
1300.14	30056.6	-44.3	2240.2	23836.0	28157440.0	-16794.0
1300.15	34702.7	-46.0	2079.7	24699.0	31882660.0	-16808.0
1300.16	30177.8	-40.6	1992.1	21830.0	27938360.0	-14805.0
1300.17	19672.8	-23.3	286.4	12560.0	16958530.0	-7802.0
1300.18	19551.5	-27.0	534.3	14569.0	17177590.0	-9791.0
1300.19	41395.0	-48.3	2385.3	25861.0	37819860.0	-16576.0
1300.20	41273.8	-52.0	2633.1	27870.0	38038950.0	-18565.0
1300.21	15147.9	-17.9	198.9	9691.0	13019230.0	-5799.0
1300.22	15026.7	-21.6	446.7	11700.0	13240310.0	-7787.0
1300.23	36870.2	-42.9	2297.6	22992.0	33875590.0	-14573.0
1300.24	36749.0	-46.6	2545.4	25001.0	34094670.0	-16562.0
1300.25	19430.3	-30.6	782.2	16576.0	17396670.0	-11779.0
1300.26	34878.3	-40.8	1755.7	21871.0	31557450.0	-13944.0
1300.27	34635.9	-48.1	2251.4	25886.0	31995620.0	-17922.0
1300.28	14905.5	-25.2	694.7	13706.0	13460390.0	-9776.0
1300.29	30353.5	-35.4	1668.1	19002.0	27613180.0	-11941.0
1300.30	30111.0	-42.8	2163.9	23016.0	28061320.0	-15918.0
1300.31	19709.1	-22.3	235.6	12013.0	16897790.0	-7218.0
1300.32	19587.8	-26.0	483.5	14022.0	17116850.0	-9207.0
1300.33	34914.6	-39.8	1704.9	21323.0	31496720.0	-13361.0
1300.34	34793.4	-43.5	1952.7	23332.0	31715800.0	-15349.0
1300.35	15184.2	-16.9	148.1	9144.0	12953490.0	-5215.0
1300.36	15063.0	-20.6	395.9	11153.0	13173570.0	-7204.0
1300.37	30389.8	-34.4	1617.3	18455.0	27552440.0	-11357.0
1300.38	30268.6	-38.1	1865.1	20463.0	27771520.0	-13346.0
1300.39	34757.1	-44.5	2003.5	23879.0	31776540.0	-15933.0
1300.40	30232.3	-39.1	1915.9	21010.0	27842260.0	-13930.0
1300.41	19596.5	-25.4	393.1	13710.0	17099070.0	-9027.0
1300.42	19475.3	-29.1	641.0	15717.0	17318150.0	-11016.0
1300.43	41318.8	-50.4	2491.9	27010.0	37950420.0	-17801.0
1300.44	41197.6	-54.1	2739.6	29018.0	38169510.0	-19790.0
1300.45	15071.7	-20.0	305.5	10841.0	13157790.0	-7024.0
1300.46	14950.5	-23.7	553.4	12848.0	13377870.0	-9013.0
1300.47	36793.9	-45.0	2404.2	24142.0	34016120.0	-15798.0
1300.48	36672.7	-48.7	2652.2	26149.0	34235210.0	-17787.0
1300.49	19354.1	-32.7	889.0	17723.0	17537230.0	-13005.0
1300.50	34802.1	-42.9	1862.3	23020.0	31698020.0	-15169.0
1300.51	34559.7	-50.2	2358.2	27033.0	32136180.0	-19147.0
1300.52	14829.2	-27.4	801.6	14854.0	13598930.0	-11002.0
1300.53	30277.3	-37.5	1774.7	20151.0	27753740.0	-13166.0
1300.54	30034.8	-44.9	2270.7	24164.0	28201880.0	-17144.0
1300.55	34680.9	-46.6	2110.1	25027.0	31917100.0	-17158.0
1300.56	30156.0	-41.2	2022.6	22158.0	27972800.0	-15155.0
1300.57	19582.0	-25.8	413.4	13929.0	17125370.0	-9260.0
1300.58	19460.8	-29.5	661.3	15936.0	17344450.0	-11249.0
1300.59	34787.6	-43.3	1882.6	23239.0	31724320.0	-15402.0
1300.60	34666.4	-47.0	2130.5	25246.0	31943400.0	-17391.0
1300.61	15057.2	-20.4	325.9	11060.0	13184090.0	-7257.0
1300.62	14935.9	-24.1	573.8	13067.0	13405150.0	-9246.0
1300.63	30262.8	-37.9	1795.1	20370.0	27780040.0	-13399.0
1300.64	30141.5	-41.6	2042.9	22377.0	27999100.0	-15388.0
1300.108	17445.5	20.2	12714.9	-21326.0	32840350.0	4898.0
1300.109	12665.6	11.7	13208.8	-16567.0	41400990.0	-2018.0
1300.110	19466.9	-54.3	11202.5	21135.0	29196010.0	-8812.0
1300.111	14687.0	-62.9	11704.7	25902.0	37766650.0	-15728.0
1300.112	32872.9	4.7	-9343.2	5242.0	5164877.0	-4667.0

1300.113	28093.1	-3.9	-8850.9	10007.0	13729550.0	-11583.0
1300.114	34892.2	-69.6	-10831.7	47354.0	1529000.0	-18403.0
1300.115	30112.3	-78.2	-10330.6	52119.0	10094650.0	-25320.0
1300.116	17747.2	18.2	9702.8	-19119.0	32297310.0	2336.0
1300.117	12967.2	9.6	10197.9	-14341.0	40857930.0	-4581.0
1300.118	19165.7	-52.5	14183.0	19040.0	29739170.0	-6245.0
1300.119	14385.9	-61.0	14691.1	23798.0	38309840.0	-13161.0
1300.120	33174.6	2.6	-12353.5	7439.0	4619840.0	-7229.0
1300.121	28394.7	-5.9	-11863.9	12200.0	13185490.0	-14146.0
1300.122	34591.2	-67.6	-7868.1	45205.0	2072215.0	-15834.0
1300.123	29811.3	-76.2	-7367.6	49967.0	10637860.0	-22751.0
1300.124	17518.5	5.1	11521.9	-15990.0	32708970.0	4964.0
1300.125	12738.6	-3.5	12013.2	-11233.0	41269620.0	-1953.0
1300.126	19539.5	-69.5	9994.2	26481.0	29064520.0	-8749.0
1300.127	14759.6	-78.1	10499.4	31264.0	37635180.0	-15665.0
1300.128	32796.7	20.1	-8095.7	-549.0	5301438.0	-4773.0
1300.129	28016.9	11.6	-7602.6	4226.0	13866110.0	-11689.0
1300.130	34816.2	-54.1	-9577.3	41530.0	1665613.0	-18508.0
1300.131	30036.3	-62.6	-9075.7	46295.0	10230260.0	-25425.0
1300.132	17820.0	3.0	8500.5	-13769.0	32165880.0	2400.0
1300.133	13039.9	-5.6	9002.5	-8997.0	40726480.0	-4517.0
1300.134	19238.4	-67.6	12991.2	24342.0	29617720.0	-6182.0
1300.135	14458.6	-76.1	13500.8	29098.0	38178390.0	-13098.0
1300.136	33098.0	18.0	-11101.1	1692.0	4757300.0	-7337.0
1300.137	28318.3	9.5	-10616.7	6445.0	13322000.0	-14253.0
1300.138	34515.1	-52.1	-6612.8	39393.0	2208802.0	-15940.0
1300.139	29735.2	-60.7	-6112.2	44151.0	10774450.0	-22857.0
1300.140	20487.6	101.9	6896.7	-61524.0	27396390.0	17553.0
1300.141	15708.0	93.3	7385.3	-56736.0	35957110.0	10639.0
1300.142	27223.0	-146.5	1905.4	79700.0	15270590.0	-28181.0
1300.143	22443.0	-155.0	2407.5	84439.0	23835210.0	-35099.0
1300.144	25116.5	97.1	280.0	-53446.0	19097220.0	14692.0
1300.145	20336.9	88.5	768.6	-48657.0	27657940.0	7778.0
1300.146	31849.7	-151.0	-4709.9	87461.0	6971859.0	-31067.0
1300.147	27069.7	-159.5	-4207.7	92201.0	15537480.0	-37986.0
1300.148	20509.3	97.4	6534.6	-59942.0	27361920.0	17572.0
1300.149	15729.4	88.8	7024.4	-55182.0	35922570.0	10655.0
1300.150	27246.1	-151.2	1539.7	81458.0	15229480.0	-28147.0
1300.151	22466.1	-159.7	2040.8	86196.0	23791100.0	-35066.0
1300.152	25094.9	101.6	645.3	-55037.0	19131710.0	14673.0
1300.153	20315.3	93.1	1134.9	-50246.0	27692430.0	7759.0
1300.154	31826.7	-146.3	-4341.3	85711.0	7012991.0	-31100.0
1300.155	27046.7	-154.9	-3839.0	90457.0	15578610.0	-38018.0
1300.156	21493.4	95.0	-3152.3	-54163.0	25582970.0	9013.0
1300.157	16713.8	86.4	-2662.2	-49370.0	34143690.0	2100.0
1300.158	26220.4	-140.0	11822.1	72610.0	17078820.0	-19614.0
1300.159	21440.3	-148.5	12323.0	77347.0	25649420.0	-26533.0
1300.160	26122.4	90.2	-9763.2	-46080.0	17273820.0	6153.0
1300.161	21342.8	81.7	-9273.1	-41288.0	25844550.0	-761.0
1300.162	30847.0	-144.5	5201.3	80375.0	8781680.0	-22501.0
1300.163	26066.9	-153.0	5702.1	85112.0	17349670.0	-29420.0
1300.164	21514.9	90.5	-3519.2	-52594.0	25538450.0	9030.0
1300.165	16735.1	82.0	-3027.9	-47829.0	34109120.0	2114.0
1300.166	26243.5	-144.7	11458.4	74361.0	17044720.0	-19581.0
1300.167	21463.4	-153.2	11959.2	79102.0	25605310.0	-26500.0
1300.168	26100.8	94.8	-9390.9	-47663.0	17318310.0	6135.0
1300.169	21321.2	86.2	-8900.9	-42871.0	25879040.0	-779.0
1300.170	30823.9	-139.8	5563.2	78615.0	8823162.0	-22535.0
1300.171	26043.8	-148.4	6065.2	83355.0	17393770.0	-29453.0
1300.268	28422.4	24.8	4404.7	-17524.0	13158560.0	9629.0

1300.269	12489.3	-3.8	6041.0	-1638.0	41706020.0	-13427.0
1300.270	30443.6	-49.8	2899.0	24942.0	9519162.0	-4083.0
1300.271	14510.4	-78.3	4568.7	40786.0	38071600.0	-27142.0
1300.272	33050.9	20.0	-2216.0	-9482.0	4855285.0	6764.0
1300.273	17118.6	-8.6	-579.1	6457.0	33406960.0	-16286.0
1300.274	35070.6	-54.4	-3716.9	32738.0	1219510.0	-6967.0
1300.275	19137.7	-82.9	-2044.2	48601.0	29772030.0	-30023.0
1300.276	28724.1	22.7	1387.2	-15322.0	12613520.0	7066.0
1300.277	12790.9	-5.9	3035.5	587.0	41162960.0	-15989.0
1300.278	30142.7	-47.9	5873.8	22798.0	10062400.0	-1515.0
1300.279	14209.5	-76.4	7552.6	38664.0	38614840.0	-24573.0
1300.280	33352.7	18.0	-5226.9	-7270.0	4310274.0	4202.0
1300.281	17420.3	-10.6	-3589.4	8636.0	32863920.0	-18848.0
1300.282	34769.8	-52.4	-746.2	30611.0	1762776.0	-4397.0
1300.283	18836.7	-80.9	926.2	46447.0	30315240.0	-27455.0
1300.284	28444.3	20.2	4043.0	-15931.0	13119140.0	9648.0
1300.285	12511.1	-8.3	5680.9	-41.0	41671580.0	-13407.0
1300.286	30465.5	-54.4	2529.5	26551.0	9480749.0	-4063.0
1300.287	14532.8	-82.9	4205.1	42452.0	38027320.0	-27117.0
1300.288	33028.6	24.6	-1844.2	-11155.0	4895596.0	6738.0
1300.289	17095.8	-3.9	-204.1	4718.0	33451140.0	-16317.0
1300.290	35047.6	-49.7	-3341.6	30978.0	1260643.0	-7000.0
1300.291	19114.9	-78.2	-1669.5	46858.0	29816210.0	-30055.0
1300.292	28746.0	18.2	1027.9	-13723.0	12574110.0	7086.0
1300.293	12812.7	-10.4	2677.5	2174.0	41128520.0	-15970.0
1300.294	30164.6	-52.5	5505.9	24419.0	10023990.0	-1495.0
1300.295	14231.7	-81.0	7193.6	40303.0	38570510.0	-24550.0
1300.296	33330.3	22.6	-4855.3	-8952.0	4350560.0	4175.0
1300.297	17397.4	-5.9	-3217.9	6902.0	32898080.0	-18880.0
1300.298	34746.8	-47.7	-372.0	28846.0	1803909.0	-4430.0
1300.299	18813.9	-76.2	1295.3	44723.0	30359420.0	-27486.0
1301.1	1054.5	60.1	-2200.2	-56908.0	87959000.0	47715.0
1301.2	-1442.3	71.3	-2408.7	-67190.0	95762070.0	51944.0
1301.3	7617.4	121.1	-3096.1	-113824.0	174843200.0	93026.0
1301.4	5120.6	132.3	-3304.8	-124095.0	182606300.0	97256.0
1301.5	807.5	47.6	-1745.7	-45078.0	67665990.0	36706.0
1301.6	-1689.2	58.8	-1954.2	-55362.0	75459090.0	40936.0
1301.7	7370.4	108.7	-2641.6	-101994.0	154580200.0	82018.0
1301.8	4873.6	119.9	-2850.3	-112267.0	162343200.0	86247.0
1301.9	-3939.0	82.5	-2617.2	-77484.0	103595200.0	56173.0
1301.10	5648.5	102.8	-2827.3	-96748.0	148740900.0	79433.0
1301.11	655.0	125.2	-3244.6	-117323.0	164367100.0	87892.0
1301.12	-4186.0	70.1	-2162.7	-65661.0	83252150.0	45165.0
1301.13	5401.6	90.3	-2372.8	-84919.0	128478000.0	68424.0
1301.14	408.0	112.8	-2790.1	-105497.0	144104100.0	76883.0
1301.15	3151.8	114.0	-3036.0	-107026.0	156604000.0	83662.0
1301.16	2904.8	101.6	-2581.5	-95197.0	136241000.0	72654.0
1301.17	2172.8	55.6	-2096.9	-52827.0	84474280.0	45828.0
1301.18	-324.0	66.8	-2305.5	-63096.0	92267350.0	50057.0
1301.19	8735.7	116.7	-2992.8	-109745.0	171328500.0	91140.0
1301.20	6238.9	127.9	-3201.5	-120006.0	179191500.0	95369.0
1301.21	1925.8	43.2	-1642.4	-40997.0	64171270.0	34820.0
1301.22	-571.0	54.4	-1850.9	-51269.0	71974340.0	39049.0
1301.23	8488.7	104.2	-2538.3	-97911.0	151065500.0	80131.0
1301.24	5991.9	115.4	-2747.0	-108172.0	158828500.0	84361.0
1301.25	-2820.8	78.0	-2514.0	-73389.0	100080400.0	54287.0
1301.26	6766.8	98.4	-2724.0	-92667.0	145326200.0	77546.0
1301.27	1773.3	120.8	-3141.3	-113228.0	160852400.0	86005.0
1301.28	-3067.7	65.6	-2059.4	-61563.0	79767430.0	43279.0
1301.29	6519.8	85.9	-2269.5	-80839.0	124963200.0	66538.0

1301.30	1526.3	108.3	-2686.8	-101400.0	140589400.0	74997.0
1301.31	2918.3	52.7	-2028.1	-50107.0	82144460.0	44570.0
1301.32	421.5	63.9	-2236.6	-60369.0	89937530.0	48800.0
1301.33	7512.3	95.4	-2655.1	-89950.0	142916400.0	76288.0
1301.34	5015.5	106.6	-2863.8	-100212.0	150779500.0	80518.0
1301.35	2671.3	40.2	-1573.5	-38275.0	61851450.0	33562.0
1301.36	174.5	51.4	-1782.1	-48540.0	69644510.0	37791.0
1301.37	7265.3	82.9	-2200.6	-78115.0	122653400.0	65280.0
1301.38	4768.5	94.1	-2409.2	-88380.0	130416400.0	69509.0
1301.39	4270.0	109.6	-2932.7	-102935.0	153089300.0	81775.0
1301.40	4023.0	97.1	-2478.1	-91103.0	132826300.0	70767.0
1301.41	607.2	61.9	-2241.5	-58541.0	89354900.0	48469.0
1301.42	-1889.6	73.1	-2450.0	-68827.0	97157960.0	52699.0
1301.43	7170.1	122.9	-3137.4	-115455.0	176229100.0	93781.0
1301.44	4673.3	134.1	-3346.1	-125733.0	183992200.0	98010.0
1301.45	360.2	49.4	-1787.0	-46711.0	69061890.0	37461.0
1301.46	-2136.5	60.6	-1995.5	-56999.0	76854980.0	41690.0
1301.47	6923.1	110.4	-2682.9	-103622.0	155966100.0	82773.0
1301.48	4426.3	121.6	-2891.6	-113906.0	163729200.0	87002.0
1301.49	-4386.3	84.3	-2658.5	-79124.0	104981000.0	56928.0
1301.50	5201.2	104.6	-2868.6	-98382.0	150226800.0	80187.0
1301.51	207.7	127.0	-3285.9	-118962.0	165753000.0	88646.0
1301.52	-4633.3	71.8	-2204.0	-67300.0	84658040.0	45920.0
1301.53	4954.3	92.1	-2414.1	-86550.0	129863800.0	69179.0
1301.54	-39.3	114.6	-2831.4	-107137.0	145490000.0	77638.0
1301.55	2704.5	115.8	-3077.3	-108665.0	157989900.0	84417.0
1301.56	2457.5	103.3	-2622.8	-96835.0	137726900.0	73408.0
1301.57	309.0	63.0	-2269.0	-59630.0	90288820.0	48972.0
1301.58	-2187.8	74.3	-2477.5	-69918.0	98081900.0	53202.0
1301.59	4903.0	105.8	-2896.2	-99471.0	151150800.0	80690.0
1301.60	2406.3	117.0	-3104.8	-109757.0	158913900.0	84920.0
1301.61	62.0	50.6	-1814.5	-47800.0	69985820.0	37964.0
1301.62	-2434.7	61.8	-2023.0	-58091.0	77788900.0	42194.0
1301.63	4656.0	93.3	-2441.7	-87639.0	130787800.0	69682.0
1301.64	2159.3	104.5	-2650.3	-97928.0	138650800.0	73912.0
1301.108	-3128.0	-1.5	-5151.9	-13132.0	131202000.0	61800.0
1301.109	-9183.2	26.0	-5771.6	-38610.0	152057400.0	70045.0
1301.110	-5135.0	199.6	-8098.1	-201379.0	134390100.0	72683.0
1301.111	-11190.1	227.2	-8706.0	-226943.0	155245400.0	80928.0
1301.112	18070.0	-81.0	4723.8	87087.0	49639660.0	28762.0
1301.113	12014.9	-53.2	4110.7	61187.0	70455000.0	37008.0
1301.114	16069.4	124.5	1825.8	-107688.0	52809310.0	39666.0
1301.115	10015.2	152.2	1221.7	-133482.0	73624870.0	47912.0
1301.116	-3102.0	8.8	-4898.7	-24838.0	130908700.0	59492.0
1301.117	-9157.3	36.4	-5517.5	-50357.0	151764000.0	67738.0
1301.118	-5163.5	189.3	-8359.2	-189796.0	134682800.0	74990.0
1301.119	-11218.5	216.9	-8963.4	-215346.0	155538200.0	83235.0
1301.120	18096.2	-70.6	4974.8	75364.0	49346340.0	26454.0
1301.121	12041.6	-43.0	4361.2	49622.0	70161820.0	34700.0
1301.122	16042.3	113.6	1556.2	-95427.0	53102390.0	41969.0
1301.123	9988.1	141.3	949.8	-121275.0	73917960.0	50215.0
1301.124	-2998.0	-44.9	-5360.6	-10222.0	130835200.0	61795.0
1301.125	-9052.9	-17.4	-5983.5	-35692.0	151590600.0	70040.0
1301.126	-5003.8	156.1	-8331.4	-198605.0	133923500.0	72679.0
1301.127	-11059.0	183.7	-8937.8	-224185.0	154778800.0	80924.0
1301.128	17952.0	-31.0	5019.9	74323.0	50109560.0	28811.0
1301.129	11897.5	-3.4	4411.2	48591.0	70925050.0	37057.0
1301.130	15952.2	174.1	2132.7	-119994.0	53279410.0	39715.0
1301.131	9898.0	201.8	1529.2	-145789.0	74094980.0	47960.0
1301.132	-2970.7	-34.8	-5114.3	-21747.0	130542200.0	59487.0

1301.133	-9025.9	-7.2	-5729.1	-47280.0	151297500.0	67733.0
1301.134	-5031.9	145.8	-8582.3	-186955.0	134216400.0	74985.0
1301.135	-11086.9	173.3	-9185.9	-212485.0	155071700.0	83230.0
1301.136	17978.9	-20.8	5276.0	62649.0	49816420.0	26505.0
1301.137	11924.6	6.8	4659.1	36986.0	70631960.0	34751.0
1301.138	15924.5	163.6	1856.2	-108094.0	53572340.0	42019.0
1301.139	9870.3	191.2	1251.8	-133874.0	74387910.0	50264.0
1301.140	6632.1	-266.1	1866.2	244508.0	98991850.0	37531.0
1301.141	576.5	-238.8	1245.1	219419.0	119847100.0	45774.0
1301.142	-50.7	410.4	-7860.9	-391749.0	109487100.0	73840.0
1301.143	-6104.5	438.3	-8464.0	-417829.0	130342700.0	82086.0
1301.144	12990.0	-291.1	4817.6	276251.0	74503750.0	27613.0
1301.145	6934.4	-263.8	4196.5	251170.0	95318960.0	35857.0
1301.146	6313.5	388.9	-4881.3	-365291.0	85060580.0	63941.0
1301.147	259.7	416.8	-5484.4	-391378.0	105866200.0	72188.0
1301.148	6671.6	-279.1	1800.1	245351.0	98861930.0	37529.0
1301.149	616.4	-251.6	1177.9	219882.0	119657200.0	45774.0
1301.150	-15.5	395.4	-7944.0	-387985.0	109396000.0	73825.0
1301.151	-6069.4	423.4	-8547.6	-414096.0	130251700.0	82072.0
1301.152	12950.9	-277.9	4887.3	275208.0	74643780.0	27617.0
1301.153	6895.4	-250.7	4266.5	250153.0	95459020.0	35860.0
1301.154	6278.4	403.7	-4796.5	-368935.0	85191620.0	63955.0
1301.155	224.3	431.6	-5399.5	-394984.0	106057200.0	72202.0
1301.156	6718.5	-231.6	2709.9	205655.0	98013890.0	29837.0
1301.157	662.9	-204.4	2089.3	180611.0	118869100.0	38081.0
1301.158	-146.1	374.8	-8741.6	-351622.0	110562700.0	81519.0
1301.159	-6199.9	402.7	-9345.3	-377745.0	131318400.0	89766.0
1301.160	13076.4	-256.7	5667.4	237520.0	73525780.0	19920.0
1301.161	7020.8	-229.5	5046.8	212476.0	94341010.0	28163.0
1301.162	6218.1	353.3	-5767.8	-325207.0	86046240.0	71620.0
1301.163	164.2	381.2	-6371.4	-351328.0	106841900.0	79867.0
1301.164	6758.1	-244.5	2637.8	206255.0	97873990.0	29837.0
1301.165	702.9	-217.0	2016.3	180849.0	118679300.0	38081.0
1301.166	-110.8	359.9	-8821.5	-347897.0	110371700.0	81505.0
1301.167	-6164.7	387.9	-9425.3	-374028.0	131227400.0	89752.0
1301.168	13037.5	-243.6	5742.7	236635.0	73655870.0	19922.0
1301.169	6981.9	-216.4	5122.2	211590.0	94471080.0	28165.0
1301.170	6182.8	368.3	-5687.9	-329036.0	86187230.0	71635.0
1301.171	129.0	396.2	-6291.0	-355109.0	107032900.0	79882.0
1301.268	11352.9	-63.0	-997.0	53913.0	78396130.0	40607.0
1301.269	-8830.8	28.6	-3067.6	-30936.0	147747300.0	68091.0
1301.270	9345.2	138.6	-3946.1	-134932.0	81543960.0	51492.0
1301.271	-10835.7	231.1	-5957.2	-221090.0	150935800.0	78979.0
1301.272	17710.8	-87.6	1949.9	85255.0	53908020.0	30691.0
1301.273	-2474.0	4.0	-106.9	415.0	123268900.0	58173.0
1301.274	15708.3	116.7	-967.8	-107831.0	57077190.0	41591.0
1301.275	-4472.9	209.3	-2974.2	-194181.0	126459000.0	69078.0
1301.276	11378.8	-52.5	-746.4	42148.0	78092730.0	38299.0
1301.277	-8805.1	39.1	-2811.7	-42770.0	147453800.0	65783.0
1301.278	9317.0	128.2	-4209.4	-123182.0	81846770.0	53797.0
1301.279	-10864.3	220.6	-6216.4	-209191.0	151228500.0	81283.0
1301.280	17736.8	-77.4	2206.6	73683.0	53614660.0	28382.0
1301.281	-2447.2	14.3	147.7	-11191.0	122975700.0	55865.0
1301.282	15679.6	106.1	-1235.4	-95818.0	57369870.0	43895.0
1301.283	-4500.6	198.7	-3244.3	-182183.0	126751900.0	71382.0
1301.284	11392.4	-76.1	-1062.1	54871.0	78256200.0	40605.0
1301.285	-8791.5	15.6	-3132.6	-30050.0	147657300.0	68089.0
1301.286	9384.3	125.4	-4024.1	-133871.0	81413940.0	51489.0
1301.287	-10798.5	217.4	-6037.7	-219072.0	150745300.0	78972.0
1301.288	17674.1	-73.5	2033.2	82745.0	54048660.0	30700.0

1301.289	-2509.0	18.8	-15.1	-3272.0	123460000.0	58187.0
1301.290	15673.3	131.8	-880.0	-111715.0	57218260.0	41606.0
1301.291	-4508.1	224.2	-2883.7	-197836.0	126550000.0	69092.0
1301.292	11418.3	-65.7	-810.9	43168.0	77962810.0	38297.0
1301.293	-8765.6	26.1	-2874.5	-41842.0	147363900.0	65782.0
1301.294	9356.2	115.0	-4287.9	-122120.0	81716770.0	53795.0
1301.295	-10826.4	206.9	-6291.9	-207398.0	151138200.0	81278.0
1301.296	17700.3	-63.2	2290.7	71003.0	53755340.0	28392.0
1301.297	-2482.3	29.2	236.5	-14938.0	123166800.0	55880.0
1301.298	15644.9	121.1	-1147.8	-99671.0	57511010.0	43910.0
1301.299	-4535.8	213.5	-3159.2	-185837.0	126842900.0	71396.0
1302.1	19181.6	-6.4	-1590.3	500.0	21753230.0	22483.0
1302.2	17482.4	-6.2	-1691.0	-52.0	27739760.0	24887.0
1302.3	43357.6	-10.4	-1416.1	-985.0	42720520.0	41678.0
1302.4	41658.4	-10.1	-1517.2	-1525.0	48707060.0	44082.0
1302.5	14753.3	-4.8	-1266.0	308.0	16723570.0	17300.0
1302.6	13054.1	-4.5	-1366.8	-246.0	22720100.0	19705.0
1302.7	38929.3	-8.7	-1092.1	-1177.0	37690860.0	36495.0
1302.8	37230.1	-8.5	-1193.0	-1713.0	43687400.0	38900.0
1302.9	15783.2	-5.9	-1791.7	-614.0	33736290.0	27292.0
1302.10	36104.8	-9.2	-1468.2	-544.0	36430340.0	35919.0
1302.11	32706.4	-8.7	-1670.1	-1643.0	48413400.0	40728.0
1302.12	11354.9	-4.3	-1467.4	-810.0	28716630.0	22109.0
1302.13	31676.5	-7.6	-1144.1	-733.0	31400680.0	30737.0
1302.14	28278.1	-7.1	-1345.9	-1835.0	43393740.0	35546.0
1302.15	34405.6	-8.9	-1569.2	-1089.0	42416870.0	38324.0
1302.16	29977.3	-7.3	-1245.1	-1278.0	37397210.0	33141.0
1302.17	19942.7	-6.5	-1525.4	684.0	19067380.0	21402.0
1302.18	18243.5	-6.2	-1626.1	139.0	25063920.0	23807.0
1302.19	44118.7	-10.4	-1351.2	-809.0	40034680.0	40597.0
1302.20	42419.5	-10.2	-1452.2	-1337.0	46031220.0	43002.0
1302.21	15514.4	-4.8	-1201.2	491.0	14047720.0	16220.0
1302.22	13815.2	-4.6	-1301.9	-55.0	20034260.0	18624.0
1302.23	39690.4	-8.8	-1027.1	-995.0	35015020.0	35415.0
1302.24	37991.2	-8.5	-1128.1	-1525.0	41001560.0	37819.0
1302.25	16544.3	-5.9	-1726.9	-420.0	31060450.0	26211.0
1302.26	36865.9	-9.2	-1403.3	-364.0	33744490.0	34838.0
1302.27	33467.5	-8.7	-1605.2	-1454.0	45737560.0	39648.0
1302.28	12116.0	-4.3	-1402.7	-615.0	26030790.0	21029.0
1302.29	32437.6	-7.6	-1079.1	-556.0	28724830.0	29656.0
1302.30	29039.2	-7.1	-1281.1	-1642.0	40707900.0	34466.0
1302.31	20450.1	-6.5	-1482.2	805.0	17286820.0	20682.0
1302.32	18750.9	-6.2	-1582.9	266.0	23273350.0	23086.0
1302.33	37373.3	-9.2	-1360.0	-247.0	31963930.0	34118.0
1302.34	35674.1	-9.0	-1461.0	-778.0	37950460.0	36523.0
1302.35	16021.8	-4.9	-1158.0	613.0	12258160.0	15499.0
1302.36	14322.6	-4.6	-1258.7	73.0	18253700.0	17904.0
1302.37	32945.0	-7.6	-1035.8	-432.0	26934270.0	28936.0
1302.38	31245.8	-7.4	-1136.8	-965.0	32930800.0	31341.0
1302.39	35166.7	-9.0	-1504.2	-901.0	39741020.0	37243.0
1302.40	30738.4	-7.3	-1180.1	-1088.0	34711360.0	32061.0
1302.41	18877.1	-6.4	-1616.2	426.0	22825550.0	22915.0
1302.42	17177.9	-6.2	-1716.9	-129.0	28812080.0	25319.0
1302.43	43053.1	-10.4	-1442.1	-1056.0	43792850.0	42110.0
1302.44	41353.9	-10.1	-1543.2	-1601.0	49779380.0	44514.0
1302.45	14448.8	-4.8	-1292.0	234.0	17795890.0	17733.0
1302.46	12749.6	-4.5	-1392.7	-323.0	23792420.0	20137.0
1302.47	38624.8	-8.7	-1118.1	-1246.0	38763190.0	36928.0
1302.48	36925.6	-8.5	-1219.0	-1790.0	44759720.0	39332.0
1302.49	15478.7	-5.9	-1817.6	-693.0	34808620.0	27724.0

1302.50	35800.3	-9.2	-1494.2	-618.0	37502660.0	36351.0
1302.51	32401.9	-8.7	-1696.1	-1719.0	49485720.0	41160.0
1302.52	11050.4	-4.3	-1493.3	-886.0	29788960.0	22542.0
1302.53	31372.0	-7.5	-1170.0	-805.0	32473000.0	31169.0
1302.54	27973.6	-7.0	-1371.8	-1915.0	44466060.0	35978.0
1302.55	34101.1	-8.9	-1595.2	-1165.0	43489190.0	38756.0
1302.56	29672.8	-7.3	-1271.1	-1353.0	38469530.0	33574.0
1302.57	18674.2	-6.4	-1633.5	376.0	23533790.0	23203.0
1302.58	16974.9	-6.1	-1734.2	-180.0	29530300.0	25607.0
1302.59	35597.4	-9.2	-1511.5	-667.0	38210900.0	36639.0
1302.60	33898.2	-8.9	-1612.5	-1216.0	44207430.0	39044.0
1302.61	14245.9	-4.8	-1309.2	184.0	18514130.0	18021.0
1302.62	12546.6	-4.5	-1410.0	-374.0	24510640.0	20425.0
1302.63	31169.1	-7.5	-1187.4	-853.0	33191240.0	31457.0
1302.64	29469.9	-7.3	-1288.4	-1404.0	39187770.0	33862.0
1302.108	39971.5	78.2	5458.8	-103461.0	38436730.0	-2984.0
1302.109	33494.5	75.2	4896.7	-107415.0	58104440.0	12509.0
1302.110	35065.3	55.5	4179.5	-80549.0	48105160.0	4565.0
1302.111	28588.7	52.5	3622.9	-84382.0	67782980.0	20058.0
1302.112	20254.6	-63.7	-5865.2	80829.0	-17493050.0	29853.0
1302.113	13777.3	-66.7	-6432.3	76867.0	2183589.0	45345.0
1302.114	15344.0	-83.8	-7149.9	99109.0	-7775746.0	37378.0
1302.115	8867.0	-86.7	-7703.1	95133.0	11897970.0	52869.0
1302.116	39568.2	96.1	5755.8	-121549.0	38453850.0	-2759.0
1302.117	33090.8	93.2	5196.4	-125563.0	58121460.0	12734.0
1302.118	35469.1	37.5	3846.8	-62421.0	48088160.0	4345.0
1302.119	28992.4	34.5	3295.9	-66229.0	67755960.0	19837.0
1302.120	19851.2	-45.7	-5565.6	62610.0	-17475960.0	30077.0
1302.121	13373.9	-48.6	-6131.0	58588.0	2199682.0	45568.0
1302.122	15749.3	-102.0	-7490.5	117489.0	-7802353.0	37157.0
1302.123	9272.2	-104.9	-8045.9	113528.0	11868340.0	52647.0
1302.124	39872.8	84.2	4607.5	-129024.0	38301550.0	-2904.0
1302.125	33395.7	81.3	4042.8	-132975.0	57979240.0	12589.0
1302.126	34966.2	62.4	3332.9	-107050.0	47979880.0	4644.0
1302.127	28489.2	59.4	2779.9	-110940.0	67657590.0	20137.0
1302.128	20345.0	-66.5	-5005.4	100336.0	-17279990.0	29720.0
1302.129	13867.8	-69.4	-5566.8	96330.0	2392676.0	45212.0
1302.130	15434.4	-86.9	-6284.5	118923.0	-7562685.0	37245.0
1302.131	8957.3	-89.8	-6836.7	114917.0	12108010.0	52736.0
1302.132	39468.9	102.3	4903.8	-147286.0	38318520.0	-2680.0
1302.133	32991.6	99.4	4350.7	-151262.0	57996160.0	12813.0
1302.134	35370.1	44.3	3015.1	-88762.0	47952910.0	4423.0
1302.135	28893.4	41.2	2465.5	-92564.0	67630700.0	19915.0
1302.136	19940.2	-48.2	-4692.1	81804.0	-17263250.0	29944.0
1302.137	13463.3	-51.1	-5261.4	77804.0	2416488.0	45435.0
1302.138	15839.1	-105.1	-6633.6	137351.0	-7599446.0	37025.0
1302.139	9362.2	-108.1	-7187.9	133399.0	12080300.0	52515.0
1302.140	38797.3	53.4	3134.7	-63115.0	7557192.0	-291.0
1302.141	32320.6	50.2	2568.6	-66674.0	27224980.0	15204.0
1302.142	22434.0	-18.1	-1115.3	6714.0	39872910.0	24844.0
1302.143	15956.9	-20.9	-1670.6	2469.0	59550610.0	40333.0
1302.144	32882.6	10.5	-250.2	-6925.0	-9231648.0	9567.0
1302.145	26405.9	7.3	-816.4	-10475.0	10441150.0	25062.0
1302.146	16516.5	-59.3	-4522.0	59439.0	23123360.0	34678.0
1302.147	10039.4	-62.1	-5077.4	55198.0	42801050.0	50168.0
1302.148	38767.8	55.3	2876.6	-70930.0	7517666.0	-267.0
1302.149	32290.8	52.3	2310.0	-74870.0	27197380.0	15226.0
1302.150	22406.6	-17.1	-1360.3	705.0	39805920.0	24883.0
1302.151	15929.6	-19.9	-1918.1	-3509.0	59483640.0	40372.0
1302.152	32911.8	8.5	6.7	818.0	-9184200.0	9542.0

1302.153	26435.1	5.4	-556.2	-2782.0	10482590.0	25036.0
1302.154	16543.8	-60.2	-4269.9	65396.0	23180320.0	34639.0
1302.155	10066.7	-63.1	-4825.7	61247.0	42858020.0	50129.0
1302.156	37453.3	112.7	4107.1	-123085.0	7604337.0	458.0
1302.157	30976.5	109.6	3545.3	-126702.0	27272110.0	15953.0
1302.158	23784.6	-79.1	-2241.2	68356.0	39767450.0	24112.0
1302.159	17307.5	-81.9	-2799.7	64150.0	59445140.0	39601.0
1302.160	31538.6	69.9	729.8	-66983.0	-9184503.0	10317.0
1302.161	25061.8	66.7	168.1	-70600.0	10488270.0	25811.0
1302.162	17867.0	-120.3	-5652.4	121149.0	23017870.0	33947.0
1302.163	11390.0	-123.1	-6210.9	116946.0	42695590.0	49436.0
1302.164	37423.7	114.6	3841.8	-130963.0	7566786.0	481.0
1302.165	30946.7	111.7	3279.8	-134950.0	27244500.0	15975.0
1302.166	23757.3	-78.1	-2488.5	62368.0	39700490.0	24151.0
1302.167	17280.1	-81.0	-3047.0	58150.0	59378160.0	39640.0
1302.168	31567.6	68.2	999.9	-59417.0	-9137105.0	10292.0
1302.169	25090.8	65.0	438.2	-63034.0	10529660.0	25786.0
1302.170	17894.5	-121.4	-5412.9	127233.0	23074890.0	33908.0
1302.171	11417.4	-124.2	-5968.4	123001.0	42752580.0	49397.0
1302.268	40629.8	31.2	2146.4	-32959.0	-4115338.0	-9555.0
1302.269	19039.6	21.3	265.0	-46162.0	61467000.0	42089.0
1302.270	35721.9	9.1	874.6	-10874.0	5565657.0	-2004.0
1302.271	14132.2	-0.7	-983.5	-24333.0	71155130.0	49631.0
1302.272	34715.2	-11.7	-1248.9	22979.0	-20904150.0	303.0
1302.273	13125.3	-22.0	-3133.1	10485.0	44678260.0	51948.0
1302.274	29804.9	-32.3	-2534.8	42324.0	-11186770.0	7834.0
1302.275	8215.2	-42.2	-4386.7	29066.0	54395700.0	59469.0
1302.276	40226.6	48.9	2432.5	-50919.0	-4098195.0	-9330.0
1302.277	18635.8	39.3	568.7	-64301.0	61483990.0	42314.0
1302.278	36126.8	-9.1	534.1	7458.0	5536947.0	-2225.0
1302.279	14536.8	-19.0	-1315.4	-5862.0	71128340.0	49411.0
1302.280	34312.0	6.1	-951.1	4910.0	-20887010.0	528.0
1302.281	12722.0	-4.0	-2829.6	-7829.0	44695380.0	52171.0
1302.282	30210.1	-50.7	-2877.8	60913.0	-11223400.0	7615.0
1302.283	8620.3	-60.5	-4728.7	47533.0	54369040.0	59248.0
1302.284	40600.2	33.0	1889.4	-40666.0	-4152889.0	-9531.0
1302.285	19009.9	23.1	8.3	-53856.0	61429420.0	42112.0
1302.286	35692.6	11.0	613.3	-18560.0	5524183.0	-1979.0
1302.287	14103.7	0.8	-1238.0	-31348.0	71097860.0	49662.0
1302.288	34743.2	-12.9	-986.0	29539.0	-20847010.0	269.0
1302.289	13152.5	-22.8	-2870.0	16259.0	44745200.0	51908.0
1302.290	29831.8	-33.2	-2279.1	48128.0	-11129910.0	7794.0
1302.291	8242.3	-43.2	-4129.2	35063.0	54452610.0	59429.0
1302.292	40196.9	50.9	2183.1	-58740.0	-4135771.0	-9306.0
1302.293	18606.3	41.1	314.0	-71967.0	61446470.0	42337.0
1302.294	36097.3	-7.1	276.5	-288.0	5496421.0	-2200.0
1302.295	14508.0	-17.3	-1564.0	-13084.0	71080990.0	49440.0
1302.296	34339.8	5.0	-688.9	11358.0	-20829920.0	493.0
1302.297	12749.1	-4.7	-2571.7	-2037.0	44752300.0	52131.0
1302.298	30237.1	-51.5	-2621.4	66644.0	-11156520.0	7574.0
1302.299	8647.2	-61.4	-4476.0	53522.0	54425900.0	59208.0
1303.1	29677.2	-68.2	-1199.1	64530.0	11078650.0	1452.0
1303.2	30112.9	-79.3	-1290.7	75144.0	10551800.0	334.0
1303.3	62183.7	-139.1	-1432.9	132776.0	27913060.0	2930.0
1303.4	62619.4	-150.2	-1524.5	143388.0	27384210.0	1811.0
1303.5	22831.6	-53.5	-937.3	50702.0	8512341.0	1118.0
1303.6	23267.3	-64.6	-1028.8	61316.0	7984489.0	0.0
1303.7	55338.1	-124.5	-1171.2	118948.0	25346750.0	2596.0
1303.8	55773.8	-135.5	-1262.6	129558.0	24817900.0	1478.0
1303.9	30548.7	-90.3	-1382.1	85757.0	10023970.0	-785.0

1303.10	52431.7	-117.8	-1362.8	112304.0	22862330.0	2486.0
1303.11	53303.2	-140.0	-1545.5	133526.0	21806650.0	250.0
1303.12	23703.1	-75.7	-1120.1	71927.0	7456661.0	-1118.0
1303.13	45586.1	-103.2	-1101.0	98474.0	20295010.0	2153.0
1303.14	46457.6	-125.3	-1283.6	119695.0	19239330.0	-84.0
1303.15	52867.5	-128.9	-1454.3	122916.0	22334500.0	1368.0
1303.16	46021.9	-114.3	-1192.5	109086.0	19767190.0	1035.0
1303.17	29482.3	-63.7	-1138.7	60236.0	11314930.0	1938.0
1303.18	29918.1	-74.8	-1230.4	70850.0	10787110.0	819.0
1303.19	61988.8	-134.6	-1372.6	128484.0	28143340.0	3415.0
1303.20	62424.6	-145.7	-1464.2	139094.0	27624520.0	2297.0
1303.21	22636.7	-49.0	-876.9	46408.0	8747622.0	1604.0
1303.22	23072.5	-60.1	-968.6	57022.0	8219795.0	486.0
1303.23	55143.2	-120.0	-1110.8	114655.0	25577030.0	3082.0
1303.24	55579.0	-131.0	-1202.4	125266.0	25048200.0	1964.0
1303.25	30353.9	-85.8	-1321.9	81464.0	10259280.0	-299.0
1303.26	52236.9	-113.3	-1302.5	108011.0	23097630.0	2972.0
1303.27	53108.4	-135.5	-1485.4	129234.0	22041950.0	735.0
1303.28	23508.2	-71.2	-1060.0	67635.0	7691942.0	-633.0
1303.29	45391.3	-98.7	-1040.6	94182.0	20530320.0	2638.0
1303.30	46262.8	-120.8	-1223.5	115403.0	19475640.0	402.0
1303.31	29352.4	-60.7	-1098.5	57374.0	11471800.0	2261.0
1303.32	29788.2	-71.8	-1190.2	67987.0	10943970.0	1143.0
1303.33	52107.0	-110.4	-1262.2	105149.0	23254500.0	3296.0
1303.34	52542.8	-121.4	-1353.9	115760.0	22726670.0	2178.0
1303.35	22506.8	-46.0	-836.7	43545.0	8904484.0	1928.0
1303.36	22942.6	-57.1	-928.4	54159.0	8376657.0	810.0
1303.37	45261.4	-95.7	-1000.4	91319.0	20687180.0	2962.0
1303.38	45697.2	-106.8	-1092.0	101930.0	20160360.0	1844.0
1303.39	52672.6	-124.4	-1394.1	118623.0	22569780.0	1854.0
1303.40	45827.0	-109.8	-1132.2	104793.0	20002470.0	1520.0
1303.41	29755.1	-70.0	-1223.2	66248.0	10984530.0	1258.0
1303.42	30190.9	-81.1	-1314.8	76862.0	10457700.0	139.0
1303.43	62261.6	-140.9	-1457.0	134493.0	27822930.0	2735.0
1303.44	62697.4	-152.0	-1548.6	145105.0	27294110.0	1617.0
1303.45	22909.5	-55.3	-961.4	52419.0	8418213.0	924.0
1303.46	23345.3	-66.4	-1053.0	63033.0	7890386.0	-194.0
1303.47	55416.0	-126.3	-1195.3	120665.0	25246620.0	2402.0
1303.48	55851.7	-137.3	-1286.6	131275.0	24727770.0	1284.0
1303.49	30626.6	-92.1	-1406.1	87474.0	9929845.0	-979.0
1303.50	52509.6	-119.6	-1386.9	114021.0	22768200.0	2292.0
1303.51	53381.1	-141.8	-1569.6	135242.0	21712520.0	55.0
1303.52	23781.0	-77.5	-1144.1	73644.0	7362534.0	-1313.0
1303.53	45664.0	-105.0	-1125.1	100191.0	20200890.0	1959.0
1303.54	46535.5	-127.1	-1307.7	121413.0	19145210.0	-278.0
1303.55	52945.4	-130.7	-1478.4	124633.0	22240370.0	1174.0
1303.56	46099.8	-116.1	-1216.5	110803.0	19673060.0	840.0
1303.57	29807.1	-71.2	-1239.3	67393.0	10921790.0	1128.0
1303.58	30242.8	-82.3	-1330.9	78007.0	10393940.0	9.7
1303.59	52561.6	-120.8	-1403.0	115166.0	22705460.0	2162.0
1303.60	52997.4	-131.9	-1494.4	125778.0	22177640.0	1044.0
1303.61	22961.5	-56.5	-977.5	53564.0	8355478.0	795.0
1303.62	23397.2	-67.6	-1069.0	64178.0	7827626.0	-324.0
1303.63	45716.0	-106.2	-1141.2	101336.0	20138150.0	1829.0
1303.64	46151.8	-117.3	-1232.6	111947.0	19610320.0	711.0
1303.108	33384.6	15.4	-404.2	-9323.0	25756410.0	7210.0
1303.109	35657.8	-10.2	-1079.4	15038.0	40046310.0	12506.0
1303.110	35294.0	-193.7	-4029.9	188782.0	22823500.0	-6284.0
1303.111	37567.2	-219.3	-4693.7	213136.0	37103390.0	-988.0
1303.112	34094.1	56.9	2809.9	-58313.0	-6592596.0	4373.0

1303.113	36367.4	31.3	2135.0	-33911.0	7691324.0	9669.0
1303.114	36000.6	-152.1	-767.5	140096.0	-9526247.0	-9151.0
1303.115	38273.8	-177.7	-1431.0	164469.0	4762646.0	-3856.0
1303.116	33618.1	15.3	-672.8	-9595.0	25695980.0	4669.0
1303.117	35891.4	-10.4	-1352.4	14872.0	39975900.0	9965.0
1303.118	35061.2	-194.1	-3788.8	189535.0	22884110.0	-3738.0
1303.119	37334.4	-219.7	-4445.5	213839.0	37164010.0	1558.0
1303.120	34327.7	56.9	2542.4	-58578.0	-6653004.0	1832.0
1303.121	36600.9	31.2	1866.4	-34203.0	7628890.0	7128.0
1303.122	35767.7	-152.1	-527.3	140441.0	-9465659.0	-6603.0
1303.123	38040.9	-177.7	-1193.0	164808.0	4822234.0	-1308.0
1303.124	33380.8	-14.6	-1065.1	22521.0	25595440.0	3785.0
1303.125	35654.0	-40.2	-1743.7	46879.0	39885340.0	9081.0
1303.126	35290.0	-224.0	-4724.4	220944.0	22662480.0	-9711.0
1303.127	37563.2	-249.7	-5389.6	245393.0	36942370.0	-4415.0
1303.128	34093.1	86.9	3554.8	-89577.0	-6412850.0	7749.0
1303.129	36366.4	61.2	2884.3	-65161.0	7867069.0	13046.0
1303.130	35999.6	-121.9	-0.5	108561.0	-9346502.0	-5774.0
1303.131	38272.7	-147.5	-664.2	132941.0	4938366.0	-479.0
1303.132	33614.2	-14.8	-1349.0	22343.0	25534980.0	1243.0
1303.133	35887.4	-40.5	-2020.5	46773.0	39824880.0	6538.0
1303.134	35057.1	-224.2	-4459.2	221442.0	22723070.0	-7165.0
1303.135	37330.3	-249.7	-5114.4	245738.0	37002960.0	-1869.0
1303.136	34326.4	86.5	3280.7	-89567.0	-6473336.0	5206.0
1303.137	36599.7	60.9	2602.8	-65250.0	7805584.0	10502.0
1303.138	35766.7	-122.0	229.6	109016.0	-9285915.0	-3227.0
1303.139	38039.9	-147.6	-432.6	133348.0	4997979.0	2069.0
1303.140	31405.3	274.6	5118.9	-258537.0	17864490.0	21968.0
1303.141	33678.9	249.0	4439.5	-234211.0	32141490.0	27268.0
1303.142	37767.3	-423.0	-6913.0	402948.0	8077439.0	-23048.0
1303.143	40040.2	-448.6	-7575.2	427325.0	22364250.0	-17755.0
1303.144	31619.3	286.9	6071.3	-273167.0	8154814.0	21127.0
1303.145	33893.0	261.3	5391.8	-248841.0	22436100.0	26427.0
1303.146	37977.9	-410.4	-5931.6	388366.0	-1621838.0	-23919.0
1303.147	40250.9	-436.1	-6593.7	412745.0	12664010.0	-18626.0
1303.148	31404.0	265.7	4918.0	-249016.0	17816160.0	20940.0
1303.149	33677.2	240.1	4239.9	-224653.0	32101050.0	26236.0
1303.150	37767.9	-432.1	-7135.6	412445.0	8023592.0	-24058.0
1303.151	40040.8	-457.7	-7797.5	436812.0	22304410.0	-18765.0
1303.152	31620.7	295.9	6278.7	-282679.0	8202338.0	22156.0
1303.153	33894.3	270.3	5598.5	-258338.0	22486440.0	27455.0
1303.154	37977.4	-401.4	-5709.5	378896.0	-1571965.0	-22908.0
1303.155	40250.4	-427.0	-6371.9	403271.0	12716880.0	-17614.0
1303.156	32184.0	274.5	4225.8	-259513.0	17654140.0	13500.0
1303.157	34457.7	248.8	3545.4	-235166.0	31940160.0	18800.0
1303.158	36991.9	-423.4	-6088.2	404433.0	8275634.0	-14549.0
1303.159	39264.8	-449.0	-6750.1	428799.0	22556450.0	-9256.0
1303.160	32398.1	286.7	5182.8	-274118.0	7944326.0	12660.0
1303.161	34671.8	261.1	4502.4	-249771.0	22224780.0	17960.0
1303.162	37202.6	-410.8	-5113.8	389851.0	-1419617.0	-15421.0
1303.163	39475.4	-436.5	-5775.5	414213.0	12861180.0	-10128.0
1303.164	32182.5	265.5	4020.9	-250000.0	17606760.0	12470.0
1303.165	34455.8	239.9	3342.0	-225617.0	31889680.0	17766.0
1303.166	36992.5	-432.5	-6304.9	413907.0	8221787.0	-15560.0
1303.167	39265.3	-458.1	-6967.6	438294.0	22506580.0	-10267.0
1303.168	32399.6	295.6	5392.5	-283578.0	7991436.0	13690.0
1303.169	34673.3	270.0	4712.1	-259231.0	22275160.0	18990.0
1303.170	37201.9	-401.7	-4893.9	380336.0	-1369796.0	-14411.0
1303.171	39474.8	-427.3	-5556.1	404711.0	12916020.0	-9117.0
1303.268	30981.7	60.1	1496.2	-55227.0	-2226569.0	49.0

1303.269	38559.2	-25.4	-764.2	26073.0	45376450.0	17702.0
1303.270	32891.4	-149.3	-2137.1	143201.0	-5169405.0	-13446.0
1303.271	40468.2	-234.7	-4344.4	224401.0	42443440.0	4202.0
1303.272	31195.2	72.4	2448.6	-69870.0	-11942110.0	-797.0
1303.273	38773.6	-13.1	192.3	11381.0	35671150.0	16863.0
1303.274	33102.4	-136.7	-1155.9	128590.0	-14865580.0	-14314.0
1303.275	40679.6	-222.2	-3362.9	209789.0	32747370.0	3337.0
1303.276	31215.2	60.1	1227.4	-55536.0	-2297002.0	-2492.0
1303.277	38792.8	-25.6	-1034.0	25912.0	45316040.0	15161.0
1303.278	32658.5	-149.4	-1887.5	143651.0	-5108817.0	-10899.0
1303.279	40235.5	-234.9	-4091.6	224901.0	42504080.0	6751.0
1303.280	31428.8	72.4	2182.8	-70140.0	-12002510.0	-3337.0
1303.281	39007.0	-13.1	-73.4	11035.0	35610680.0	14322.0
1303.282	32869.8	-136.8	-911.7	129016.0	-14804910.0	-11765.0
1303.283	40446.7	-222.2	-3118.3	210134.0	32797950.0	5885.0
1303.284	30980.5	51.1	1295.2	-45709.0	-2276875.0	-979.0
1303.285	38558.0	-34.4	-965.3	35618.0	45336150.0	16674.0
1303.286	32890.2	-158.3	-2349.8	152782.0	-5219710.0	-14474.0
1303.287	40467.7	-243.8	-4559.5	233968.0	42393310.0	3182.0
1303.288	31195.6	81.4	2665.6	-79294.0	-11882000.0	223.0
1303.289	38773.2	-4.1	418.1	1990.0	35721040.0	17876.0
1303.290	33102.0	-127.7	-928.2	119153.0	-14815680.0	-13303.0
1303.291	40679.3	-213.1	-3133.8	200328.0	32797290.0	4350.0
1303.292	31214.1	51.0	1024.3	-45977.0	-2337284.0	-3519.0
1303.293	38791.5	-34.6	-1229.8	35401.0	45265710.0	14132.0
1303.294	32657.4	-158.5	-2103.0	153304.0	-5159098.0	-11926.0
1303.295	40234.8	-243.9	-4298.8	234421.0	42453900.0	5728.0
1303.296	31429.1	81.3	2400.4	-79560.0	-11952440.0	-2318.0
1303.297	39006.6	-4.1	147.4	1674.0	35660580.0	15335.0
1303.298	32869.2	-127.8	-684.2	119568.0	-14755070.0	-10754.0
1303.299	40446.4	-213.2	-2900.3	200770.0	32857880.0	6898.0
1304.1	58105.4	88.7	-3939.5	-108164.0	35662690.0	-30538.0
1304.2	59089.0	101.2	-4245.4	-122824.0	42333600.0	-31897.0
1304.3	120200.0	175.4	-5822.5	-212738.0	69313020.0	-58264.0
1304.4	121200.0	188.0	-6128.5	-227427.0	75988120.0	-59623.0
1304.5	44698.8	69.2	-3063.7	-84273.0	27432660.0	-23497.0
1304.6	45682.4	81.8	-3369.6	-98928.0	34103580.0	-24856.0
1304.7	106800.0	156.0	-4946.6	-188845.0	61074680.0	-51223.0
1304.8	107800.0	168.6	-5252.6	-203537.0	67749780.0	-52582.0
1304.9	60072.7	113.8	-4551.3	-137454.0	49014550.0	-33256.0
1304.10	101600.0	149.4	-5257.6	-181363.0	59228160.0	-49946.0
1304.11	103500.0	174.5	-5869.4	-210673.0	72552850.0	-52664.0
1304.12	46666.3	94.3	-3675.4	-113552.0	40774570.0	-26215.0
1304.13	88147.7	129.9	-4381.7	-157475.0	50976480.0	-42905.0
1304.14	90115.1	155.1	-4993.5	-186777.0	64318360.0	-45623.0
1304.15	102500.0	162.0	-5563.6	-196039.0	65877750.0	-51305.0
1304.16	89131.2	142.5	-4687.7	-172148.0	57647370.0	-44264.0
1304.17	57662.3	83.5	-3783.2	-102046.0	32689650.0	-29917.0
1304.18	58645.6	96.0	-4089.2	-116733.0	39360490.0	-31276.0
1304.19	119700.0	170.2	-5666.2	-206609.0	66315470.0	-57642.0
1304.20	120700.0	182.8	-5972.2	-221328.0	72990570.0	-59001.0
1304.21	44255.7	64.0	-2907.4	-78155.0	24449630.0	-22876.0
1304.22	45239.1	76.6	-3213.4	-92838.0	31120490.0	-24235.0
1304.23	106300.0	150.8	-4790.4	-182729.0	58077130.0	-50601.0
1304.24	107300.0	163.4	-5096.4	-197443.0	64762230.0	-51960.0
1304.25	59629.4	108.6	-4395.1	-131370.0	46031460.0	-32635.0
1304.26	101100.0	144.2	-5101.4	-175241.0	56230610.0	-49325.0
1304.27	103100.0	169.4	-5713.2	-204583.0	69580820.0	-52043.0
1304.28	46222.9	89.1	-3519.2	-107470.0	37791460.0	-25594.0
1304.29	87704.6	124.7	-4225.5	-151348.0	47993440.0	-42283.0

1304.30	89671.7	149.9	-4837.3	-180693.0	61335250.0	-45002.0
1304.31	57366.9	80.0	-3679.0	-97964.0	30694300.0	-29502.0
1304.32	58350.1	92.6	-3985.0	-112670.0	37375110.0	-30861.0
1304.33	100800.0	140.7	-4997.2	-171152.0	54234080.0	-48910.0
1304.34	101800.0	153.3	-5303.2	-185866.0	60919180.0	-50269.0
1304.35	43960.3	60.5	-2803.2	-74075.0	22464270.0	-22461.0
1304.36	44943.6	73.1	-3109.2	-88777.0	29135110.0	-23820.0
1304.37	87409.1	121.3	-4121.3	-147275.0	46008060.0	-41869.0
1304.38	88392.4	133.9	-4427.3	-161984.0	52678900.0	-43228.0
1304.39	102100.0	156.8	-5407.3	-189941.0	62905710.0	-50684.0
1304.40	88687.9	137.3	-4531.5	-166060.0	54664280.0	-43642.0
1304.41	58282.7	90.7	-4002.0	-110609.0	36857920.0	-30787.0
1304.42	59266.3	103.3	-4307.9	-125260.0	43528840.0	-32146.0
1304.43	120400.0	177.5	-5885.0	-215190.0	70504040.0	-58512.0
1304.44	121300.0	190.1	-6190.9	-229863.0	77153630.0	-59871.0
1304.45	44876.1	71.3	-3126.2	-86719.0	28627890.0	-23746.0
1304.46	45859.8	83.8	-3432.1	-101364.0	35298840.0	-25105.0
1304.47	106900.0	158.1	-5009.2	-191302.0	62250190.0	-51471.0
1304.48	107900.0	170.6	-5315.0	-205972.0	68925290.0	-52830.0
1304.49	60250.1	115.9	-4613.8	-139886.0	50199800.0	-33505.0
1304.50	101700.0	151.5	-5320.1	-183808.0	60393670.0	-50195.0
1304.51	103700.0	176.6	-5931.9	-213108.0	73743870.0	-52913.0
1304.52	46843.6	96.4	-3737.9	-115988.0	41969800.0	-26464.0
1304.53	88324.9	132.0	-4444.3	-159926.0	52171680.0	-43153.0
1304.54	90292.4	157.2	-5056.0	-189207.0	65513590.0	-45872.0
1304.55	102700.0	164.1	-5626.0	-198474.0	67068770.0	-51554.0
1304.56	89308.6	144.6	-4750.2	-174584.0	58842620.0	-44513.0
1304.57	58400.8	92.1	-4043.7	-112240.0	37658040.0	-30952.0
1304.58	59384.5	104.7	-4349.6	-126884.0	44328990.0	-32312.0
1304.59	101800.0	152.9	-5361.8	-185438.0	61189180.0	-50360.0
1304.60	102800.0	165.4	-5667.7	-200097.0	67864280.0	-51719.0
1304.61	44994.3	72.7	-3167.8	-88349.0	29418050.0	-23911.0
1304.62	45978.0	85.2	-3473.7	-102988.0	36088990.0	-25270.0
1304.63	88443.1	133.4	-4485.9	-161556.0	52961830.0	-43319.0
1304.64	89426.8	146.0	-4791.8	-176208.0	59632780.0	-44678.0
1304.108	78526.2	-52.1	-5440.4	68373.0	16475030.0	-42253.0
1304.109	84685.0	-26.1	-6191.8	38425.0	31081140.0	-49857.0
1304.110	80110.7	130.5	-9379.9	-134734.0	20790920.0	-32983.0
1304.111	86268.7	156.6	-10119.6	-164582.0	35397150.0	-40587.0
1304.112	52888.8	42.6	2677.3	-73255.0	46201930.0	-28645.0
1304.113	59051.2	68.3	1930.9	-102402.0	60803960.0	-36252.0
1304.114	54548.5	217.1	-1221.7	-261708.0	50395320.0	-19422.0
1304.115	60710.8	242.5	-1959.5	-290545.0	64997320.0	-27028.0
1304.116	78434.2	-44.5	-6572.0	59423.0	16214560.0	-44603.0
1304.117	84593.4	-18.4	-7323.9	29437.0	30820780.0	-52207.0
1304.118	80193.0	122.7	-8249.9	-125254.0	21073360.0	-30630.0
1304.119	86351.4	148.7	-8986.0	-155133.0	35678240.0	-38234.0
1304.120	52798.6	50.2	1544.1	-82114.0	45938920.0	-30996.0
1304.121	58961.2	75.8	796.9	-111180.0	60541000.0	-38602.0
1304.122	54624.6	209.2	-99.3	-252411.0	50684740.0	-17063.0
1304.123	60787.4	234.6	-839.5	-281336.0	65276870.0	-24669.0
1304.124	78590.7	-112.1	-5784.0	159302.0	16101490.0	-42409.0
1304.125	84750.0	-86.0	-6538.5	129304.0	30706720.0	-50013.0
1304.126	80178.7	69.8	-9752.8	-42529.0	20407820.0	-33140.0
1304.127	86337.3	95.9	-10491.7	-72482.0	35014650.0	-40744.0
1304.128	52973.1	90.1	3106.0	-141963.0	46333440.0	-28582.0
1304.129	59134.2	115.6	2364.2	-170883.0	60935130.0	-36187.0
1304.130	54632.3	264.8	-777.1	-330831.0	50526700.0	-19358.0
1304.131	60794.7	290.2	-1514.8	-359654.0	65128730.0	-26964.0
1304.132	78500.9	-104.5	-6924.3	150445.0	15833580.0	-44758.0

1304.133	84661.3	-78.4	-7671.8	120479.0	30437100.0	-52363.0
1304.134	80261.6	61.9	-8612.4	-33084.0	20688330.0	-30787.0
1304.135	86419.9	88.0	-9347.7	-63031.0	35295720.0	-38390.0
1304.136	52887.0	97.6	1974.8	-150643.0	46061480.0	-30934.0
1304.137	59048.7	123.1	1224.6	-179643.0	60663320.0	-38540.0
1304.138	54709.8	257.2	337.4	-322020.0	50816470.0	-17001.0
1304.139	60871.7	282.6	-400.4	-350863.0	65408370.0	-24606.0
1304.140	67680.4	-229.0	2118.4	250133.0	21879270.0	-48290.0
1304.141	73833.7	-202.5	1365.3	219359.0	36494980.0	-55891.0
1304.142	73065.2	369.6	-10943.5	-408479.0	36098930.0	-17456.0
1304.143	79231.6	394.8	-11680.2	-436850.0	50691980.0	-25065.0
1304.144	59968.5	-198.5	4541.3	203873.0	30827970.0	-44194.0
1304.145	66121.7	-172.0	3788.1	173081.0	45447650.0	-51795.0
1304.146	65422.2	393.1	-8492.4	-442205.0	44939200.0	-13403.0
1304.147	71588.5	418.3	-9229.1	-470585.0	59532220.0	-21011.0
1304.148	67701.2	-247.2	2012.2	277705.0	21763580.0	-48337.0
1304.149	73859.9	-221.1	1259.0	247779.0	36371660.0	-55941.0
1304.150	73039.4	355.3	-11071.0	-387805.0	36062350.0	-17475.0
1304.151	79206.4	380.5	-11807.3	-416151.0	50655550.0	-25084.0
1304.152	59953.4	-180.5	4652.7	176645.0	30934110.0	-44151.0
1304.153	66105.9	-154.0	3898.8	145860.0	45553620.0	-51751.0
1304.154	65445.8	407.4	-8365.6	-463035.0	44975220.0	-13383.0
1304.155	71611.2	432.7	-9102.3	-491588.0	59568020.0	-20990.0
1304.156	67373.4	-203.2	-1649.0	219707.0	21013950.0	-56122.0
1304.157	73525.7	-176.6	-2403.1	188921.0	35626410.0	-63722.0
1304.158	73313.2	344.4	-7183.8	-378997.0	37082200.0	-9595.0
1304.159	79480.4	369.5	-7920.0	-407336.0	51675450.0	-17204.0
1304.160	59660.4	-172.5	778.2	173195.0	29969370.0	-52026.0
1304.161	65812.7	-145.9	24.1	142408.0	44578820.0	-59626.0
1304.162	65669.3	367.7	-4738.4	-412576.0	45922240.0	-5541.0
1304.163	71836.5	392.9	-5474.6	-440915.0	60505490.0	-13150.0
1304.164	67396.9	-221.6	-1759.3	247802.0	20893950.0	-56171.0
1304.165	73554.3	-195.5	-2513.4	217827.0	35503700.0	-63774.0
1304.166	73289.4	330.1	-7306.1	-358376.0	37036120.0	-9615.0
1304.167	79456.8	355.3	-8042.5	-386716.0	51629430.0	-17224.0
1304.168	59642.9	-154.4	891.4	145775.0	30074900.0	-51980.0
1304.169	65795.2	-127.9	137.3	114989.0	44694360.0	-59581.0
1304.170	65695.7	382.0	-4612.9	-433149.0	45958970.0	-5523.0
1304.171	71861.9	407.2	-5349.6	-461537.0	60551970.0	-13131.0
1304.268	62333.7	-46.7	-1744.0	48927.0	9894327.0	-28598.0
1304.269	82863.6	40.1	-4252.4	-50788.0	58578510.0	-53945.0
1304.270	63921.5	135.6	-5690.9	-153415.0	14208380.0	-19331.0
1304.271	84465.5	220.6	-8144.6	-249976.0	62867150.0	-44686.0
1304.272	54626.5	-16.5	678.2	3399.0	18839220.0	-24505.0
1304.273	75148.7	70.5	-1820.9	-96672.0	67540430.0	-49849.0
1304.274	56269.2	160.1	-3239.7	-188907.0	23061270.0	-15272.0
1304.275	76812.6	244.8	-5692.2	-284977.0	71714900.0	-40627.0
1304.276	62243.2	-39.0	-2875.0	39970.0	9633240.0	-30949.0
1304.277	82772.0	47.9	-5383.5	-59842.0	58315140.0	-56295.0
1304.278	64000.7	127.7	-4561.0	-143918.0	14494580.0	-16976.0
1304.279	84542.7	213.1	-7011.9	-241214.0	63156840.0	-42329.0
1304.280	54533.4	-8.7	-450.1	-5862.0	18580470.0	-26854.0
1304.281	75059.0	78.0	-2952.6	-105472.0	67267550.0	-52200.0
1304.282	56343.6	152.5	-2114.2	-180009.0	23355250.0	-12914.0
1304.283	76889.5	237.1	-4569.4	-275881.0	72004510.0	-38270.0
1304.284	62353.3	-64.7	-1849.7	76251.0	9781327.0	-28644.0
1304.285	82883.5	22.1	-4358.2	-23501.0	58463580.0	-53992.0
1304.286	63938.2	117.6	-5808.7	-126172.0	14098630.0	-19375.0
1304.287	84465.4	204.3	-8266.2	-225576.0	62787120.0	-44721.0
1304.288	54633.6	-0.7	800.3	-20105.0	18908030.0	-24475.0

1304.289	75173.0	84.7	-1690.1	-117190.0	67576630.0	-49829.0
1304.290	56296.8	174.3	-3109.7	-209450.0	23096310.0	-15254.0
1304.291	76837.4	259.2	-5559.7	-305775.0	71761220.0	-40608.0
1304.292	62261.1	-57.1	-2982.7	67306.0	9520806.0	-30993.0
1304.293	82792.8	29.8	-5486.1	-32495.0	58200440.0	-56343.0
1304.294	64017.7	109.7	-4680.2	-116699.0	14383920.0	-17020.0
1304.295	84547.5	196.3	-7128.4	-215953.0	63068070.0	-42367.0
1304.296	54543.1	6.9	-327.1	-28943.0	18644950.0	-26825.0
1304.297	75084.4	92.2	-2824.7	-126033.0	67314030.0	-52181.0
1304.298	56371.8	166.6	-1984.4	-200400.0	23389450.0	-12896.0
1304.299	76914.1	251.5	-4443.1	-296858.0	72050780.0	-38250.0
1305.1	50611.9	-5.2	164.9	7976.0	-21348900.0	-75157.0
1305.2	51919.1	-6.4	453.8	9696.0	-17265440.0	-78005.0
1305.3	104200.0	-12.0	2352.6	18005.0	-42538580.0	-149388.0
1305.4	105600.0	-13.2	2641.3	19708.0	-38431440.0	-152235.0
1305.5	38931.3	-4.1	144.9	6202.0	-16418630.0	-57815.0
1305.6	40238.5	-5.3	433.7	7928.0	-12335160.0	-60663.0
1305.7	92566.6	-10.9	2332.5	16234.0	-37596260.0	-132046.0
1305.8	93873.7	-12.1	2621.1	17936.0	-33522820.0	-134894.0
1305.9	53226.5	-7.7	742.5	11454.0	-13181920.0	-80853.0
1305.10	88156.6	-10.0	1696.5	14995.0	-36171250.0	-127119.0
1305.11	90771.2	-12.4	2273.6	18480.0	-28004270.0	-132814.0
1305.12	41545.9	-6.6	722.5	9701.0	-8261642.0	-63511.0
1305.13	76476.0	-8.8	1676.3	13220.0	-31250970.0	-109777.0
1305.14	79090.6	-11.3	2253.5	16717.0	-23083990.0	-115473.0
1305.15	89463.8	-11.2	1985.2	16717.0	-32087780.0	-129966.0
1305.16	77783.1	-10.1	1965.0	14942.0	-27167530.0	-112625.0
1305.17	50026.3	-4.8	77.9	7289.0	-23168290.0	-73881.0
1305.18	51333.3	-5.9	366.9	8978.0	-19084880.0	-76728.0
1305.19	103700.0	-11.6	2265.8	17325.0	-44336130.0	-148111.0
1305.20	105000.0	-12.7	2554.4	18993.0	-40254500.0	-150959.0
1305.21	38345.6	-3.6	57.9	5516.0	-18248040.0	-56539.0
1305.22	39652.7	-4.8	346.8	7209.0	-14164600.0	-59387.0
1305.23	91980.9	-10.4	2245.6	15538.0	-39425670.0	-130769.0
1305.24	93287.8	-11.6	2534.3	17212.0	-35342280.0	-133617.0
1305.25	52640.6	-7.2	655.6	10726.0	-15001380.0	-79576.0
1305.26	87571.0	-9.5	1609.6	14306.0	-37990640.0	-125842.0
1305.27	90185.4	-11.9	2186.8	17755.0	-29833700.0	-131538.0
1305.28	40960.0	-6.0	635.5	8964.0	-10081100.0	-62235.0
1305.29	75890.4	-8.4	1589.5	12537.0	-33070360.0	-108500.0
1305.30	78504.7	-10.8	2166.6	15984.0	-24903450.0	-114196.0
1305.31	49635.9	-4.4	19.9	6835.0	-24387880.0	-73029.0
1305.32	50942.7	-5.6	308.9	8503.0	-20304520.0	-75877.0
1305.33	87180.7	-9.2	1551.7	13858.0	-39210200.0	-124991.0
1305.34	88487.5	-10.4	1840.4	15530.0	-35126840.0	-127838.0
1305.35	37955.2	-3.3	-0.1	5058.0	-19467630.0	-55688.0
1305.36	39262.1	-4.5	288.8	6731.0	-15384240.0	-58535.0
1305.37	75499.9	-8.0	1531.5	12068.0	-34289980.0	-107649.0
1305.38	76806.8	-9.2	1820.2	13747.0	-30206580.0	-110497.0
1305.39	88878.0	-10.7	1898.3	15999.0	-33907220.0	-128690.0
1305.40	77197.3	-9.6	1878.2	14216.0	-28986970.0	-111348.0
1305.41	50846.1	-5.4	199.8	8254.0	-20619160.0	-75668.0
1305.42	52153.4	-6.6	488.6	9984.0	-16535670.0	-78516.0
1305.43	104500.0	-12.2	2387.4	18277.0	-41792050.0	-149898.0
1305.44	105800.0	-13.4	2676.0	19999.0	-37710420.0	-152746.0
1305.45	39165.5	-4.3	179.7	6480.0	-15688880.0	-58326.0
1305.46	40472.8	-5.5	468.5	8216.0	-11605390.0	-61174.0
1305.47	92800.8	-11.1	2367.3	16498.0	-36866520.0	-132557.0
1305.48	94108.0	-12.3	2655.8	18229.0	-32793050.0	-135404.0
1305.49	53460.8	-7.9	777.3	11751.0	-12452150.0	-81364.0

1305.50	88390.9	-10.2	1731.3	15276.0	-35441480.0	-127629.0
1305.51	91005.5	-12.6	2308.4	18772.0	-27274500.0	-133325.0
1305.52	41780.3	-6.8	757.2	9991.0	-7531846.0	-64022.0
1305.53	76710.2	-9.0	1711.1	13493.0	-30521230.0	-110287.0
1305.54	79325.0	-11.5	2288.3	17015.0	-22354190.0	-115983.0
1305.55	89698.1	-11.4	2019.9	17008.0	-31358020.0	-130477.0
1305.56	78017.5	-10.3	1999.7	15233.0	-26437730.0	-113135.0
1305.57	51002.3	-5.6	223.0	8439.0	-20129310.0	-76008.0
1305.58	52309.6	-6.8	511.7	10176.0	-16045820.0	-78856.0
1305.59	88547.1	-10.3	1754.4	15463.0	-34951640.0	-127970.0
1305.60	89854.3	-11.5	2043.0	17202.0	-30868170.0	-130818.0
1305.61	39321.7	-4.4	202.9	6665.0	-15209030.0	-58667.0
1305.62	40629.0	-5.6	491.6	8409.0	-11125540.0	-61515.0
1305.63	76866.4	-9.2	1734.3	13680.0	-30031380.0	-110628.0
1305.64	78173.7	-10.4	2022.8	15426.0	-25947890.0	-113476.0
1305.108	66464.9	-111.3	642.3	189335.0	-27644800.0	-82857.0
1305.109	70699.5	-117.1	1353.1	198979.0	-49354560.0	-101471.0
1305.110	68818.1	-113.7	7577.1	186156.0	-13124500.0	-89797.0
1305.111	73050.8	-119.4	8293.4	195655.0	-34834740.0	-108408.0
1305.112	47813.4	99.5	-6218.1	-164823.0	-15062800.0	-66698.0
1305.113	52049.2	93.6	-5510.9	-154954.0	-36772250.0	-85314.0
1305.114	50241.0	87.9	686.9	-152518.0	-623520.6	-73707.0
1305.115	54477.3	82.2	1405.6	-142900.0	-22342840.0	-92323.0
1305.116	66711.5	-88.5	1389.1	165853.0	-26991900.0	-83040.0
1305.117	70947.3	-94.2	2106.3	175352.0	-48711340.0	-101656.0
1305.118	68557.1	-136.8	6826.8	210213.0	-13751080.0	-89601.0
1305.119	72790.5	-142.4	7545.9	219659.0	-35461140.0	-108214.0
1305.120	48060.9	122.1	-5468.9	-187958.0	-14409660.0	-66882.0
1305.121	52297.4	116.3	-4762.0	-178138.0	-36128930.0	-85498.0
1305.122	49974.0	65.2	-88.1	-129150.0	-1251633.0	-73504.0
1305.123	54210.8	59.5	628.0	-119511.0	-22970820.0	-92120.0
1305.124	66627.5	-209.1	411.3	347396.0	-27633320.0	-83093.0
1305.125	70863.0	-214.8	1119.5	357041.0	-49342850.0	-101708.0
1305.126	68986.7	-211.8	7359.3	345050.0	-13111490.0	-90039.0
1305.127	73220.9	-217.4	8082.8	354505.0	-34821350.0	-108652.0
1305.128	47780.1	184.5	-6007.8	-301588.0	-15231300.0	-66589.0
1305.129	52014.9	178.7	-5294.0	-291811.0	-36941000.0	-85204.0
1305.130	50206.9	173.0	892.4	-289472.0	-792220.0	-73598.0
1305.131	54443.5	167.2	1611.8	-279845.0	-22511460.0	-92214.0
1305.132	66879.2	-186.1	1159.7	323711.0	-26989120.0	-83281.0
1305.133	71116.3	-191.8	1881.3	333179.0	-48698230.0	-101898.0
1305.134	68726.4	-234.8	6611.4	368897.0	-13747900.0	-89844.0
1305.135	72959.7	-240.5	7331.5	378339.0	-35457980.0	-108456.0
1305.136	48035.8	207.3	-5236.4	-324862.0	-14586070.0	-66782.0
1305.137	52270.4	201.4	-4535.0	-315052.0	-36295820.0	-85397.0
1305.138	49942.3	150.2	113.8	-266014.0	-1419719.0	-73398.0
1305.139	54177.8	144.4	829.7	-256357.0	-23139240.0	-92013.0
1305.140	57171.0	-30.1	-9743.4	61124.0	-40165680.0	-69084.0
1305.141	61398.3	-35.1	-9034.7	69562.0	-61867290.0	-87691.0
1305.142	65114.3	-49.5	13381.1	70171.0	8138659.0	-92315.0
1305.143	69355.4	-55.8	14095.5	80770.0	-13577440.0	-110935.0
1305.144	51554.0	35.6	-11777.8	-48991.0	-36358580.0	-64218.0
1305.145	55781.2	30.5	-11069.1	-40578.0	-58060210.0	-82825.0
1305.146	59568.4	8.6	11297.4	-27395.0	11851900.0	-87513.0
1305.147	63809.4	2.2	12011.7	-16794.0	-9862222.0	-106133.0
1305.148	57222.6	-59.6	-9817.9	108975.0	-40162520.0	-69156.0
1305.149	61456.9	-65.5	-9110.6	118694.0	-61872340.0	-87770.0
1305.150	65121.0	-74.7	13333.8	110854.0	8194367.0	-92347.0
1305.151	69362.5	-81.1	14045.8	121540.0	-13525630.0	-110967.0
1305.152	51505.0	64.8	-11703.9	-96223.0	-36361080.0	-64149.0

1305.153	55731.8	59.8	-10992.1	-87913.0	-58062820.0	-82756.0
1305.154	59559.8	34.0	11351.8	-68434.0	11799710.0	-87480.0
1305.155	63799.4	27.8	12066.2	-58082.0	-9914773.0	-106099.0
1305.156	57989.5	45.7	-7269.2	-16969.0	-38006880.0	-69690.0
1305.157	62216.2	40.8	-6556.3	-8695.0	-59698650.0	-88298.0
1305.158	64212.1	-125.2	10827.8	148053.0	6070507.0	-91631.0
1305.159	68453.7	-131.6	11539.1	158773.0	-15657460.0	-110251.0
1305.160	52371.2	111.4	-9296.2	-127131.0	-34200110.0	-64824.0
1305.161	56597.9	106.4	-8583.3	-118856.0	-55891880.0	-83431.0
1305.162	58666.2	-67.0	8740.1	50232.0	9781748.0	-86828.0
1305.163	62907.9	-73.4	9451.2	60953.0	-11942200.0	-105448.0
1305.164	58044.9	15.8	-7351.0	31393.0	-38002750.0	-69766.0
1305.165	62278.2	10.1	-6639.2	40899.0	-59712830.0	-88379.0
1305.166	64219.7	-150.7	10777.9	189129.0	6122446.0	-91663.0
1305.167	68461.7	-157.1	11490.1	199847.0	-15595420.0	-110283.0
1305.168	52320.3	140.8	-9209.7	-174630.0	-34193090.0	-64753.0
1305.169	56546.9	135.9	-8496.7	-166355.0	-55894890.0	-83361.0
1305.170	58660.2	-41.8	8782.1	9567.0	9724217.0	-86797.0
1305.171	62901.1	-48.1	9496.3	20140.0	-11993930.0	-105417.0
1305.268	54966.3	-28.2	-2594.8	49747.0	2121903.0	-55454.0
1305.269	69082.8	-47.4	-227.2	81946.0	-70246980.0	-117501.0
1305.270	57324.8	-31.4	4356.7	48165.0	16643560.0	-62400.0
1305.271	71450.4	-51.6	6735.2	81898.0	-55743000.0	-124456.0
1305.272	49357.3	36.5	-4640.8	-58865.0	5914048.0	-50593.0
1305.273	63458.9	18.5	-2273.7	-28693.0	-66431630.0	-112630.0
1305.274	51769.7	27.3	2273.8	-50633.0	20368450.0	-57589.0
1305.275	65891.1	7.8	4658.0	-17898.0	-52011180.0	-119642.0
1305.276	55213.5	-5.6	-1858.0	26577.0	2764964.0	-55637.0
1305.277	69330.6	-24.5	529.7	58265.0	-69603760.0	-117686.0
1305.278	57058.5	-54.6	3587.3	72284.0	16016620.0	-62199.0
1305.279	71183.9	-74.4	5976.4	105362.0	-56370990.0	-124255.0
1305.280	49601.9	59.3	-3892.7	-82382.0	6564445.0	-50775.0
1305.281	63707.5	41.1	-1527.0	-51854.0	-65788220.0	-112815.0
1305.282	51499.2	4.7	1502.7	-27370.0	19746450.0	-57383.0
1305.283	65624.5	-15.1	3882.5	5668.0	-52639190.0	-119440.0
1305.284	55015.7	-57.5	-2667.6	97186.0	2124505.0	-55525.0
1305.285	69132.6	-76.8	-298.5	129369.0	-70244270.0	-117573.0
1305.286	57372.1	-60.6	4284.6	95313.0	16649620.0	-62469.0
1305.287	71481.6	-79.3	6674.0	126642.0	-55715040.0	-124510.0
1305.288	49330.3	63.7	-4568.7	-102647.0	5885159.0	-50545.0
1305.289	63448.7	44.0	-2207.1	-69773.0	-66484240.0	-112597.0
1305.290	51763.0	52.5	2332.0	-91102.0	20314740.0	-57559.0
1305.291	65880.5	33.3	4718.7	-59050.0	-52063880.0	-119609.0
1305.292	55261.9	-34.8	-1923.3	73748.0	2777311.0	-55708.0
1305.293	69381.2	-53.9	458.1	105741.0	-69600860.0	-117758.0
1305.294	57106.6	-83.7	3521.3	119316.0	16022890.0	-62269.0
1305.295	71220.3	-102.5	5916.5	150728.0	-56351700.0	-124313.0
1305.296	49577.4	86.2	-3822.1	-125768.0	6532196.0	-50729.0
1305.297	63698.2	66.6	-1463.5	-92903.0	-65840590.0	-112783.0
1305.298	51493.6	29.7	1560.6	-67713.0	19691020.0	-57354.0
1305.299	65614.3	10.6	3942.8	-35659.0	-52681790.0	-119407.0
1306.1	23849.7	-51.1	729.4	59024.0	12967060.0	1907.0
1306.2	24068.0	-60.4	481.0	70322.0	11936750.0	1679.0
1306.3	52043.3	-100.9	873.2	118019.0	30746250.0	4280.0
1306.4	52261.5	-110.2	624.8	129319.0	29721910.0	4052.0
1306.5	18343.2	-40.5	459.0	46977.0	9968350.0	1473.0
1306.6	18561.4	-49.9	210.6	58275.0	8938013.0	1245.0
1306.7	46536.7	-90.3	602.8	105974.0	27751510.0	3845.0
1306.8	46755.0	-99.6	354.5	117270.0	26717200.0	3617.0
1306.9	24286.3	-69.8	232.8	81615.0	10906440.0	1451.0

1306.10	43585.2	-85.9	830.0	100322.0	25418580.0	3568.0
1306.11	44021.8	-104.6	333.6	122908.0	23349960.0	3112.0
1306.12	18779.8	-59.2	-37.5	69564.0	7907727.0	1017.0
1306.13	38078.7	-75.4	559.7	88275.0	22413880.0	3134.0
1306.14	38515.3	-94.0	63.4	110858.0	20355250.0	2678.0
1306.15	43803.5	-95.3	581.7	111619.0	24384270.0	3340.0
1306.16	38296.9	-84.7	311.3	99572.0	21389540.0	2906.0
1306.17	23752.5	-47.4	816.5	54578.0	13426260.0	2000.0
1306.18	23970.7	-56.7	568.0	65880.0	12395930.0	1772.0
1306.19	51946.1	-97.2	960.3	113574.0	31211450.0	4373.0
1306.20	52164.3	-106.5	711.9	124876.0	30177110.0	4145.0
1306.21	18245.9	-36.8	546.1	42531.0	10428530.0	1566.0
1306.22	18464.2	-46.2	297.6	53833.0	9398217.0	1338.0
1306.23	46439.5	-86.6	689.8	101529.0	28206720.0	3938.0
1306.24	46657.7	-95.9	441.4	112831.0	27182380.0	3710.0
1306.25	24189.0	-66.1	319.7	77175.0	11365610.0	1544.0
1306.26	43488.0	-82.2	917.1	95878.0	25873790.0	3661.0
1306.27	43924.5	-100.9	420.5	118469.0	23815140.0	3205.0
1306.28	18682.5	-55.5	49.4	65127.0	8367906.0	1110.0
1306.29	37981.4	-71.7	646.7	83830.0	22879050.0	3227.0
1306.30	38418.0	-90.3	150.2	106420.0	20820430.0	2771.0
1306.31	23687.7	-44.9	874.5	51614.0	13732730.0	2062.0
1306.32	23905.9	-54.3	626.0	62919.0	12702400.0	1834.0
1306.33	43423.2	-79.8	975.1	92913.0	26177260.0	3723.0
1306.34	43641.4	-89.1	726.7	104216.0	25152920.0	3495.0
1306.35	18181.1	-34.4	604.1	39568.0	10734000.0	1628.0
1306.36	18399.3	-43.7	355.6	50872.0	9704662.0	1400.0
1306.37	37916.6	-69.2	704.7	80868.0	23182520.0	3289.0
1306.38	38134.8	-78.5	456.3	92169.0	22148190.0	3061.0
1306.39	43706.2	-91.6	668.7	107178.0	24849450.0	3433.0
1306.40	38199.6	-81.0	398.3	95131.0	21844720.0	2999.0
1306.41	23888.6	-52.6	694.6	60802.0	12782980.0	1870.0
1306.42	24106.9	-61.9	446.2	72099.0	11752670.0	1642.0
1306.43	52082.2	-102.4	838.4	119798.0	30566170.0	4243.0
1306.44	52300.5	-111.7	590.1	131095.0	29531860.0	4015.0
1306.45	18382.1	-42.0	424.2	48756.0	9785273.0	1436.0
1306.46	18600.4	-51.4	175.8	60051.0	8754962.0	1208.0
1306.47	46575.6	-91.8	568.0	107753.0	27571430.0	3808.0
1306.48	46793.9	-101.1	319.8	119045.0	26537120.0	3580.0
1306.49	24325.2	-71.2	198.1	83390.0	10722360.0	1414.0
1306.50	43624.1	-87.4	795.2	102100.0	25228510.0	3531.0
1306.51	44060.7	-106.1	298.9	124683.0	23169880.0	3075.0
1306.52	18818.7	-60.7	-72.2	71340.0	7723650.0	980.0
1306.53	38117.6	-76.9	524.9	90053.0	22233800.0	3097.0
1306.54	38554.2	-95.5	28.6	112634.0	20175180.0	2640.0
1306.55	43842.4	-96.8	547.0	113395.0	24204200.0	3303.0
1306.56	38335.8	-86.2	276.6	101347.0	21199460.0	2868.0
1306.57	23914.6	-53.6	671.3	61987.0	12660610.0	1845.0
1306.58	24132.9	-62.9	423.0	73283.0	11630300.0	1617.0
1306.59	43650.1	-88.4	772.0	103285.0	25105140.0	3506.0
1306.60	43868.4	-97.7	523.8	114579.0	24080830.0	3278.0
1306.61	18408.0	-43.0	400.9	49941.0	9661881.0	1411.0
1306.62	18626.3	-52.3	152.7	61236.0	8631570.0	1183.0
1306.63	38143.5	-77.8	501.7	91238.0	22110410.0	3072.0
1306.64	38361.8	-87.2	253.5	102531.0	21076100.0	2844.0
1306.108	35381.6	121.2	8222.9	-158535.0	7080846.0	8999.0
1306.109	31311.6	98.1	9218.4	-130059.0	11643590.0	13926.0
1306.110	34390.0	-76.8	-7.0	83714.0	4571889.0	-2797.0
1306.111	30319.9	-100.0	997.5	112207.0	9135606.0	2130.0
1306.112	28937.3	-18.8	293.5	25779.0	25021900.0	2693.0

1306.113	24867.3	-41.9	1289.6	54265.0	29583650.0	7619.0
1306.114	27957.4	-215.9	-7900.2	266356.0	22501930.0	-9117.0
1306.115	23887.6	-239.0	-6894.3	294839.0	27063730.0	-4190.0
1306.116	35350.0	117.2	8764.9	-156612.0	6933785.0	6742.0
1306.117	31280.1	94.0	9757.2	-128004.0	11497550.0	11669.0
1306.118	34419.3	-73.3	-570.4	82313.0	4719364.0	-537.0
1306.119	30349.1	-96.4	439.5	110757.0	9284055.0	4390.0
1306.120	28905.8	-22.7	835.9	27670.0	24873870.0	436.0
1306.121	24835.8	-45.8	1832.7	56125.0	29435610.0	5362.0
1306.122	27986.1	-212.0	-8459.9	264562.0	22649250.0	-6857.0
1306.123	23916.4	-235.1	-7456.1	293034.0	27221070.0	-1930.0
1306.124	35400.4	99.1	8030.5	-138342.0	7178642.0	2513.0
1306.125	31330.6	76.0	9023.6	-109872.0	11742440.0	7439.0
1306.126	34409.9	-99.1	-228.3	104124.0	4669966.0	-9284.0
1306.127	30339.9	-122.4	774.9	132731.0	9233709.0	-4357.0
1306.128	28937.8	4.4	561.7	3448.0	24902030.0	9158.0
1306.129	24867.5	-18.7	1562.1	31964.0	29473700.0	14085.0
1306.130	27957.3	-192.4	-7609.5	243755.0	22391910.0	-2651.0
1306.131	23887.5	-215.6	-6603.7	272241.0	26953700.0	2275.0
1306.132	35369.5	95.1	8563.5	-136310.0	7032760.0	255.0
1306.133	31299.8	71.9	9561.6	-107736.0	11595580.0	5182.0
1306.134	34439.2	-95.4	-773.5	102463.0	4817440.0	-7024.0
1306.135	30369.1	-118.5	237.6	130900.0	9381157.0	-2098.0
1306.136	28907.2	0.2	1100.5	5651.0	24764230.0	6900.0
1306.137	24837.0	-22.9	2095.9	34043.0	29325920.0	11827.0
1306.138	27986.4	-188.6	-8180.5	242075.0	22539330.0	-392.0
1306.139	23916.5	-211.7	-7173.6	270507.0	27101100.0	4535.0
1306.140	34280.0	303.4	15185.4	-376657.0	16290830.0	20557.0
1306.141	30208.6	280.2	16177.8	-348066.0	20856210.0	25485.0
1306.142	30987.8	-356.3	-12212.2	429552.0	7916168.0	-18778.0
1306.143	26918.9	-379.3	-11204.8	457914.0	12479010.0	-13853.0
1306.144	32342.6	261.0	12792.7	-320777.0	21680600.0	18669.0
1306.145	28271.2	237.8	13785.1	-292184.0	26241980.0	23598.0
1306.146	29062.7	-397.7	-14572.8	483829.0	13291900.0	-20679.0
1306.147	24993.8	-420.7	-13565.5	512193.0	17855920.0	-15754.0
1306.148	34286.3	296.9	15126.7	-370696.0	16319430.0	18610.0
1306.149	30216.3	273.7	16120.3	-342224.0	20888180.0	23537.0
1306.150	30986.7	-363.4	-12295.1	436421.0	7951833.0	-20717.0
1306.151	26917.9	-386.4	-11287.3	464762.0	12514760.0	-15791.0
1306.152	32336.4	267.6	12855.8	-326796.0	21649020.0	20616.0
1306.153	28264.9	244.4	13847.4	-298177.0	26210380.0	25544.0
1306.154	29063.4	-390.6	-14490.9	477029.0	13257070.0	-18740.0
1306.155	24994.2	-413.7	-13484.1	505421.0	17816020.0	-13814.0
1306.156	34174.0	290.2	16995.1	-370318.0	15803790.0	13033.0
1306.157	30102.4	267.0	17986.4	-341690.0	20369120.0	17962.0
1306.158	31081.1	-343.7	-14073.8	424030.0	8412856.0	-11242.0
1306.159	27012.4	-366.8	-13066.0	452368.0	12975860.0	-6317.0
1306.160	32236.3	247.8	14605.8	-314403.0	21193480.0	11146.0
1306.161	28164.7	224.6	15597.1	-285775.0	25754820.0	16075.0
1306.162	29156.1	-385.1	-16439.9	478328.0	13788720.0	-13143.0
1306.163	25087.4	-408.2	-15431.9	506662.0	18349800.0	-8218.0
1306.164	34181.1	283.7	16933.9	-364432.0	15831600.0	11086.0
1306.165	30110.8	260.6	17926.4	-335918.0	20391270.0	16013.0
1306.166	31080.2	-350.8	-14151.7	430834.0	8448270.0	-13181.0
1306.167	27011.5	-373.9	-13144.6	459197.0	13010630.0	-8256.0
1306.168	32229.6	254.3	14669.8	-320337.0	21161770.0	13093.0
1306.169	28158.0	231.1	15661.1	-291710.0	25723110.0	18022.0
1306.170	29157.5	-378.0	-16358.7	471439.0	13753080.0	-11205.0
1306.171	25088.5	-401.1	-15351.4	499803.0	18320080.0	-6279.0
1306.268	37870.4	99.2	4274.3	-127045.0	8039739.0	1048.0

1306.269	24303.9	22.0	7586.6	-32020.0	23249920.0	17471.0
1306.270	36878.8	-99.1	-3967.7	115368.0	5530782.0	-10747.0
1306.271	23314.1	-176.1	-610.1	210074.0	20737430.0	5673.0
1306.272	35935.0	56.9	1883.1	-71360.0	13425020.0	-841.0
1306.273	22365.2	-20.4	5196.7	23858.0	28635360.0	15584.0
1306.274	34952.4	-140.5	-6329.7	169789.0	10908360.0	-12647.0
1306.275	21386.5	-217.6	-2972.7	264598.0	26115700.0	3774.0
1306.276	37839.0	95.3	4816.9	-125191.0	7893729.0	-1209.0
1306.277	24272.3	17.9	8126.5	-29953.0	23101860.0	15214.0
1306.278	36907.6	-95.2	-4523.9	113622.0	5679129.0	-8488.0
1306.279	23342.6	-172.3	-1165.0	208469.0	20894700.0	7933.0
1306.280	35902.9	52.9	2427.4	-69424.0	13278830.0	-3098.0
1306.281	22333.9	-24.2	5742.4	25644.0	28497380.0	13327.0
1306.282	34980.5	-136.7	-6890.4	168122.0	11056530.0	-10386.0
1306.283	21415.3	-213.7	-3532.0	262792.0	26273040.0	6034.0
1306.284	37876.1	92.6	4215.4	-121035.0	8069194.0	-898.0
1306.285	24309.7	15.4	7527.0	-25977.0	23281400.0	15525.0
1306.286	36884.5	-105.7	-4037.7	121487.0	5561236.0	-12693.0
1306.287	23317.1	-182.9	-685.5	216497.0	20778190.0	3730.0
1306.288	35932.3	63.7	1956.8	-77749.0	13392330.0	1102.0
1306.289	22365.3	-13.4	5280.0	17147.0	28605390.0	17524.0
1306.290	34953.0	-133.5	-6245.0	162960.0	10872510.0	-10708.0
1306.291	21386.4	-210.6	-2886.3	257830.0	26085670.0	5714.0
1306.292	37844.4	88.6	4755.8	-119112.0	7923106.0	-3155.0
1306.293	24278.3	11.3	8071.6	-23977.0	23133390.0	13267.0
1306.294	36913.2	-102.0	-4596.4	119834.0	5709558.0	-10433.0
1306.295	23346.4	-179.1	-1232.8	214754.0	20925670.0	5989.0
1306.296	35900.6	59.7	2502.0	-75860.0	13246240.0	-1155.0
1306.297	22334.1	-17.3	5821.7	18963.0	28457430.0	15267.0
1306.298	34981.4	-129.7	-6805.0	161262.0	11021760.0	-8448.0
1306.299	21415.2	-206.8	-3454.3	256149.0	26233020.0	7974.0
1313.1	19594.9	24.9	464.0	-13122.0	17038660.0	8696.0
1313.2	19472.0	28.6	712.5	-15126.0	17257310.0	10683.0
1313.3	41298.2	50.0	2557.3	-26393.0	37855170.0	17534.0
1313.4	41175.3	53.6	2806.2	-28396.0	38073820.0	19521.0
1313.5	15075.4	19.5	352.6	-10314.0	13102730.0	6688.0
1313.6	14952.5	23.2	601.1	-12318.0	13325380.0	8675.0
1313.7	36778.7	44.5	2446.1	-23584.0	33912250.0	15526.0
1313.8	36655.8	48.2	2694.8	-25588.0	34140890.0	17513.0
1313.9	19349.2	32.3	961.0	-17131.0	17485980.0	12670.0
1313.10	34787.2	42.5	1929.3	-22411.0	31604220.0	14883.0
1313.11	34541.5	49.8	2426.7	-26420.0	32051540.0	18857.0
1313.12	14829.7	26.9	849.5	-14323.0	13549060.0	10662.0
1313.13	30267.7	37.0	1817.9	-19603.0	27671290.0	12875.0
1313.14	30022.0	44.4	2315.3	-23612.0	28118610.0	16849.0
1313.15	34664.3	46.1	2178.0	-24415.0	31832860.0	16870.0
1313.16	30144.8	40.7	2066.7	-21607.0	27889940.0	14862.0
1313.17	19650.1	23.4	386.7	-12305.0	16942740.0	7822.0
1313.18	19527.2	27.1	635.2	-14308.0	17161390.0	9809.0
1313.19	41353.4	48.4	2479.9	-25576.0	37749250.0	16660.0
1313.20	41230.5	52.1	2728.7	-27578.0	37977900.0	18647.0
1313.21	15130.6	18.0	275.3	-9497.0	13001820.0	5814.0
1313.22	15007.7	21.7	523.8	-11500.0	13225460.0	7801.0
1313.23	36833.9	43.0	2368.7	-22767.0	33816330.0	14652.0
1313.24	36711.0	46.7	2617.5	-24770.0	34034980.0	16639.0
1313.25	19404.4	30.8	883.7	-16313.0	17380060.0	11796.0
1313.26	34842.4	40.9	1851.9	-21594.0	31508300.0	14009.0
1313.27	34596.7	48.3	2349.3	-25602.0	31955620.0	17982.0
1313.28	14884.9	25.4	772.3	-13505.0	13448140.0	9788.0
1313.29	30322.9	35.5	1740.5	-18786.0	27575370.0	12001.0

1313.30	30077.2	42.9	2237.9	-22794.0	28012690.0	15975.0
1313.31	19686.9	22.4	335.2	-11760.0	16872130.0	7239.0
1313.32	19564.0	26.1	583.7	-13763.0	17090780.0	9226.0
1313.33	34879.2	39.9	1800.3	-21050.0	31437680.0	13426.0
1313.34	34756.3	43.6	2049.1	-23052.0	31666330.0	15413.0
1313.35	15167.4	17.0	223.8	-8952.0	12935200.0	5231.0
1313.36	15044.5	20.7	472.3	-10955.0	13158850.0	7218.0
1313.37	30359.7	34.5	1689.0	-18241.0	27504760.0	11418.0
1313.38	30236.8	38.2	1937.6	-20244.0	27723410.0	13405.0
1313.39	34719.5	44.6	2100.7	-23597.0	31726940.0	15995.0
1313.40	30200.0	39.2	1989.3	-20789.0	27794020.0	13988.0
1313.41	19572.8	25.5	494.9	-13449.0	17083020.0	9046.0
1313.42	19450.0	29.2	743.4	-15453.0	17301700.0	11033.0
1313.43	41276.1	50.6	2588.3	-26720.0	37889530.0	17884.0
1313.44	41153.3	54.2	2837.2	-28723.0	38118210.0	19871.0
1313.45	15053.3	20.1	383.5	-10641.0	13142100.0	7038.0
1313.46	14930.5	23.8	632.0	-12645.0	13365770.0	9025.0
1313.47	36756.6	45.2	2477.1	-23911.0	33956610.0	15876.0
1313.48	36633.8	48.8	2725.7	-25915.0	34175280.0	17863.0
1313.49	19327.1	32.9	991.9	-17458.0	17520340.0	13020.0
1313.50	34765.1	43.1	1960.2	-22738.0	31648580.0	15233.0
1313.51	34519.4	50.4	2457.6	-26748.0	32095900.0	19206.0
1313.52	14807.6	27.5	880.4	-14651.0	13588420.0	11012.0
1313.53	30245.6	37.6	1848.8	-19930.0	27715650.0	13225.0
1313.54	29999.9	45.0	2346.2	-23940.0	28152980.0	17198.0
1313.55	34642.3	46.7	2209.0	-24742.0	31867250.0	17219.0
1313.56	30122.8	41.3	2097.6	-21934.0	27934320.0	15212.0
1313.57	19558.1	25.9	515.5	-13667.0	17109270.0	9279.0
1313.58	19435.2	29.6	764.0	-15671.0	17327920.0	11266.0
1313.59	34750.4	43.5	1980.9	-22956.0	31674830.0	15466.0
1313.60	34627.6	47.1	2229.6	-24961.0	31893500.0	17453.0
1313.61	15038.6	20.5	404.1	-10859.0	13169350.0	7271.0
1313.62	14915.7	24.2	652.6	-12863.0	13392000.0	9258.0
1313.63	30230.9	38.1	1869.5	-20148.0	27741900.0	13458.0
1313.64	30108.1	41.7	2118.2	-22153.0	27960580.0	15445.0
1313.108	33192.8	-2.8	-11725.5	-4710.0	4508483.0	7376.0
1313.109	28413.8	5.8	-11235.2	-9435.0	13072360.0	14298.0
1313.110	34603.6	67.6	-7328.7	-42600.0	1971379.0	16031.0
1313.111	29824.6	76.2	-6826.3	-47332.0	10535260.0	22953.0
1313.112	17691.8	-17.2	9269.9	15938.0	32313180.0	-2549.0
1313.113	12913.0	-8.6	9759.3	11182.0	40874110.0	4371.0
1313.114	19105.9	53.5	13629.5	-22371.0	29773920.0	6073.0
1313.115	14327.1	62.1	14132.8	-27104.0	38334840.0	12993.0
1313.116	32900.2	-4.9	-8770.9	-2334.0	5036841.0	4839.0
1313.117	28121.2	3.6	-8280.1	-7067.0	13600720.0	11760.0
1313.118	34895.7	69.7	-10235.7	-44937.0	1443893.0	18574.0
1313.119	30116.7	78.3	-9731.7	-49671.0	10007770.0	25495.0
1313.120	17399.3	-19.4	12225.9	18316.0	32838560.0	-5087.0
1313.121	12620.5	-10.8	12715.6	13582.0	41409490.0	1833.0
1313.122	19397.8	55.5	10704.5	-24631.0	29248380.0	8617.0
1313.123	14619.1	64.1	11201.9	-29375.0	37809330.0	15536.0
1313.124	33116.7	-19.0	-10557.7	800.0	4645070.0	7399.0
1313.125	28337.7	-10.4	-10071.3	-3925.0	13208950.0	14320.0
1313.126	34527.8	51.4	-6177.0	-37067.0	2107042.0	16052.0
1313.127	29748.7	60.0	-5670.5	-41804.0	10670890.0	22974.0
1313.128	17775.1	-0.6	8092.4	9799.0	32164430.0	-2634.0
1313.129	12996.2	8.0	8596.4	5076.0	40725330.0	4286.0
1313.130	19189.3	70.2	12468.5	-28465.0	29625190.0	5988.0
1313.131	14410.5	78.7	12970.9	-33199.0	38186120.0	12908.0
1313.132	32824.3	-21.2	-7610.0	3199.0	5172479.0	4860.0

1313.133	28045.3	-12.6	-7113.8	-1535.0	13736360.0	11781.0
1313.134	34819.9	53.5	-9083.0	-39403.0	1579557.0	18594.0
1313.135	30040.9	62.1	-8578.2	-44136.0	10143430.0	25516.0
1313.136	17482.9	-2.7	11060.4	12186.0	32689890.0	-5174.0
1313.137	12704.0	5.8	11547.3	7466.0	41260790.0	1746.0
1313.138	19481.1	72.2	9525.4	-30790.0	29099630.0	8531.0
1313.139	14702.3	80.8	10027.3	-35521.0	37660560.0	15451.0
1313.140	26120.9	-90.2	-9379.2	46900.0	17203440.0	-6185.0
1313.141	21341.6	-81.7	-8887.2	42203.0	25764240.0	739.0
1313.142	30828.3	145.1	5243.6	-80015.0	8736086.0	22623.0
1313.143	26049.7	153.7	5740.7	-84774.0	17295280.0	29540.0
1313.144	21469.8	-94.7	-3065.6	53204.0	25546950.0	-9154.0
1313.145	16690.5	-86.1	-2573.6	48507.0	34107750.0	-2230.0
1313.146	26180.2	140.9	11518.1	-74031.0	17078570.0	19624.0
1313.147	21401.6	149.5	12015.2	-78791.0	25639550.0	26542.0
1313.148	26098.1	-95.1	-9034.2	48557.0	17237620.0	-6179.0
1313.149	21319.1	-86.5	-8543.4	43837.0	25808500.0	743.0
1313.150	30803.4	140.1	5596.9	-78185.0	8780766.0	22648.0
1313.151	26024.8	148.7	6094.7	-82946.0	17338930.0	29566.0
1313.152	21492.9	-89.8	-3402.7	51534.0	25502840.0	-9162.0
1313.153	16713.6	-81.3	-2912.3	46839.0	34063640.0	-2238.0
1313.154	26205.1	145.9	11163.1	-75854.0	17024920.0	19599.0
1313.155	21426.4	154.5	11660.1	-80614.0	25595880.0	26517.0
1313.156	25145.4	-97.5	481.9	54835.0	18964590.0	-14642.0
1313.157	20366.1	-88.9	971.8	50140.0	27525390.0	-7718.0
1313.158	31800.6	151.9	-4476.3	-87677.0	6980334.0	31106.0
1313.159	27022.0	160.5	-3978.0	-92439.0	15543310.0	38024.0
1313.160	20494.3	-101.9	6798.9	61143.0	27308100.0	-17610.0
1313.161	15715.0	-93.3	7288.9	56449.0	35868900.0	-10686.0
1313.162	27152.5	147.8	1791.8	-81694.0	15318600.0	28108.0
1313.163	22373.9	156.3	2290.0	-86455.0	23877580.0	35026.0
1313.164	25122.7	-102.3	823.0	56480.0	19008800.0	-14637.0
1313.165	20343.6	-93.8	1312.0	51764.0	27569650.0	-7715.0
1313.166	31775.8	147.0	-4116.4	-85851.0	7025007.0	31132.0
1313.167	26997.2	155.6	-3617.6	-90613.0	15587990.0	38049.0
1313.168	20517.3	-97.0	6461.1	59482.0	27263960.0	-17618.0
1313.169	15738.0	-88.5	6951.1	54787.0	35824760.0	-10694.0
1313.170	27177.4	152.8	1436.8	-83527.0	15273960.0	28082.0
1313.171	22398.7	161.3	1934.0	-88286.0	23833910.0	35000.0
1313.268	33341.4	-18.0	-4953.0	8180.0	4252391.0	-4159.0
1313.269	17411.2	10.5	-3310.8	-7547.0	32801600.0	18913.0
1313.270	34752.2	52.5	-561.9	-29763.0	1715286.0	4496.0
1313.271	18822.9	81.1	1108.9	-45579.0	30261720.0	27560.0
1313.272	28690.3	-22.4	1359.3	14460.0	12595900.0	-7129.0
1313.273	12759.9	6.2	3002.9	-1280.0	41145050.0	15945.0
1313.274	30103.6	48.3	5720.3	-23745.0	10053430.0	1501.0
1313.275	14174.4	76.9	7386.9	-39575.0	38595890.0	24566.0
1313.276	33048.7	-20.1	-1994.6	10555.0	4780724.0	-6696.0
1313.277	17118.6	8.4	-357.3	-5194.0	33326960.0	16376.0
1313.278	35044.1	54.6	-3476.9	-32078.0	1187750.0	7039.0
1313.279	19114.8	83.2	-1803.5	-47900.0	29736180.0	30104.0
1313.280	28397.6	-24.5	4318.6	16844.0	13124230.0	-9666.0
1313.281	12467.4	4.0	5949.7	1106.0	41670440.0	13407.0
1313.282	30395.3	50.4	2802.3	-26043.0	9526841.0	4046.0
1313.283	14466.2	79.0	4458.8	-41875.0	38070330.0	27110.0
1313.284	33318.6	-22.8	-4606.9	9844.0	4293575.0	-4152.0
1313.285	17388.4	5.7	-2965.1	-5893.0	32835780.0	18919.0
1313.286	34729.3	47.6	-216.1	-28080.0	1756444.0	4503.0
1313.287	18799.1	76.2	1455.1	-43860.0	30305650.0	27575.0
1313.288	28714.5	-17.4	1012.4	12703.0	12552070.0	-7147.0

1313.289	12784.9	11.1	2653.4	-3102.0	41101430.0	15920.0
1313.290	30128.7	53.3	5367.8	-25591.0	10008830.0	1474.0
1313.291	14199.4	81.9	7040.8	-41398.0	38552260.0	24540.0
1313.292	33025.9	-25.0	-1652.3	12223.0	4821908.0	-6689.0
1313.293	17095.8	3.5	-7.6	-3532.0	33371140.0	16382.0
1313.294	35021.2	49.7	-3130.1	-30396.0	1228908.0	7046.0
1313.295	19091.2	78.3	-1455.1	-46186.0	29770170.0	30117.0
1313.296	28421.9	-19.6	3970.6	15077.0	13080430.0	-9685.0
1313.297	12492.4	9.0	5596.8	-724.0	41626810.0	13381.0
1313.298	30420.4	55.4	2449.8	-27881.0	9482244.0	4019.0
1313.299	14491.2	83.9	4107.6	-43703.0	38026710.0	27084.0
1316.1	23920.7	8.0	-1324.9	-4669.0	9626171.0	-33775.0
1316.2	22484.5	8.6	-1802.0	-5340.0	12194800.0	-36496.0
1316.3	51309.8	15.0	-1661.8	-9133.0	20680130.0	-64183.0
1316.4	49873.6	15.6	-2139.2	-9805.0	23252750.0	-66904.0
1316.5	18404.9	6.1	-1150.5	-3646.0	7397090.0	-25984.0
1316.6	16968.8	6.8	-1627.6	-4317.0	9964741.0	-28704.0
1316.7	45794.1	13.2	-1487.3	-8109.0	18451080.0	-56392.0
1316.8	44357.9	13.8	-1965.0	-8782.0	21018700.0	-59113.0
1316.9	21048.4	9.3	-2279.3	-6009.0	14762450.0	-39216.0
1316.10	43093.1	12.9	-1560.5	-7794.0	17364050.0	-55061.0
1316.11	40220.7	14.2	-2515.9	-9133.0	22500300.0	-60502.0
1316.12	15532.7	7.4	-2105.1	-4984.0	12532390.0	-31425.0
1316.13	37577.3	11.1	-1386.2	-6771.0	15134970.0	-47270.0
1316.14	34705.0	12.3	-2341.6	-8108.0	20273250.0	-52711.0
1316.15	41656.9	13.5	-2038.0	-8466.0	19931680.0	-57782.0
1316.16	36141.2	11.7	-1863.7	-7442.0	17702620.0	-49990.0
1316.17	24562.1	7.7	-1131.2	-4385.0	8479791.0	-32553.0
1316.18	23125.9	8.3	-1608.1	-5059.0	11047420.0	-35274.0
1316.19	51951.3	14.7	-1467.9	-8849.0	19532780.0	-62962.0
1316.20	50515.0	15.4	-1945.3	-9524.0	22101380.0	-65682.0
1316.21	19046.4	5.9	-956.7	-3361.0	6249737.0	-24762.0
1316.22	17610.2	6.5	-1433.7	-4036.0	8818362.0	-27483.0
1316.23	46435.5	12.9	-1293.4	-7826.0	17303700.0	-55170.0
1316.24	44999.3	13.5	-1770.8	-8501.0	19871320.0	-57891.0
1316.25	21689.8	9.0	-2085.4	-5728.0	13615070.0	-37995.0
1316.26	43734.5	12.6	-1366.6	-7511.0	16216670.0	-53839.0
1316.27	40862.2	13.9	-2321.7	-8852.0	21353950.0	-59281.0
1316.28	16174.1	7.1	-1911.0	-4704.0	11386010.0	-30204.0
1316.29	38218.8	10.8	-1192.2	-6487.0	13987620.0	-46048.0
1316.30	35346.4	12.0	-2147.5	-7828.0	19126870.0	-51490.0
1316.31	24989.8	7.5	-1002.0	-4195.0	7714898.0	-31739.0
1316.32	23553.5	8.1	-1478.9	-4871.0	10282500.0	-34460.0
1316.33	44162.2	12.4	-1237.3	-7321.0	15452780.0	-53025.0
1316.34	42725.9	13.1	-1714.7	-7996.0	18020380.0	-55746.0
1316.35	19474.1	5.7	-827.5	-3172.0	5485579.0	-23948.0
1316.36	18037.8	6.3	-1304.4	-3848.0	8053443.0	-26668.0
1316.37	38646.5	10.6	-1062.9	-6298.0	13222720.0	-45234.0
1316.38	37210.2	11.2	-1540.3	-6973.0	15791320.0	-47954.0
1316.39	42298.3	13.2	-1844.0	-8185.0	18785300.0	-56560.0
1316.40	36782.6	11.4	-1669.6	-7162.0	16555240.0	-48769.0
1316.41	23664.1	8.1	-1402.4	-4782.0	10085710.0	-34263.0
1316.42	22227.9	8.8	-1879.6	-5453.0	12653340.0	-36984.0
1316.43	51053.2	15.1	-1739.4	-9247.0	21138670.0	-64672.0
1316.44	49617.0	15.8	-2216.9	-9917.0	23707300.0	-67393.0
1316.45	18148.4	6.3	-1228.0	-3759.0	7855657.0	-26472.0
1316.46	16712.2	6.9	-1705.1	-4429.0	10423280.0	-29193.0
1316.47	45537.5	13.3	-1564.9	-8223.0	18909620.0	-56881.0
1316.48	44101.3	13.9	-2042.7	-8893.0	21480240.0	-59602.0
1316.49	20791.8	9.4	-2357.0	-6121.0	15220990.0	-39705.0

1316.50	42836.5	13.0	-1638.1	-7907.0	17822590.0	-55549.0
1316.51	39964.2	14.3	-2593.6	-9245.0	22954870.0	-60991.0
1316.52	15276.1	7.5	-2182.7	-5097.0	12991930.0	-31914.0
1316.53	37320.8	11.2	-1463.8	-6885.0	15593540.0	-47758.0
1316.54	34448.5	12.4	-2419.2	-8220.0	20727810.0	-53200.0
1316.55	41400.3	13.7	-2115.7	-8578.0	20391220.0	-58270.0
1316.56	35884.6	11.8	-1941.4	-7554.0	18161160.0	-50479.0
1316.57	23493.0	8.2	-1454.1	-4858.0	10391060.0	-34589.0
1316.58	22056.9	8.8	-1931.3	-5528.0	12958720.0	-37310.0
1316.59	42665.4	13.1	-1689.8	-7983.0	18128940.0	-55875.0
1316.60	41229.3	13.7	-2167.4	-8653.0	20697600.0	-58596.0
1316.61	17977.3	6.3	-1279.6	-3835.0	8162010.0	-26798.0
1316.62	16541.2	7.0	-1756.8	-4504.0	10729660.0	-29519.0
1316.63	37149.7	11.3	-1515.5	-6960.0	15898890.0	-48084.0
1316.64	35713.5	11.9	-1993.2	-7629.0	18467510.0	-50805.0
1316.108	35400.3	6.8	3153.3	-793.0	1023617.0	-50795.0
1316.109	30890.6	8.4	1403.2	-2580.0	9107192.0	-64373.0
1316.110	33235.6	34.0	-7230.8	-23207.0	4895402.0	-54225.0
1316.111	28725.6	35.5	-8972.4	-24963.0	12979900.0	-67802.0
1316.112	30014.5	-18.4	6663.6	15407.0	10623700.0	-8488.0
1316.113	25505.0	-16.9	4912.5	13714.0	18706320.0	-22066.0
1316.114	27866.6	7.8	-3750.9	-5601.0	14464770.0	-11923.0
1316.115	23358.1	9.3	-5477.3	-7273.0	22548650.0	-25499.0
1316.116	35754.7	16.6	4155.7	-8315.0	391023.9	-51207.0
1316.117	31245.1	18.2	2406.8	-10119.0	8474817.0	-64785.0
1316.118	32876.7	23.9	-8231.2	-15494.0	5535846.0	-53814.0
1316.119	28366.9	25.5	-9969.4	-17256.0	13619400.0	-67392.0
1316.120	30369.3	-8.6	7665.2	7892.0	9990209.0	-8900.0
1316.121	25860.4	-7.0	5925.5	6191.0	18076990.0	-22476.0
1316.122	27508.1	-2.2	-4731.1	2067.0	15105320.0	-11509.0
1316.123	22999.6	-0.7	-6466.0	385.0	23187200.0	-25085.0
1316.124	35431.0	-16.6	3444.1	18545.0	968448.3	-50568.0
1316.125	30921.6	-15.0	1689.5	16753.0	9051100.0	-64146.0
1316.126	33268.7	10.6	-6928.9	-3854.0	4835846.0	-53996.0
1316.127	28758.9	12.2	-8669.4	-5627.0	12919400.0	-67574.0
1316.128	30014.9	3.4	6343.7	-1694.0	10622800.0	-8719.0
1316.129	25505.8	4.9	4614.6	-3364.0	18706530.0	-22295.0
1316.130	27867.4	29.5	-4050.3	-22708.0	14463970.0	-12152.0
1316.131	23358.9	31.1	-5775.4	-24386.0	22548850.0	-25729.0
1316.132	35787.5	-6.7	4456.8	10988.0	332391.3	-50978.0
1316.133	31278.2	-5.1	2711.0	9192.0	8415208.0	-64556.0
1316.134	32910.1	0.6	-7920.2	3853.0	5476367.0	-53586.0
1316.135	28400.2	2.2	-9658.5	2084.0	13559890.0	-67163.0
1316.136	30371.7	13.3	7367.9	-9240.0	9985820.0	-9130.0
1316.137	25862.8	14.8	5629.9	-10934.0	18067600.0	-22706.0
1316.138	27508.6	19.5	-5071.2	-15083.0	15103440.0	-11740.0
1316.139	23000.0	21.1	-6798.5	-16752.0	23187300.0	-25316.0
1316.140	36036.7	-33.3	16676.0	30476.0	-126038.0	-31986.0
1316.141	31525.5	-31.7	14929.9	28618.0	7960122.0	-45563.0
1316.142	28842.5	56.1	-17952.4	-42579.0	12741720.0	-43424.0
1316.143	24335.0	57.6	-19687.0	-44211.0	20817860.0	-57000.0
1316.144	34416.6	-40.6	17745.4	34938.0	2761675.0	-19290.0
1316.145	29905.3	-39.0	15999.4	33078.0	10847840.0	-32867.0
1316.146	27238.6	48.0	-16914.0	-36867.0	15599570.0	-30734.0
1316.147	22731.1	49.4	-18649.3	-38499.0	23678700.0	-44311.0
1316.148	36046.8	-40.4	16762.9	36297.0	-144461.5	-31918.0
1316.149	31537.0	-38.8	15010.5	34523.0	7939456.0	-45496.0
1316.150	28841.9	49.6	-17845.2	-37489.0	12742570.0	-43353.0
1316.151	24334.4	51.1	-19582.9	-39107.0	20817700.0	-56930.0
1316.152	34407.4	-33.6	17655.2	29178.0	2778328.0	-19357.0

1316.153	29896.1	-32.0	15913.1	27302.0	10864500.0	-32934.0
1316.154	27239.0	54.5	-17011.9	-42006.0	15599670.0	-30804.0
1316.155	22731.1	56.0	-18748.6	-43651.0	23678700.0	-44381.0
1316.156	37217.0	-0.6	20006.0	5429.0	-2235943.0	-33360.0
1316.157	32705.7	1.1	18265.4	3548.0	5854224.0	-46936.0
1316.158	27640.3	22.7	-21275.9	-17051.0	14886040.0	-42052.0
1316.159	23132.9	24.2	-23014.7	-18664.0	22961200.0	-55629.0
1316.160	35596.7	-7.8	21085.7	9843.0	655718.0	-20663.0
1316.161	31085.4	-6.1	19345.1	7961.0	8742434.0	-34240.0
1316.162	26036.4	14.6	-20242.4	-11326.0	17741890.0	-29363.0
1316.163	21529.0	16.0	-21981.2	-12939.0	25822050.0	-42940.0
1316.164	37227.6	-7.7	20081.3	11322.0	-2253239.0	-33293.0
1316.165	32717.7	-6.1	18335.0	9520.0	5832285.0	-46870.0
1316.166	27639.8	16.2	-21172.3	-11939.0	14886910.0	-41982.0
1316.167	23132.4	17.6	-22911.1	-13553.0	22971080.0	-55559.0
1316.168	35587.4	-0.7	21012.3	4009.0	672345.7	-20730.0
1316.169	31076.1	0.9	19271.8	2127.0	8759134.0	-34306.0
1316.170	26037.0	21.0	-20356.3	-16389.0	17742040.0	-29434.0
1316.171	21529.5	22.5	-22091.0	-18021.0	25822180.0	-43010.0
1316.268	38769.4	-3.6	6424.7	6491.0	-5029926.0	-20146.0
1316.269	23737.2	1.7	594.7	566.0	21915360.0	-65406.0
1316.270	36604.7	23.6	-3971.2	-15903.0	-1162141.0	-23577.0
1316.271	21576.7	28.6	-9754.2	-21489.0	25774220.0	-68834.0
1316.272	37150.2	-10.9	7475.6	11063.0	-2152984.0	-7454.0
1316.273	22114.8	-5.7	1654.2	5125.0	24801490.0	-52711.0
1316.274	34998.3	15.5	-2935.7	-10342.0	1701067.0	-10888.0
1316.275	19969.5	20.6	-8709.9	-15896.0	28644220.0	-56144.0
1316.276	39123.6	6.2	7415.9	-983.0	-5669570.0	-20559.0
1316.277	24091.5	11.6	1594.0	-6984.0	21275740.0	-65818.0
1316.278	36245.1	13.5	-4972.2	-8166.0	-520874.9	-23166.0
1316.279	21216.7	18.6	-10755.9	-13837.0	26422380.0	-68423.0
1316.280	37504.3	-1.1	8482.7	3513.0	-2782653.0	-7865.0
1316.281	22470.3	4.2	2667.5	-2425.0	24172170.0	-53122.0
1316.282	34637.6	5.5	-3937.9	-2664.0	2344052.0	-10477.0
1316.283	19610.3	10.5	-9713.5	-8222.0	29282590.0	-55732.0
1316.284	38779.1	-10.6	6515.1	12285.0	-5047452.0	-20078.0
1316.285	23746.8	-5.3	680.4	6359.0	21897810.0	-65337.0
1316.286	36613.9	16.6	-3886.6	-10111.0	-1179794.0	-23509.0
1316.287	21581.6	21.8	-9674.4	-15992.0	25765470.0	-68766.0
1316.288	37146.6	-4.2	7393.6	5628.0	-2143903.0	-7521.0
1316.289	22115.3	0.9	1573.4	-14.0	24801610.0	-52780.0
1316.290	34999.2	22.0	-3038.8	-15448.0	1699296.0	-10957.0
1316.291	19969.7	27.1	-8800.9	-21024.0	28644270.0	-56213.0
1316.292	39133.4	-0.7	7515.3	4772.0	-5687070.0	-20490.0
1316.293	24101.5	4.6	1684.3	-1177.0	21258290.0	-65750.0
1316.294	36254.5	6.6	-4885.6	-2390.0	-537477.2	-23097.0
1316.295	21223.0	11.8	-10666.1	-8263.0	26403990.0	-68355.0
1316.296	37501.2	5.7	8400.2	-1880.0	-2773444.0	-7933.0
1316.297	22470.8	10.8	2578.8	-7563.0	24172300.0	-53191.0
1316.298	34639.0	12.0	-4035.9	-7763.0	2341409.0	-10546.0
1316.299	19610.6	17.1	-9811.8	-13375.0	29282670.0	-55800.0

Calcolo resistenze

Resistenza a trazione dei bulloni

$$F_{tb,Rd} = 0.9 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} = 254061.8 \text{ N}$$

Resistenza a punzonamento flangia

$$B_{pf,Rd} = 0.6 \cdot \pi \cdot d_m \cdot t_f \cdot f_{tk} / \gamma_{M2} = 830586.8 \text{ N}$$

Bull.	$F_{t,Rd} \text{ [N]}$	$F_{t,Rd} \text{ [N]}$
1	235201.9	235201.9
2	81442.9	81442.9
3	134213.8	134213.8
4	134213.8	134213.8

5	81442.9	81442.9
6	235201.9	235201.9
7	235201.9	235201.9
8	81442.9	81442.9
9	134213.8	134213.8
10	134213.8	134213.8
11	81442.9	81442.9
12	235201.9	235201.9

Legenda

$F_{f,Rd} = M_{res,m} / (B_m \cdot R_m)$ resistenza a flessione flangia

$F_{t,Rd} = \min [F_{tb,Rd} , B_{pf,Rd} , F_{f,Rd}]$ resistenza a trazione di progetto

Resistenza a taglio dei bulloni

$$F_{vb,Rd} = 0.5 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} =$$

141145.5 N

Bull.	$F_{bf,x,Rd}$ [N]	$F_{v,x,Rd}$ [N]	$F_{bf,y,Rd}$ [N]	$F_{v,y,Rd}$ [N]
1	408000.0	141145.5	494400.0	141145.5
2	225215.9	141145.5	354959.9	141145.5
3	225215.9	141145.5	354959.9	141145.5
4	225215.9	141145.5	354959.9	141145.5
5	225215.9	141145.5	354959.9	141145.5
6	408000.0	141145.5	494400.0	141145.5
7	408000.0	141145.5	494400.0	141145.5
8	225215.9	141145.5	354959.9	141145.5
9	225215.9	141145.5	354959.9	141145.5
10	225215.9	141145.5	354959.9	141145.5
11	225215.9	141145.5	354959.9	141145.5
12	408000.0	141145.5	494400.0	141145.5

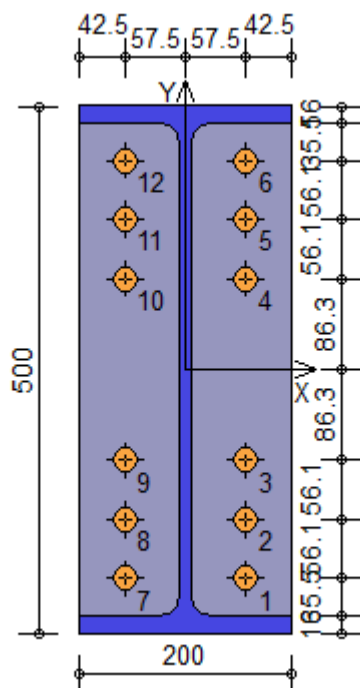
Legenda

$F_{bf,x,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \varnothing \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione x

$F_{v,x,Rd} = \min [F_{vb,Rd} , F_{bf,x,Rd}]$ resistenza a taglio di progetto in direzione x

$F_{bf,y,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \varnothing \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione y

$F_{v,y,Rd} = \min [F_{vb,Rd} , F_{bf,y,Rd}]$ resistenza a taglio di progetto in direzione y



Verifiche sui bulloni

1-Taglio e trazione (Nodo n. 1301, CMB n. 44)

Bull.	X [mm]	Y [mm]	$F_{v,Ed}$ [N]	$F_{v,Rd}$ [N]	$F_{t,Ed}$ [N]	$F_{t,Rd}$ [N]	FV ₁	VER
1	57.50	-198.50	378.5	141145.5	93958.5	235201.9	0.288025	Ok
2	57.50	-142.40	375.4	141145.5	79395.5	81442.9	0.698989	Ok

3	57.50	-86.30	373.2	141145.5	64832.6	134213.8	0.347683	Ok
4	57.50	86.30	371.5	141145.5	20027.5	134213.8	0.109218	Ok
5	57.50	142.40	372.7	141145.5	5464.5	81442.9	0.050567	Ok
6	57.50	198.50	374.8	141145.5	0.0	235201.9	0.002655	Ok
7	-57.50	-198.50	414.4	141145.5	94034.7	235201.9	0.288511	Ok
8	-57.50	-142.40	411.6	141145.5	79471.7	81442.9	0.699914	Ok
9	-57.50	-86.30	409.6	141145.5	64908.8	134213.8	0.348346	Ok
10	-57.50	86.30	408.1	141145.5	20103.7	134213.8	0.109883	Ok
11	-57.50	142.40	409.2	141145.5	5540.7	81442.9	0.051493	Ok
12	-57.50	198.50	411.0	141145.5	0.0	235201.9	0.002912	Ok

2-Trazione (Nodo n. 1301, CMB n. 44)

Bull.	X [mm]	Y [mm]	F _{t,Ed} [N]	F _{t,Rd} [N]	FV ₂	VER
1	57.50	-198.50	93958.5	235201.9	0.399480	Ok
2	57.50	-142.40	79395.5	81442.9	0.974861	Ok
3	57.50	-86.30	64832.6	134213.8	0.483054	Ok
4	57.50	86.30	20027.5	134213.8	0.149221	Ok
5	57.50	142.40	5464.5	81442.9	0.067096	Ok
6	57.50	198.50	0.0	235201.9	0.000000	Ok
7	-57.50	-198.50	94034.7	235201.9	0.399804	Ok
8	-57.50	-142.40	79471.7	81442.9	0.975797	Ok
9	-57.50	-86.30	64908.8	134213.8	0.483622	Ok
10	-57.50	86.30	20103.7	134213.8	0.149789	Ok
11	-57.50	142.40	5540.7	81442.9	0.068032	Ok
12	-57.50	198.50	0.0	235201.9	0.000000	Ok

Legenda

F_{v,Ed} forza di taglio agente sul bullone

F_{v,Rd} resistenza a taglio di progetto del bullone

F_{t,Ed} forza di trazione agente sul bullone

F_{t,Rd} resistenza a trazione di progetto del bullone

FV₁ = F_{v,Ed} / F_{v,Rd} + F_{t,Ed} / (1.4 • F_{t,Rd})

FV₂ = F_{t,Ed} / F_{t,Rd}

VER → FV_i ≤ 1

Verifiche sulle saldature profilo-flangia (versione beta)

Si considera la sezione di gola (avente altezza $a = s_c / 2^{0.5} = 7.071$) in posizione ribaltata: vengono considerate positive le tensioni normali di trazione e le tensioni tangenziali agenti verso destra e verso il basso. Tutte le tensioni sono espresse in N/mm².

Verifica formula (4.2.84) (Nodo n. 1301, CMB n. 44)

Cordoni	n _⊥	t _⊥	τ	FV ₁	VER ₁
Ala inferiore interno lato destro	209.01	0.00	0.06	209.01	Ok
Ala inferiore interno lato sinistro	210.72	0.00	0.06	210.72	Ok
Anima lato destro	-194.29	0.00	0.78	194.29	Ok
Anima lato sinistro	-194.29	0.00	0.78	194.29	Ok
Ala superiore interno lato destro	-211.55	0.00	0.06	211.55	Ok
Ala superiore interno lato sinistro	-209.83	0.00	0.06	209.83	Ok

Verifica formula (4.2.85) (Nodo n. 1301, CMB n. 44)

Cordoni	n _⊥	t _⊥	τ	FV ₂	VER ₂
Ala inferiore interno lato destro	209.01	0.00	0.06	209.01	Ok
Ala inferiore interno lato sinistro	210.72	0.00	0.06	210.72	Ok
Anima lato destro	-194.29	0.00	0.78	194.29	Ok
Anima lato sinistro	-194.29	0.00	0.78	194.29	Ok
Ala superiore interno lato destro	-211.55	0.00	0.06	211.55	Ok
Ala superiore interno lato sinistro	-209.83	0.00	0.06	209.83	Ok

Legenda

n_⊥ tensione normale perpendicolare all'asse del cordone

t_⊥ tensione tangenziale perpendicolare all'asse del cordone

τ_{||} tensione tangenziale parallela all'asse del cordone

FV₁ = (n_⊥² + t_⊥² + τ_{||}²)^{0.5}

FV₂ = |n_⊥| + |t_⊥|

VER_i → FV_i ≤ β_i • f_{yk} (β₁ • f_{yk} = 248.50 N/mm² β₂ • f_{yk} = 301.75 N/mm²)

Verifica del momento di progetto del giunto (Nodo n. 1301, CMB n. 44)

Momento resistente del giunto $M_{j,Rd} = 388240200.0 \text{ N mm}$
Momento di progetto $M_{j,Ed} = 183252000.0 \text{ N mm}$
 $M_{j,Ed} / M_{j,Rd} = 0.472007 \text{ Ok}$

Trave lato 3-

Tipo di profilo: IPE 500

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Flangia:Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Dimensioni (B x H x Sp): 200.0 x 500.0 x 30.0 mm

Bullonature:Viti cl. 10.9 Dadi 10 o 12 ($f_{yb} = 900 \text{ N/mm}^2$, $f_{tb} = 1000 \text{ N/mm}^2$)Diametro gambo $\varnothing = 24 \text{ mm}$ $A_{res} = 352.9 \text{ mm}^2$ (ridotta per filettatura)Diametro dado/testa $d_m = 36 \text{ mm}$ Diametro foro $\varnothing_0 = 25.5 \text{ mm}$ Saldature:Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\beta_1 = 0.70$ $\beta_2 = 0.85$ Spessore cordoni d'angolo $s_c = 10 \text{ mm}$ Sollecitazioni nella sezione d'attacco dell'elemento:

Nodo.CMB	V2 [N]	V3 [N]	N [N]	M2 [N mm]	M3 [N mm]	T [N mm]
497.1	11529.5	-41.4	3107.6	35914.0	23701180.0	33693.0
497.2	8052.3	-48.5	3575.8	42018.0	29254140.0	40800.0
497.3	27970.7	-87.9	7417.6	77811.0	45595320.0	58723.0
497.4	24493.7	-94.9	7885.7	83887.0	51138340.0	65830.0
497.5	8870.6	-32.5	2371.5	28083.0	18232890.0	25925.0
497.6	5393.4	-39.5	2839.7	34193.0	23775860.0	33032.0
497.7	25311.8	-78.9	6681.5	69983.0	40127040.0	50955.0
497.8	21834.8	-86.0	7149.6	76052.0	45670060.0	58062.0
497.9	4575.0	-55.6	4044.0	48160.0	34797080.0	47906.0
497.10	23038.3	-73.9	6124.6	65245.0	39027070.0	51214.0
497.11	16083.9	-88.1	7060.8	77480.0	50123000.0	65428.0
497.12	1916.0	-46.7	3307.8	40348.0	29328770.0	40139.0
497.13	20379.5	-65.0	5388.5	57410.0	33558810.0	43446.0
497.14	13424.9	-79.2	6324.7	69657.0	44644690.0	57660.0
497.15	19561.2	-81.0	6592.8	71341.0	44580060.0	58321.0
497.16	16902.3	-72.1	5856.6	63506.0	39101780.0	50553.0
497.17	13082.5	-38.6	2914.8	33494.0	21227350.0	30502.0
497.18	9605.5	-45.6	3383.1	39564.0	26770360.0	37609.0
497.19	29523.7	-85.1	7224.9	75404.0	43121500.0	55532.0
497.20	26046.8	-92.1	7693.0	81439.0	48664540.0	62639.0
497.21	10423.6	-29.7	2178.8	25664.0	15759060.0	22734.0
497.22	6946.6	-36.7	2647.0	31738.0	21302080.0	29841.0
497.23	26864.9	-76.1	6488.8	67556.0	37643240.0	47764.0
497.24	23388.0	-83.1	6956.9	73598.0	43196280.0	54871.0
497.25	6128.3	-52.7	3851.3	45696.0	32323330.0	44715.0
497.26	24591.4	-71.1	5932.0	62827.0	36553260.0	48023.0
497.27	17637.1	-85.2	6868.2	75024.0	47639220.0	62236.0
497.28	3469.3	-43.8	3115.2	37878.0	26845020.0	36947.0
497.29	21932.5	-62.2	5195.9	55001.0	31074980.0	40255.0
497.30	14978.2	-76.3	6132.0	67190.0	42170940.0	54469.0
497.31	14117.8	-36.7	2786.4	31886.0	19581450.0	28375.0
497.32	10641.0	-43.7	3254.6	37932.0	25124520.0	35481.0

497.33	25626.7	-69.2	5803.5	61228.0	34897370.0	45896.0
497.34	22149.8	-76.3	6271.6	67269.0	40450410.0	53002.0
497.35	11459.0	-27.8	2050.3	24052.0	14103190.0	20607.0
497.36	7982.1	-34.8	2518.5	30103.0	19646230.0	27713.0
497.37	22967.9	-60.3	5067.4	53377.0	29429110.0	38128.0
497.38	19491.0	-67.3	5535.5	59425.0	34972150.0	45234.0
497.39	21114.4	-78.2	6400.1	68892.0	42096280.0	55130.0
497.40	18455.6	-69.2	5664.0	61046.0	36628020.0	47362.0
497.41	10908.2	-42.5	3184.7	36885.0	24692680.0	34969.0
497.42	7431.1	-49.6	3652.9	43000.0	30245680.0	42076.0
497.43	27349.5	-89.0	7494.7	78774.0	46586860.0	59999.0
497.44	23872.4	-96.1	7962.8	84870.0	52129850.0	67106.0
497.45	8249.4	-33.6	2448.6	29054.0	19224420.0	27201.0
497.46	4772.1	-40.7	2916.8	35175.0	24767360.0	34308.0
497.47	24690.7	-80.0	6758.6	70937.0	41118600.0	52231.0
497.48	21213.5	-87.1	7226.6	77038.0	46661560.0	59338.0
497.49	3953.7	-56.7	4121.0	49151.0	35788590.0	49183.0
497.50	22417.1	-75.1	6201.7	66218.0	40018600.0	52490.0
497.51	15462.5	-89.2	7137.9	78464.0	51114480.0	66704.0
497.52	1294.7	-47.8	3384.9	41332.0	30320280.0	41415.0
497.53	19758.3	-66.1	5465.6	58374.0	34550340.0	44722.0
497.54	12803.6	-80.3	6401.8	70649.0	45636200.0	58936.0
497.55	18939.9	-82.1	6669.8	72325.0	45561570.0	59597.0
497.56	16281.0	-73.2	5933.7	64489.0	40093280.0	51829.0
497.57	10494.1	-43.3	3236.1	37533.0	25357050.0	35820.0
497.58	7016.9	-50.4	3704.3	43654.0	30900010.0	42927.0
497.59	22002.9	-75.8	6253.1	66867.0	40682940.0	53341.0
497.60	18525.7	-82.9	6721.2	72981.0	46225910.0	60448.0
497.61	7835.2	-34.4	2500.0	29702.0	19888760.0	28052.0
497.62	4358.0	-41.4	2968.2	35830.0	25431720.0	35159.0
497.63	19344.1	-66.9	5517.0	59022.0	35204680.0	45573.0
497.64	15866.8	-74.0	5985.1	65144.0	40757620.0	52680.0
497.108	10474.6	-135.8	6928.2	210375.0	35052070.0	34003.0
497.109	3451.7	-150.0	7593.8	223260.0	46260530.0	42654.0
497.110	8219.0	-249.4	9679.9	295546.0	38646660.0	44042.0
497.111	1197.6	-263.4	10353.7	308264.0	49855510.0	52691.0
497.112	29626.5	153.3	-2040.3	-206593.0	4237720.0	19256.0
497.113	22603.5	138.9	-1372.1	-193389.0	15443150.0	27907.0
497.114	27309.9	27.3	730.6	-103697.0	7928310.0	29365.0
497.115	20286.4	13.0	1408.4	-90630.0	19135060.0	38017.0
497.116	10342.6	-145.1	7234.0	220968.0	35278400.0	36220.0
497.117	3318.7	-159.3	7900.5	233838.0	46486600.0	44872.0
497.118	8362.5	-240.8	9377.0	285778.0	38413280.0	41813.0
497.119	1340.8	-254.7	10053.1	298410.0	49612040.0	50462.0
497.120	29494.0	143.7	-1735.2	-195617.0	4459919.0	21473.0
497.121	22470.6	129.3	-1066.0	-182410.0	15665250.0	30125.0
497.122	27458.6	36.7	421.9	-114474.0	7680857.0	27128.0
497.123	20434.9	22.5	1096.7	-101427.0	18882940.0	35780.0
497.124	10279.3	-262.9	7727.5	378765.0	35372250.0	34206.0
497.125	3255.7	-277.1	8390.4	391631.0	46570530.0	42858.0
497.126	8017.9	-377.8	10470.4	465583.0	38975360.0	44252.0
497.127	995.3	-391.9	11145.9	478353.0	50173900.0	52903.0
497.128	29721.3	263.2	-2796.9	-350449.0	4084904.0	19172.0
497.129	22699.5	248.7	-2121.9	-337219.0	15287640.0	27822.0
497.130	27407.1	137.6	-19.2	-248102.0	7771461.0	29279.0
497.131	20383.4	123.3	658.9	-235001.0	18979800.0	37931.0
497.132	10143.2	-272.3	8030.5	389375.0	35597530.0	36428.0
497.133	3118.1	-286.5	8700.2	402183.0	46805430.0	45082.0
497.134	8161.4	-368.8	10172.8	455395.0	38731970.0	42022.0
497.135	1139.9	-382.7	10849.2	468006.0	49930790.0	50671.0

497.136	29582.1	253.3	-2484.0	-339152.0	4317394.0	21399.0
497.137	22560.5	238.9	-1816.7	-325997.0	15520180.0	30048.0
497.138	27553.2	147.0	-337.8	-258882.0	7528231.0	27045.0
497.139	20530.6	132.8	339.3	-245828.0	18737360.0	35696.0
497.140	19826.9	104.5	672.8	-44071.0	20047840.0	17106.0
497.141	12810.9	91.3	1337.6	-32552.0	31248060.0	25749.0
497.142	12231.2	-290.8	9891.0	263291.0	32150180.0	50663.0
497.143	5203.4	-305.8	10567.6	277385.0	43357390.0	59319.0
497.144	25591.9	194.1	-2019.3	-173321.0	10773490.0	12660.0
497.145	18576.0	180.9	-1354.5	-161831.0	21968740.0	21303.0
497.146	17935.2	-211.0	7205.9	148125.0	22965270.0	46287.0
497.147	10907.5	-226.0	7882.4	162218.0	34182500.0	54943.0
497.148	19765.5	66.0	910.1	6904.0	20152180.0	17170.0
497.149	12742.9	51.8	1574.2	19839.0	31350710.0	25820.0
497.150	12206.8	-323.7	10123.1	306376.0	32183960.0	50684.0
497.151	5178.6	-338.8	10799.0	320512.0	43401060.0	59341.0
497.152	25652.4	232.1	-2254.5	-223693.0	10676930.0	12598.0
497.153	18636.9	218.9	-1589.1	-212239.0	21874270.0	21241.0
497.154	17961.6	-177.9	6975.7	104796.0	22932000.0	46263.0
497.155	10935.2	-192.7	7652.0	118600.0	34139570.0	54918.0
497.156	19390.0	73.5	1690.9	-8959.0	20776390.0	24491.0
497.157	12374.7	60.4	2356.6	2484.0	31976780.0	33134.0
497.158	12737.0	-259.2	8869.8	227130.0	31309210.0	43196.0
497.159	5708.6	-274.3	9545.6	241289.0	42526260.0	51853.0
497.160	25156.5	163.1	-996.4	-138184.0	11502420.0	20044.0
497.161	18141.2	150.0	-330.8	-126741.0	22697820.0	28686.0
497.162	18440.7	-179.2	6180.5	111716.0	22134220.0	38820.0
497.163	11412.3	-194.3	6856.3	125870.0	33341280.0	47477.0
497.164	19324.8	34.8	1923.7	42512.0	20889760.0	24559.0
497.165	12303.2	20.6	2588.7	55319.0	32088550.0	33209.0
497.166	12711.8	-292.3	9103.6	270501.0	31352780.0	43218.0
497.167	5683.1	-307.4	9779.6	284679.0	42559760.0	51875.0
497.168	25219.1	201.2	-1226.4	-188620.0	11401390.0	19980.0
497.169	18203.8	188.0	-560.8	-177177.0	22593790.0	28622.0
497.170	18464.3	-146.2	5945.7	68585.0	22090240.0	38800.0
497.171	11436.6	-161.2	6622.2	82646.0	33307480.0	47456.0
497.268	25394.0	-14.3	2999.1	44083.0	11161010.0	18721.0
497.269	1983.3	-61.6	5216.7	87162.0	48515940.0	47558.0
497.270	23134.5	-129.5	5749.1	131403.0	14759610.0	28766.0
497.271	-282.5	-178.1	8004.6	176342.0	52117940.0	57609.0
497.272	31150.0	74.3	302.8	-83721.0	1899365.0	14285.0
497.273	7754.5	28.5	2526.7	-42807.0	39228170.0	43105.0
497.274	28845.9	-48.6	3063.5	14680.0	5569590.0	24381.0
497.275	5433.9	-96.6	5321.6	58750.0	42926190.0	53219.0
497.276	25261.3	-23.7	3302.3	54804.0	11383160.0	20938.0
497.277	1850.2	-71.0	5523.8	97684.0	48731990.0	49777.0
497.278	23282.6	-120.5	5443.0	121355.0	14513390.0	26530.0
497.279	-134.1	-168.7	7700.7	165614.0	51875790.0	55374.0
497.280	31020.0	65.0	611.1	-73197.0	2116202.0	16499.0
497.281	7621.5	18.9	2833.3	-31823.0	39444240.0	45323.0
497.282	28997.2	-39.0	2754.4	3669.0	5318186.0	22141.0
497.283	5582.1	-87.2	5009.7	48031.0	42673990.0	50983.0
497.284	25335.1	-52.4	3237.3	94624.0	11255980.0	18782.0
497.285	1923.9	-99.8	5454.5	137690.0	48610790.0	47620.0
497.286	23076.4	-167.5	5981.5	181705.0	14853790.0	28826.0
497.287	-327.5	-214.2	8234.9	223875.0	52196460.0	57654.0
497.288	31192.7	109.4	75.0	-129963.0	1830258.0	14243.0
497.289	7783.3	61.4	2303.4	-85929.0	39175520.0	43080.0
497.290	28871.6	-15.9	2834.7	-28027.0	5528145.0	24359.0
497.291	5463.3	-63.4	5096.1	15331.0	42873690.0	53193.0

497.292	25203.3	-61.8	3541.8	105241.0	11475360.0	20998.0
497.293	1790.0	-109.1	5763.7	148215.0	48826630.0	49839.0
497.294	23224.0	-158.6	5675.9	171648.0	14607440.0	26591.0
497.295	-183.3	-205.3	7934.8	213885.0	51953240.0	55423.0
497.296	31060.6	99.8	383.7	-118986.0	2051559.0	16460.0
497.297	7649.4	51.8	2607.2	-74930.0	39401360.0	45299.0
497.298	29021.9	-6.4	2526.2	-38871.0	5277487.0	22120.0
497.299	5611.2	-54.0	4780.3	4496.0	42631420.0	50957.0
677.1	49898.6	-59.2	-2294.0	64791.0	50389130.0	-47782.0
677.2	52396.6	-70.4	-2512.0	77447.0	54356380.0	-52014.0
677.3	101700.0	-120.3	-3245.1	132673.0	102493700.0	-93140.0
677.4	104200.0	-131.5	-3463.2	145330.0	106451400.0	-97373.0
677.5	38387.1	-46.9	-1819.3	51428.0	38762550.0	-36758.0
677.6	40885.1	-58.2	-2037.3	64083.0	42719790.0	-40990.0
677.7	90158.0	-108.0	-2770.4	119311.0	90849300.0	-82116.0
677.8	92656.0	-119.3	-2988.5	131964.0	94806540.0	-86348.0
677.9	54894.6	-81.6	-2730.0	90096.0	58313610.0	-56246.0
677.10	86138.2	-102.0	-2959.8	112310.0	86863860.0	-79533.0
677.11	91134.2	-124.4	-3395.9	137607.0	94778330.0	-87997.0
677.12	43383.1	-69.4	-2255.4	76727.0	46677030.0	-45222.0
677.13	74626.8	-89.7	-2485.1	98946.0	75227300.0	-68509.0
677.14	79622.7	-112.1	-2921.3	124239.0	83141750.0	-76973.0
677.15	88636.2	-113.2	-3177.9	124964.0	90821100.0	-83765.0
677.16	77124.7	-100.9	-2703.2	111600.0	79184510.0	-72741.0
677.17	48779.8	-54.7	-2187.1	59780.0	48623730.0	-45894.0
677.18	51277.8	-66.0	-2405.2	72442.0	52580970.0	-50126.0
677.19	100600.0	-115.8	-3138.3	127663.0	100733100.0	-91253.0
677.20	103000.0	-127.1	-3356.4	140324.0	104665300.0	-95485.0
677.21	37268.3	-42.5	-1712.5	46417.0	36987140.0	-34870.0
677.22	39766.3	-53.7	-1930.5	59078.0	40944380.0	-39102.0
677.23	89039.2	-103.6	-2663.6	114302.0	89083900.0	-80228.0
677.24	91537.2	-114.8	-2881.7	126963.0	93041140.0	-84461.0
677.25	53775.8	-77.2	-2623.2	85093.0	56538210.0	-54358.0
677.26	85019.5	-97.5	-2853.0	107302.0	85088470.0	-77645.0
677.27	90015.4	-119.9	-3289.1	132606.0	93002930.0	-86109.0
677.28	42264.3	-64.9	-2148.6	71728.0	44901620.0	-43334.0
677.29	73508.0	-85.3	-2378.3	93937.0	73451890.0	-66621.0
677.30	78503.9	-107.7	-2814.4	119239.0	81366340.0	-75085.0
677.31	48034.0	-51.8	-2115.9	56440.0	47443470.0	-44635.0
677.32	50531.9	-63.0	-2334.0	69105.0	51400690.0	-48868.0
677.33	84273.6	-94.5	-2781.8	103961.0	83908190.0	-76386.0
677.34	86771.5	-105.8	-2999.8	116622.0	87865420.0	-80619.0
677.35	36522.5	-39.5	-1641.3	43077.0	35806890.0	-33611.0
677.36	39020.4	-50.8	-1859.3	55741.0	39764100.0	-37843.0
677.37	72762.1	-82.3	-2307.1	90599.0	72271620.0	-65362.0
677.38	75260.1	-93.5	-2525.2	103258.0	76228850.0	-69594.0
677.39	87517.4	-108.7	-3071.1	119960.0	89045690.0	-81877.0
677.40	76005.9	-96.5	-2596.4	106596.0	77409100.0	-70853.0
677.41	50346.1	-61.0	-2336.7	66795.0	51103290.0	-48537.0
677.42	52844.1	-72.2	-2554.7	79449.0	55060530.0	-52769.0
677.43	102100.0	-122.1	-3287.9	134677.0	103195700.0	-93896.0
677.44	104600.0	-133.3	-3505.9	147331.0	107153500.0	-98128.0
677.45	38834.7	-48.7	-1862.0	53432.0	39466730.0	-37513.0
677.46	41332.6	-59.9	-2080.1	66085.0	43423950.0	-41745.0
677.47	90605.5	-109.8	-2813.1	121315.0	91563460.0	-82871.0
677.48	93103.5	-121.0	-3031.2	133963.0	95520700.0	-87103.0
677.49	55342.1	-83.4	-2772.8	92095.0	59017770.0	-57001.0
677.50	86585.8	-103.7	-3002.5	114313.0	87568040.0	-80288.0
677.51	91581.7	-126.2	-3438.7	139607.0	95482500.0	-88752.0
677.52	43830.6	-71.1	-2298.1	78727.0	47381190.0	-45977.0

677.53	75074.3	-91.5	-2527.9	100950.0	75931460.0	-69264.0
677.54	80070.2	-113.9	-2964.0	126240.0	83845900.0	-77728.0
677.55	89083.7	-115.0	-3220.6	126965.0	91525250.0	-84520.0
677.56	77572.3	-102.7	-2745.9	113600.0	79888700.0	-73496.0
677.57	50644.5	-62.1	-2365.2	68131.0	51579410.0	-49040.0
677.58	53142.4	-73.4	-2583.2	80784.0	55536620.0	-53272.0
677.59	86884.1	-104.9	-3031.0	115648.0	88044130.0	-80791.0
677.60	89382.1	-116.1	-3249.1	128299.0	92001380.0	-85023.0
677.61	39133.0	-49.9	-1890.5	54767.0	39942830.0	-38016.0
677.62	41631.0	-61.1	-2108.5	67419.0	43900070.0	-42248.0
677.63	75372.6	-92.7	-2556.3	102285.0	76407550.0	-69767.0
677.64	77870.6	-103.9	-2774.4	114933.0	80364780.0	-73999.0
677.108	44576.8	103.4	5906.8	-83067.0	24801540.0	-26571.0
677.109	50606.9	74.8	5275.6	-51757.0	39059820.0	-34828.0
677.110	46625.7	-86.2	2240.2	125896.0	31544220.0	-42015.0
677.111	52655.3	-114.9	1621.9	157232.0	45792360.0	-50271.0
677.112	65537.3	-23.3	-5809.4	-3568.0	73388560.0	-59511.0
677.113	71567.6	-51.8	-6434.2	27764.0	87636900.0	-67768.0
677.114	67591.9	-208.7	-9447.0	203197.0	80112700.0	-74940.0
677.115	73621.7	-237.3	-10061.8	234533.0	94360900.0	-83196.0
677.116	44604.5	114.1	5608.9	-92582.0	25438610.0	-28879.0
677.117	50635.2	85.3	4978.0	-61090.0	39687040.0	-37136.0
677.118	46597.4	-97.4	2550.8	136096.0	30917000.0	-39711.0
677.119	52627.0	-126.0	1935.2	167365.0	45165150.0	-47968.0
677.120	65565.1	-12.5	-6109.7	-13132.0	74015660.0	-61819.0
677.121	71595.3	-41.0	-6734.3	18168.0	88273960.0	-70076.0
677.122	67561.5	-219.6	-9144.8	212893.0	79484940.0	-72635.0
677.123	73591.4	-248.2	-9763.1	244212.0	93733170.0	-80891.0
677.124	44687.3	101.7	6232.0	-65269.0	25039730.0	-26580.0
677.125	50717.6	73.1	5597.3	-33966.0	39288060.0	-34836.0
677.126	46736.9	-87.9	2537.0	143994.0	31782580.0	-42022.0
677.127	52767.1	-116.7	1920.3	175483.0	46030890.0	-50279.0
677.128	65435.6	-16.1	-6062.3	-24139.0	73122620.0	-59479.0
677.129	71465.7	-44.8	-6679.5	7239.0	87380900.0	-67737.0
677.130	67489.8	-201.3	-9684.3	182273.0	79846650.0	-74909.0
677.131	73519.7	-229.9	-10299.0	213616.0	94104870.0	-83165.0
677.132	44715.8	112.3	5927.4	-74615.0	25677000.0	-28887.0
677.133	50746.4	83.5	5300.1	-43172.0	39925410.0	-37143.0
677.134	46708.3	-98.8	2854.2	153839.0	31155290.0	-39718.0
677.135	52738.0	-127.4	2238.9	185096.0	45403460.0	-47974.0
677.136	65465.1	-5.7	-6356.6	-33265.0	73760140.0	-61787.0
677.137	71494.8	-34.2	-6984.0	-2049.0	88008330.0	-70044.0
677.138	67460.3	-212.3	-9393.7	192105.0	79219130.0	-72604.0
677.139	73489.9	-240.9	-10008.9	223371.0	93467270.0	-80860.0
677.140	49519.2	279.1	6207.9	-299019.0	33942350.0	-20083.0
677.141	55548.7	250.2	5577.0	-267554.0	48200480.0	-28342.0
677.142	56359.8	-348.5	-5950.5	395882.0	56407390.0	-71551.0
677.143	62390.0	-376.9	-6565.8	427060.0	70655690.0	-79805.0
677.144	55806.4	239.9	2684.0	-274411.0	48526210.0	-29972.0
677.145	61836.0	211.0	2053.1	-242943.0	62774360.0	-38230.0
677.146	62651.3	-384.1	-9455.5	418411.0	70972340.0	-81421.0
677.147	68681.4	-412.5	-10070.8	449591.0	85220620.0	-89676.0
677.148	49552.4	278.8	6301.8	-293803.0	34010820.0	-20084.0
677.149	55582.5	250.2	5669.3	-262499.0	48269100.0	-28341.0
677.150	56390.3	-350.9	-5873.1	402280.0	56485160.0	-71562.0
677.151	62420.4	-379.2	-6488.1	433429.0	70733440.0	-79817.0
677.152	55773.3	240.4	2595.4	-279712.0	48457770.0	-29971.0
677.153	61802.9	211.5	1963.7	-248207.0	62705920.0	-38229.0
677.154	62620.8	-381.9	-9533.3	412109.0	70884570.0	-81411.0
677.155	68650.9	-410.3	-10148.7	443325.0	85142840.0	-89666.0

677.156	49611.0	314.8	5222.0	-330840.0	36055760.0	-27775.0
677.157	55640.6	285.8	4590.0	-299322.0	50303920.0	-36034.0
677.158	56259.2	-385.3	-4927.7	428728.0	54311720.0	-63872.0
677.159	62289.3	-413.6	-5542.4	459871.0	68550000.0	-72126.0
677.160	55898.1	275.5	1703.0	-306181.0	50629610.0	-37665.0
677.161	61927.7	246.6	1071.1	-274663.0	64887760.0	-45923.0
677.162	62550.8	-420.9	-8438.8	451286.0	68866700.0	-73743.0
677.163	68580.9	-449.2	-9053.5	482423.0	83114980.0	-81997.0
677.164	49644.5	314.6	5310.7	-325730.0	36114310.0	-27775.0
677.165	55674.6	285.9	4677.4	-294366.0	50372590.0	-36033.0
677.166	56289.6	-387.5	-4845.0	435036.0	54389480.0	-63883.0
677.167	62319.8	-415.8	-5459.7	466212.0	68637780.0	-72138.0
677.168	55865.0	275.9	1616.6	-311359.0	50571160.0	-37664.0
677.169	61894.6	246.9	984.7	-279842.0	64819310.0	-45923.0
677.170	62520.3	-418.5	-8518.3	444858.0	68788930.0	-73731.0
677.171	68550.4	-446.9	-9133.6	476037.0	83037210.0	-81986.0
677.268	44874.9	91.6	2521.0	-91531.0	25187590.0	-28472.0
677.269	64975.8	-3.9	416.5	12982.0	72685330.0	-55994.0
677.270	46926.1	-97.9	-1154.6	117632.0	31930850.0	-43918.0
677.271	67025.6	-192.8	-3200.7	221768.0	79428230.0	-71435.0
677.272	51162.6	52.8	-1005.2	-67188.0	39761580.0	-38357.0
677.273	71262.2	-43.2	-3096.9	37587.0	87268980.0	-65884.0
677.274	53216.9	-133.9	-4658.3	140342.0	46495630.0	-53790.0
677.275	73316.1	-229.0	-6702.8	244621.0	93992940.0	-81310.0
677.276	44902.5	102.3	2224.1	-101145.0	25814630.0	-30779.0
677.277	65004.1	6.6	118.7	3659.0	73322540.0	-58302.0
677.278	46896.1	-108.8	-846.1	127368.0	31303190.0	-41613.0
677.279	66996.3	-203.9	-2890.0	231687.0	78800760.0	-69132.0
677.280	51190.1	63.4	-1298.8	-76685.0	40398590.0	-40665.0
677.281	71289.8	-32.3	-3396.3	27902.0	87906020.0	-68190.0
677.282	53186.7	-144.9	-4353.9	150180.0	45867930.0	-51486.0
677.283	73286.0	-239.8	-6403.2	254279.0	93365260.0	-79005.0
677.284	44908.0	91.1	2615.9	-86249.0	25256030.0	-28474.0
677.285	65009.0	-4.4	511.0	18304.0	72763790.0	-55996.0
677.286	46959.0	-98.5	-1071.3	123047.0	31999240.0	-43920.0
677.287	67057.7	-194.1	-3121.7	227571.0	79506420.0	-71441.0
677.288	51131.0	54.2	-1085.0	-72952.0	39693520.0	-38351.0
677.289	71231.6	-41.0	-3169.5	31409.0	87191180.0	-65874.0
677.290	53186.6	-131.5	-4734.3	133993.0	46417900.0	-53780.0
677.291	73285.5	-226.8	-6774.4	238357.0	93915130.0	-81300.0
677.292	44935.7	101.8	2316.9	-95766.0	25893100.0	-30781.0
677.293	65037.2	6.2	216.2	8893.0	73390980.0	-58303.0
677.294	46929.3	-109.5	-763.8	132906.0	31371670.0	-41615.0
677.295	67028.6	-204.9	-2806.5	237313.0	78868990.0	-69136.0
677.296	51158.7	65.0	-1377.9	-82508.0	40320580.0	-40659.0
677.297	71259.3	-30.2	-3471.6	21764.0	87828250.0	-68181.0
677.298	53156.4	-142.5	-4429.8	143795.0	45790200.0	-51476.0
677.299	73255.7	-237.8	-6480.3	248185.0	93287530.0	-78996.0
734.1	796.3	7.0	169.9	-4028.0	17053140.0	75206.0
734.2	-498.7	8.4	451.7	-4933.0	23132780.0	78048.0
734.3	6038.6	15.3	2332.3	-8871.0	33190450.0	149463.0
734.4	4743.5	16.7	2614.6	-9779.0	39270060.0	152305.0
734.5	613.7	5.5	147.2	-3183.0	13106560.0	57853.0
734.6	-681.3	6.9	429.0	-4087.0	19196200.0	60694.0
734.7	5856.0	13.8	2309.7	-8026.0	29253870.0	132110.0
734.8	4560.9	15.2	2592.1	-8931.0	35333480.0	134952.0
734.9	-1793.5	9.8	733.7	-5829.0	29212480.0	80889.0
734.10	4465.9	12.8	1683.4	-7421.0	28349250.0	127186.0
734.11	1876.1	15.6	2248.1	-9215.0	40518590.0	132869.0
734.12	-1976.0	8.3	711.1	-4979.0	25275920.0	63536.0

734.13	4283.3	11.3	1660.8	-6575.0	24412670.0	109833.0
734.14	1693.6	14.1	2225.6	-8366.0	36572040.0	115516.0
734.15	3170.9	14.2	1965.7	-8325.0	34428900.0	130028.0
734.16	2988.3	12.7	1943.1	-7478.0	30492320.0	112674.0
734.17	1376.7	6.4	85.2	-3671.0	14331200.0	73932.0
734.18	81.5	7.8	366.9	-4585.0	20410790.0	76774.0
734.19	6619.1	14.7	2247.4	-8516.0	30468530.0	148189.0
734.20	5323.7	16.2	2529.6	-9430.0	36548080.0	151031.0
734.21	1194.1	4.9	62.5	-2826.0	10384620.0	56579.0
734.22	-101.1	6.3	344.2	-3739.0	16474210.0	59421.0
734.23	6436.4	13.2	2224.8	-7672.0	26531920.0	130836.0
734.24	5141.1	14.7	2507.0	-8586.0	32611490.0	133678.0
734.25	-1213.3	9.2	648.9	-5482.0	26490490.0	79615.0
734.26	5046.3	12.2	1598.5	-7066.0	25627310.0	125912.0
734.27	2456.3	15.1	2163.1	-8870.0	37796600.0	131595.0
734.28	-1395.9	7.7	626.2	-4635.0	22553910.0	62262.0
734.29	4863.8	10.7	1575.9	-6220.0	21690750.0	108559.0
734.30	2273.7	13.5	2140.6	-8022.0	33850020.0	114242.0
734.31	1763.7	6.0	28.8	-3433.0	12509920.0	73083.0
734.32	468.4	7.5	310.4	-4351.0	18599490.0	75925.0
734.33	5433.4	11.9	1542.0	-6828.0	23816060.0	125063.0
734.34	4138.0	13.3	1824.1	-7742.0	29895600.0	127905.0
734.35	1581.1	4.5	6.1	-2590.0	8574338.0	55729.0
734.36	285.8	5.9	287.7	-3506.0	14662910.0	58571.0
734.37	5250.7	10.3	1519.3	-5985.0	19869450.0	107709.0
734.38	3955.4	11.8	1801.5	-6897.0	25959020.0	110551.0
734.39	3751.1	13.7	1880.7	-7977.0	31706910.0	128754.0
734.40	3568.4	12.2	1858.1	-7132.0	27770300.0	111401.0
734.41	564.2	7.2	203.7	-4170.0	18133930.0	75716.0
734.42	-730.8	8.6	485.6	-5072.0	24223570.0	78557.0
734.43	5806.4	15.6	2366.3	-9013.0	34281210.0	149973.0
734.44	4511.4	17.0	2648.6	-9917.0	40360860.0	152814.0
734.45	381.5	5.7	181.0	-3325.0	14197320.0	58362.0
734.46	-913.4	7.1	462.9	-4226.0	20276990.0	61204.0
734.47	5623.8	14.0	2343.6	-8170.0	30334630.0	132620.0
734.48	4328.8	15.4	2626.1	-9068.0	36424280.0	135461.0
734.49	-2025.5	10.0	767.7	-5966.0	30303290.0	81399.0
734.50	4233.8	13.1	1717.4	-7562.0	29440040.0	127696.0
734.51	1644.0	15.8	2282.1	-9353.0	41599380.0	133379.0
734.52	-2208.1	8.5	745.1	-5117.0	26366710.0	64045.0
734.53	4051.1	11.5	1694.7	-6717.0	25493440.0	110342.0
734.54	1461.5	14.3	2259.5	-8504.0	37662830.0	116025.0
734.55	2938.8	14.5	1999.7	-8463.0	35519690.0	130537.0
734.56	2756.2	12.9	1977.1	-7615.0	31583110.0	113184.0
734.57	409.4	7.4	226.3	-4264.0	18864440.0	76055.0
734.58	-885.5	8.8	508.2	-5165.0	24944110.0	78897.0
734.59	4079.0	13.2	1740.0	-7656.0	30160550.0	128035.0
734.60	2784.1	14.6	2022.3	-8555.0	36240220.0	130877.0
734.61	226.8	5.8	203.6	-3420.0	14927860.0	58702.0
734.62	-1068.1	7.2	485.5	-4318.0	21007530.0	61544.0
734.63	3896.4	11.7	1717.4	-6811.0	26223970.0	110682.0
734.64	2601.5	13.1	1999.8	-7707.0	32303640.0	113524.0
734.108	15212.5	-75.3	-4378.7	55617.0	-19159290.0	66894.0
734.109	10992.9	-68.7	-3691.1	52074.0	1310289.0	85504.0
734.110	13243.7	-0.6	599.9	-10221.0	-8911532.0	73558.0
734.111	9023.1	5.9	1298.5	-13693.0	11563790.0	92169.0
734.112	-3493.2	3.0	774.4	6985.0	27548880.0	82855.0
734.113	-7710.6	9.0	1462.3	3674.0	48013020.0	101465.0
734.114	-5382.1	68.1	5753.5	-55049.0	37777020.0	89455.0
734.115	-9597.5	74.1	6445.8	-58414.0	58251680.0	108062.0

734.116	15463.4	-48.7	-5185.3	30557.0	-19215290.0	66702.0
734.117	11244.3	-42.0	-4499.5	26940.0	1257421.0	85312.0
734.118	12976.7	-27.6	1434.2	14889.0	-8849644.0	73765.0
734.119	8756.7	-21.1	2135.3	11425.0	11624830.0	92376.0
734.120	-3240.7	29.6	-30.4	-18071.0	27493300.0	82663.0
734.121	-7456.6	35.7	652.0	-21447.0	47957820.0	101271.0
734.122	-5652.1	41.5	6563.4	-30032.0	37838150.0	89663.0
734.123	-9866.9	47.4	7253.9	-33375.0	58302960.0	108269.0
734.124	15387.0	-122.6	-4191.9	80835.0	-18974780.0	66648.0
734.125	11168.6	-116.0	-3506.8	77288.0	1496110.0	85257.0
734.126	13425.3	-48.0	751.7	14731.0	-8725206.0	73304.0
734.127	9205.4	-41.5	1452.6	11192.0	11746300.0	91915.0
734.128	-3517.5	35.6	628.3	-12427.0	27322680.0	82986.0
734.129	-7734.8	41.6	1319.6	-15814.0	47796850.0	101595.0
734.130	-5406.1	100.9	5622.0	-74427.0	37560900.0	89586.0
734.131	-9621.4	106.9	6312.8	-77802.0	58025580.0	108193.0
734.132	15643.8	-95.7	-5014.8	55592.0	-19029270.0	66450.0
734.133	11426.1	-89.1	-4322.9	51998.0	1438798.0	85059.0
734.134	13159.3	-75.1	1592.1	39925.0	-8663062.0	73511.0
734.135	8939.1	-68.6	2294.5	36453.0	11806360.0	92122.0
734.136	-3258.0	62.4	-179.7	-37729.0	27268880.0	82787.0
734.137	-7474.7	68.5	498.8	-41100.0	47743200.0	101395.0
734.138	-5674.9	74.3	6431.6	-49337.0	37612340.0	89793.0
734.139	-9891.0	80.2	7123.7	-52676.0	58086810.0	108401.0
734.140	10938.6	-131.4	-8289.3	114095.0	-14779560.0	64722.0
734.141	6712.2	-124.3	-7603.6	110344.0	5698282.0	83339.0
734.142	4480.8	105.7	8304.3	-100895.0	19383050.0	86857.0
734.143	270.2	111.3	8996.0	-104075.0	39848930.0	105459.0
734.144	5305.0	-105.3	-6744.6	98351.0	-758694.5	69529.0
734.145	1078.4	-98.1	-6058.9	94597.0	19715100.0	88146.0
734.146	-1077.2	123.6	9843.8	-113283.0	33375210.0	91600.0
734.147	-5287.8	129.2	10535.8	-116461.0	53851080.0	110203.0
734.148	10993.8	-145.7	-8238.7	121716.0	-14725480.0	64645.0
734.149	6773.9	-139.2	-7550.7	118192.0	5751022.0	83256.0
734.150	4486.1	96.0	8342.3	-95223.0	19444400.0	86820.0
734.151	276.0	101.6	9036.3	-98358.0	39920410.0	105423.0
734.152	5254.5	-91.3	-6784.7	90896.0	-813577.0	69604.0
734.153	1027.6	-84.1	-6102.6	87087.0	19662140.0	88221.0
734.154	-1084.3	133.5	9799.5	-119102.0	33313390.0	91638.0
734.155	-5296.4	139.2	10492.0	-122307.0	53778890.0	110242.0
734.156	11772.3	-42.6	-10960.4	30675.0	-14946890.0	64087.0
734.157	7545.3	-35.3	-10279.5	26846.0	5524806.0	82705.0
734.158	3562.9	17.0	11063.2	-17383.0	19588900.0	87569.0
734.159	-647.0	22.6	11758.1	-20503.0	40064950.0	106172.0
734.160	6137.6	-16.2	-9415.7	14820.0	-932298.3	68895.0
734.161	1910.6	-9.0	-8734.8	10991.0	19537390.0	87513.0
734.162	-1995.6	34.8	12596.6	-29763.0	33590920.0	92313.0
734.163	-6205.5	40.4	13291.5	-32882.0	54056980.0	110915.0
734.164	11830.7	-57.3	-10909.1	38475.0	-14891990.0	64008.0
734.165	7609.8	-50.6	-10226.1	34860.0	5576260.0	82619.0
734.166	3569.6	7.3	11111.2	-11613.0	19660600.0	87532.0
734.167	-640.1	12.8	11806.2	-14743.0	40126710.0	106134.0
734.168	6085.4	-1.9	-9463.7	7155.0	-987614.6	68971.0
734.169	1858.4	5.4	-8782.8	3326.0	19484080.0	87588.0
734.170	-2000.5	44.4	12559.3	-35363.0	33519670.0	92349.0
734.171	-6211.2	50.0	13251.1	-38545.0	53985520.0	110952.0
734.268	13553.6	-52.4	-3386.5	41568.0	-26692480.0	50794.0
734.269	-510.8	-30.5	-1093.4	29713.0	41549690.0	112828.0
734.270	11587.0	21.9	1587.8	-24240.0	-16434160.0	57458.0
734.271	-2460.9	41.7	3906.1	-35191.0	51792220.0	119478.0

734.272	7925.7	-27.0	-1833.7	26164.0	-12678150.0	55595.0
734.273	-6151.2	-4.9	458.5	14270.0	55570830.0	117643.0
734.274	6018.3	40.7	3135.2	-36967.0	-2435732.0	62210.0
734.275	-8032.4	60.3	5445.7	-47908.0	65800940.0	124235.0
734.276	13805.2	-26.0	-4184.2	16654.0	-26748290.0	50603.0
734.277	-259.6	-3.8	-1900.1	4588.0	41493780.0	112637.0
734.278	11316.6	-5.2	2419.1	1018.0	-16373140.0	57668.0
734.279	-2733.1	15.0	4741.1	-10110.0	51862790.0	119690.0
734.280	8175.0	-0.1	-2637.3	1044.0	-12724560.0	55405.0
734.281	-5896.8	21.8	-358.3	-10825.0	55515720.0	117448.0
734.282	5742.9	14.1	3962.3	-11870.0	-2372986.0	62424.0
734.283	-8303.0	33.6	6265.3	-22762.0	65861910.0	124444.0
734.284	13607.2	-66.6	-3336.4	49111.0	-26638800.0	50719.0
734.285	-457.1	-44.6	-1041.7	37269.0	41603390.0	112753.0
734.286	11638.0	7.8	1634.5	-16820.0	-16381150.0	57384.0
734.287	-2428.8	29.4	3954.0	-28428.0	51860410.0	119420.0
734.288	7899.8	-15.2	-1881.7	19535.0	-12734760.0	55649.0
734.289	-6158.3	5.0	411.7	8372.0	55499020.0	117681.0
734.290	6014.3	50.4	3097.2	-42671.0	-2503752.0	62247.0
734.291	-8040.0	70.2	5408.2	-53727.0	65728990.0	124274.0
734.292	13857.7	-40.0	-4142.8	24064.0	-26684900.0	50528.0
734.293	-204.8	-18.0	-1844.9	12175.0	41547760.0	112561.0
734.294	11368.2	-19.1	2464.4	8361.0	-16319970.0	57593.0
734.295	-2695.2	2.3	4789.5	-3174.0	51922450.0	119627.0
734.296	8151.9	11.3	-2685.5	-5478.0	-12790450.0	55457.0
734.297	-5903.3	31.6	-406.2	-16701.0	55444070.0	117486.0
734.298	5740.2	23.7	3922.0	-17577.0	-2441675.0	62459.0
734.299	-8310.3	43.6	6222.6	-28660.0	65790040.0	124483.0
1201.1	27092.6	48.7	865.5	-44378.0	10413320.0	-1916.0
1201.2	26873.7	58.0	621.1	-52200.0	9722481.0	-1690.0
1201.3	57235.8	97.5	1083.6	-86797.0	26610850.0	-4299.0
1201.4	57016.8	106.8	839.3	-94619.0	25914990.0	-4074.0
1201.5	20843.2	38.7	564.7	-35108.0	8000101.0	-1479.0
1201.6	20624.3	48.0	320.4	-42930.0	7309259.0	-1254.0
1201.7	50986.4	87.5	782.9	-77526.0	24196630.0	-3863.0
1201.8	50767.4	96.9	538.5	-85351.0	23500760.0	-3637.0
1201.9	26654.7	67.3	376.7	-60023.0	9032614.0	-1465.0
1201.10	48192.8	82.8	1018.2	-74070.0	21749980.0	-3584.0
1201.11	47754.9	101.5	529.4	-89719.0	20368280.0	-3133.0
1201.12	20405.4	57.4	75.9	-50755.0	6618418.0	-1028.0
1201.13	41943.5	72.9	717.4	-64801.0	19336790.0	-3148.0
1201.14	41505.6	91.6	228.6	-80451.0	17955080.0	-2697.0
1201.15	47973.9	92.2	773.9	-81894.0	21059140.0	-3359.0
1201.16	41724.5	82.2	473.1	-72624.0	18645920.0	-2922.0
1201.17	27190.2	45.0	950.7	-41254.0	10721220.0	-2007.0
1201.18	26971.2	54.3	706.4	-49075.0	10031350.0	-1782.0
1201.19	57333.4	93.8	1168.9	-83671.0	26915750.0	-4391.0
1201.20	57114.4	103.1	924.6	-91495.0	26229880.0	-4166.0
1201.21	20940.8	35.0	650.0	-31984.0	8307999.0	-1571.0
1201.22	20721.8	44.4	405.7	-39805.0	7617131.0	-1345.0
1201.23	51084.0	83.9	868.2	-74401.0	24501530.0	-3955.0
1201.24	50865.0	93.2	623.9	-82224.0	23815660.0	-3729.0
1201.25	26752.3	63.7	462.0	-56898.0	9340512.0	-1557.0
1201.26	48290.4	79.2	1103.5	-70944.0	22057880.0	-3676.0
1201.27	47852.5	97.8	614.7	-86593.0	20677170.0	-3225.0
1201.28	20502.9	53.7	161.3	-47628.0	6927290.0	-1120.0
1201.29	42041.1	69.2	802.7	-61675.0	19644680.0	-3240.0
1201.30	41603.1	87.9	313.9	-77324.0	18262950.0	-2789.0
1201.31	27255.3	42.5	1007.6	-39170.0	10926830.0	-2069.0
1201.32	27036.3	51.9	763.3	-46992.0	10235960.0	-1843.0

1201.33	48355.5	76.7	1160.3	-68861.0	22263490.0	-3737.0
1201.34	48136.5	86.0	916.0	-76684.0	21572620.0	-3512.0
1201.35	21005.9	32.6	706.9	-29900.0	8513605.0	-1632.0
1201.36	20786.9	41.9	462.5	-37722.0	7822739.0	-1407.0
1201.37	42106.1	66.8	859.6	-59591.0	19850270.0	-3301.0
1201.38	41887.1	76.1	615.2	-67415.0	19159400.0	-3075.0
1201.39	48071.4	88.5	859.2	-78768.0	21367010.0	-3451.0
1201.40	41822.0	78.5	558.4	-69499.0	18953790.0	-3014.0
1201.41	27053.6	50.1	831.4	-45628.0	10290370.0	-1879.0
1201.42	26834.6	59.5	587.0	-53450.0	9599506.0	-1653.0
1201.43	57196.7	99.0	1049.5	-88047.0	26480880.0	-4263.0
1201.44	56977.8	108.3	805.2	-95870.0	25795040.0	-4037.0
1201.45	20804.2	40.2	530.6	-36358.0	7877152.0	-1442.0
1201.46	20585.3	49.5	286.3	-44180.0	7186310.0	-1217.0
1201.47	50947.4	89.0	748.9	-78776.0	24076680.0	-3826.0
1201.48	50728.4	98.3	504.4	-86602.0	23380810.0	-3601.0
1201.49	26615.7	68.8	342.6	-61274.0	8908666.0	-1428.0
1201.50	48153.8	84.3	984.1	-75320.0	21626030.0	-3548.0
1201.51	47715.9	103.0	495.2	-90970.0	20245320.0	-3097.0
1201.52	20366.4	58.9	41.8	-52006.0	6495469.0	-991.0
1201.53	41904.4	74.4	683.3	-66051.0	19212810.0	-3111.0
1201.54	41466.6	93.0	194.5	-81701.0	17832130.0	-2660.0
1201.55	47934.8	93.6	739.7	-83144.0	20936170.0	-3322.0
1201.56	41685.5	83.7	439.0	-73875.0	18522970.0	-2885.0
1201.57	27027.5	51.1	808.7	-46461.0	10207720.0	-1854.0
1201.58	26808.6	60.5	564.3	-54283.0	9516874.0	-1629.0
1201.59	48127.8	85.3	961.4	-76153.0	21544400.0	-3523.0
1201.60	47908.8	94.6	717.0	-83978.0	20853530.0	-3298.0
1201.61	20778.2	41.2	507.9	-37191.0	7794519.0	-1418.0
1201.62	20559.2	50.5	263.5	-45014.0	7103652.0	-1192.0
1201.63	41878.4	75.3	660.6	-66885.0	19131180.0	-3086.0
1201.64	41659.4	84.7	416.2	-74709.0	18440310.0	-2861.0
1201.108	33664.7	18.6	1377.9	-19815.0	-6952135.0	-574.0
1201.109	37726.8	42.0	2374.5	-39042.0	7768106.0	-5473.0
1201.110	34577.5	213.0	-7984.4	-174617.0	-9859280.0	6756.0
1201.111	38639.4	236.4	-6979.0	-193887.0	4857911.0	1858.0
1201.112	27181.5	-120.4	8475.5	90406.0	24094000.0	-6739.0
1201.113	31244.3	-96.9	9471.7	71129.0	38810420.0	-11639.0
1201.114	28109.8	75.0	-901.6	-64737.0	21170810.0	574.0
1201.115	32172.7	98.3	109.5	-83906.0	35887260.0	-4326.0
1201.116	33645.9	12.6	929.8	-12408.0	-6876931.0	-2811.0
1201.117	37708.1	36.0	1925.2	-31659.0	7846337.0	-7710.0
1201.118	34594.1	218.9	-7522.5	-181953.0	-9935045.0	8995.0
1201.119	38656.1	242.3	-6514.3	-201230.0	4780172.0	4097.0
1201.120	27163.1	-126.4	8027.6	97823.0	24169310.0	-8977.0
1201.121	31226.0	-103.1	9027.9	78647.0	38885750.0	-13876.0
1201.122	28125.3	80.5	-435.4	-71753.0	21094760.0	2814.0
1201.123	32188.2	103.9	570.2	-90967.0	35811210.0	-2085.0
1201.124	33688.2	-5.9	1731.8	4474.0	-6786140.0	-6941.0
1201.125	37750.4	17.4	2725.0	-14756.0	7936128.0	-11840.0
1201.126	34601.8	188.2	-7639.8	-150056.0	-9693081.0	389.0
1201.127	38663.9	211.7	-6633.9	-169355.0	5025161.0	-4510.0
1201.128	27189.2	-94.3	8118.0	65523.0	23895960.0	-405.0
1201.129	31251.8	-71.0	9127.8	46378.0	38622340.0	-5305.0
1201.130	28117.6	100.9	-1241.3	-89522.0	20982800.0	6908.0
1201.131	32180.5	124.3	-230.2	-108687.0	35699250.0	2009.0
1201.132	33670.0	-12.1	1281.7	12014.0	-6700783.0	-9178.0
1201.133	37732.5	11.3	2281.3	-7250.0	8014561.0	-14077.0
1201.134	34618.6	194.1	-7169.8	-157392.0	-9768795.0	2628.0
1201.135	38680.6	217.6	-6161.1	-176675.0	4947421.0	-2271.0

1201.136	27171.7	-100.4	7678.3	73010.0	23981500.0	-2643.0
1201.137	31234.5	-77.1	8678.7	53895.0	38697920.0	-7542.0
1201.138	28133.2	106.8	-798.4	-96817.0	20906780.0	9148.0
1201.139	32196.0	130.2	212.4	-115981.0	35623200.0	4248.0
1201.140	30326.2	-257.4	14916.3	199476.0	7311375.0	-11279.0
1201.141	34387.1	-234.1	15914.7	180284.0	22032150.0	-16176.0
1201.142	33390.2	392.2	-16305.9	-317229.0	-2402160.0	13133.0
1201.143	37453.9	415.6	-15299.7	-336454.0	12315490.0	8233.0
1201.144	28377.0	-299.4	17052.7	232647.0	16626970.0	-13123.0
1201.145	32437.9	-276.1	18051.1	213455.0	31344910.0	-18021.0
1201.146	31455.3	350.9	-14186.1	-284215.0	6902247.0	11273.0
1201.147	35519.0	374.3	-13180.1	-303447.0	21620900.0	6373.0
1201.148	30333.6	-264.8	15020.5	206812.0	7361733.0	-13189.0
1201.149	34395.6	-241.4	16016.4	187596.0	22084320.0	-18088.0
1201.150	33387.8	384.3	-16196.4	-309769.0	-2342772.0	11233.0
1201.151	37451.6	407.8	-15190.7	-329009.0	12371900.0	6333.0
1201.152	28370.8	-291.9	16950.8	225263.0	16576390.0	-11214.0
1201.153	32431.6	-268.6	17949.6	206092.0	31293300.0	-16112.0
1201.154	31457.3	358.7	-14293.7	-291636.0	6845757.0	13174.0
1201.155	35520.7	382.1	-13288.4	-310884.0	21561330.0	8273.0
1201.156	30263.4	-277.4	13425.0	224107.0	7575516.0	-18735.0
1201.157	34324.2	-254.1	14424.1	204943.0	22296100.0	-23632.0
1201.158	33440.1	411.5	-14760.4	-341342.0	-2659431.0	20602.0
1201.159	37504.0	434.9	-13754.9	-360588.0	12061270.0	15702.0
1201.160	28314.0	-319.4	15566.3	257286.0	16891900.0	-20579.0
1201.161	32374.8	-296.1	16565.4	238122.0	31608810.0	-25477.0
1201.162	31505.0	370.2	-12645.5	-308309.0	6648926.0	18742.0
1201.163	35568.9	393.7	-11640.0	-327554.0	21363630.0	13842.0
1201.164	30271.3	-284.7	13523.8	231427.0	7625578.0	-20646.0
1201.165	34333.1	-261.4	14520.6	212241.0	22348370.0	-25544.0
1201.166	33438.1	403.7	-14648.5	-333930.0	-2599941.0	18702.0
1201.167	37502.0	427.2	-13643.1	-353180.0	12117760.0	13801.0
1201.168	28307.5	-312.0	15469.4	249954.0	16840240.0	-18670.0
1201.169	32368.2	-288.7	16468.5	230790.0	31557130.0	-23567.0
1201.170	31507.4	378.0	-12758.0	-315782.0	6591538.0	20642.0
1201.171	35571.2	401.5	-11751.8	-335008.0	21314210.0	15742.0
1201.268	26649.3	-57.8	2699.1	41373.0	-13251760.0	2991.0
1201.269	40189.7	20.1	6023.7	-22646.0	35812390.0	-13339.0
1201.270	27562.7	136.8	-6672.9	-113544.0	-16168760.0	10320.0
1201.271	41106.1	214.9	-3313.7	-177656.0	32896170.0	-6012.0
1201.272	24701.0	-99.6	4829.7	74477.0	-3938775.0	1145.0
1201.273	38239.7	-21.7	8159.1	10398.0	45124950.0	-15183.0
1201.274	25625.8	95.5	-4551.3	-80573.0	-6852859.0	8462.0
1201.275	39169.1	173.6	-1190.7	-144666.0	42212040.0	-7870.0
1201.276	26630.8	-63.7	2249.3	48737.0	-13176480.0	753.0
1201.277	40171.0	14.2	5572.5	-15322.0	35887620.0	-15576.0
1201.278	27578.6	142.7	-6209.7	-120798.0	-16244700.0	12560.0
1201.279	41121.7	220.8	-2850.6	-184992.0	32820150.0	-3772.0
1201.280	24682.0	-105.6	4385.3	81884.0	-3863622.0	-1092.0
1201.281	38221.5	-27.8	7712.6	17888.0	45210300.0	-17420.0
1201.282	25640.7	101.3	-4090.3	-87807.0	-6929057.0	10703.0
1201.283	39184.7	179.3	-733.4	-151868.0	42126020.0	-5630.0
1201.284	26656.4	-65.2	2804.8	48717.0	-13199950.0	1080.0
1201.285	40196.9	12.7	6127.3	-15347.0	35864230.0	-15249.0
1201.286	27569.2	129.3	-6571.0	-106139.0	-16117100.0	8411.0
1201.287	41109.1	207.4	-3214.7	-170344.0	32956930.0	-7918.0
1201.288	24699.5	-92.0	4728.3	67105.0	-3989158.0	3049.0
1201.289	38241.9	-14.0	8058.8	3027.0	45075510.0	-13283.0
1201.290	25628.6	103.4	-4659.7	-88067.0	-6912144.0	10362.0
1201.291	39171.4	181.3	-1292.2	-152095.0	42152620.0	-5970.0

1201.292	26637.6	-71.2	2355.8	56129.0	-13124750.0	-1156.0
1201.293	40178.3	6.8	5680.3	-7997.0	35939480.0	-17486.0
1201.294	27585.2	135.2	-6107.9	-113392.0	-16193020.0	10651.0
1201.295	41125.7	213.2	-2746.0	-177626.0	32871170.0	-5679.0
1201.296	24681.1	-98.0	4283.5	74510.0	-3913851.0	812.0
1201.297	38223.9	-20.0	7607.5	10481.0	45150920.0	-15520.0
1201.298	25643.7	109.1	-4196.8	-95253.0	-6988292.0	12602.0
1201.299	39186.9	187.1	-841.5	-159320.0	42076580.0	-3730.0
1215.1	9531.4	38.3	-2484.9	-6889.0	9269460.0	-7958.0
1215.2	10388.1	41.6	-3021.2	-6691.0	8401005.0	-8116.0
1215.3	18321.1	73.2	-3628.9	-15488.0	22053710.0	-16599.0
1215.4	19177.9	76.5	-4165.1	-15288.0	21182280.0	-16757.0
1215.5	7336.1	29.2	-2025.9	-4871.0	7126439.0	-6130.0
1215.6	8192.8	32.5	-2562.1	-4674.0	6257983.0	-6288.0
1215.7	16125.8	64.1	-3169.8	-13471.0	19903690.0	-14772.0
1215.8	16982.5	67.4	-3706.0	-13270.0	19042240.0	-14930.0
1215.9	11244.8	44.9	-3557.5	-6499.0	7533549.0	-8274.0
1215.10	15684.2	62.7	-3285.7	-12908.0	18211040.0	-14007.0
1215.11	17397.6	69.4	-4358.2	-12518.0	16478130.0	-14323.0
1215.12	9049.4	35.8	-3098.5	-4483.0	5389502.0	-6447.0
1215.13	13488.9	53.6	-2826.7	-10890.0	16071020.0	-12179.0
1215.14	15202.2	60.3	-3899.2	-10502.0	14338080.0	-12495.0
1215.15	16541.0	66.0	-3821.9	-12710.0	17349610.0	-14165.0
1215.16	14345.6	56.9	-3362.9	-10692.0	15199560.0	-12337.0
1215.17	9149.3	36.7	-2260.1	-6883.0	9656987.0	-7882.0
1215.18	10006.0	40.1	-2796.3	-6681.0	8788530.0	-8040.0
1215.19	17939.0	71.7	-3404.1	-15483.0	22436240.0	-16523.0
1215.20	18795.8	75.0	-3940.3	-15278.0	21564810.0	-16681.0
1215.21	6953.9	27.6	-1801.0	-4865.0	7512940.0	-6055.0
1215.22	7810.7	30.9	-2337.3	-4664.0	6645510.0	-6213.0
1215.23	15743.6	62.5	-2944.9	-13464.0	20296190.0	-14696.0
1215.24	16600.4	65.9	-3481.2	-13259.0	19424760.0	-14854.0
1215.25	10862.7	43.4	-3332.6	-6488.0	7920075.0	-8198.0
1215.26	15302.1	61.2	-3060.8	-12902.0	18603570.0	-13931.0
1215.27	17015.5	67.8	-4133.4	-12507.0	16870650.0	-14247.0
1215.28	8667.3	34.3	-2873.6	-4471.0	5777028.0	-6371.0
1215.29	13106.7	52.1	-2601.8	-10885.0	16463520.0	-12103.0
1215.30	14820.1	58.7	-3674.3	-10490.0	14720610.0	-12420.0
1215.31	8894.5	35.7	-2110.1	-6880.0	9914987.0	-7832.0
1215.32	9751.3	39.0	-2646.4	-6675.0	9046557.0	-7990.0
1215.33	15047.3	60.2	-2911.0	-12900.0	18858570.0	-13880.0
1215.34	15904.1	63.5	-3447.2	-12695.0	17997140.0	-14038.0
1215.35	6699.2	26.6	-1651.1	-4862.0	7771966.0	-6004.0
1215.36	7555.9	29.9	-2187.4	-4657.0	6903510.0	-6162.0
1215.37	12852.0	51.0	-2451.9	-10880.0	16718550.0	-12053.0
1215.38	13708.7	54.4	-2988.2	-10676.0	15847090.0	-12211.0
1215.39	16158.8	64.5	-3597.1	-12700.0	17732110.0	-14089.0
1215.40	13963.5	55.4	-3138.1	-10681.0	15592090.0	-12261.0
1215.41	9684.3	38.9	-2574.9	-6891.0	9114465.0	-7988.0
1215.42	10541.0	42.2	-3111.1	-6696.0	8246010.0	-8146.0
1215.43	18474.0	73.8	-3718.8	-15490.0	21892720.0	-16629.0
1215.44	19330.7	77.1	-4255.0	-15292.0	21031260.0	-16787.0
1215.45	7488.9	29.8	-2115.8	-4873.0	6971419.0	-6161.0
1215.46	8345.6	33.1	-2652.1	-4678.0	6102963.0	-6319.0
1215.47	16278.6	64.7	-3259.7	-13472.0	19752670.0	-14802.0
1215.48	17135.3	68.0	-3796.0	-13275.0	18881220.0	-14960.0
1215.49	11397.7	45.5	-3647.5	-6504.0	7378553.0	-8304.0
1215.50	15837.1	63.3	-3375.6	-12911.0	18060040.0	-14037.0
1215.51	17550.5	70.0	-4448.2	-12523.0	16327130.0	-14353.0
1215.52	9202.3	36.4	-3188.4	-4488.0	5235507.0	-6477.0

1215.53	13641.7	54.2	-2916.6	-10892.0	15920000.0	-12209.0
1215.54	15355.1	60.9	-3989.1	-10507.0	14177090.0	-12526.0
1215.55	16693.8	66.7	-3911.9	-12714.0	17188590.0	-14195.0
1215.56	14498.4	57.5	-3452.8	-10697.0	15048540.0	-12368.0
1215.57	9786.2	39.3	-2634.8	-6893.0	9011459.0	-8008.0
1215.58	10642.9	42.6	-3171.1	-6698.0	8143004.0	-8166.0
1215.59	15939.0	63.8	-3435.6	-12913.0	17956040.0	-14057.0
1215.60	16795.7	67.1	-3971.9	-12717.0	17084580.0	-14215.0
1215.61	7590.8	30.2	-2175.8	-4875.0	6868414.0	-6181.0
1215.62	8447.5	33.5	-2712.1	-4681.0	5999958.0	-6339.0
1215.63	13743.6	54.6	-2976.5	-10894.0	15815990.0	-12230.0
1215.64	14600.3	58.0	-3512.8	-10700.0	14944540.0	-12388.0
1215.108	4275.7	-21.3	-1916.2	26885.0	18610730.0	-14227.0
1215.109	-172.9	-14.9	-3915.8	23393.0	23065890.0	-19825.0
1215.110	5876.7	-34.5	-21080.8	66337.0	17039150.0	-9744.0
1215.111	1428.2	-28.0	-23072.4	62778.0	21494330.0	-15342.0
1215.112	20252.5	117.3	18308.0	-82277.0	3010413.0	-3854.0
1215.113	15803.3	123.9	16307.5	-85913.0	7465422.0	-9453.0
1215.114	21840.1	106.7	-870.1	-45197.0	1445410.0	605.0
1215.115	17390.8	113.4	-2855.9	-48889.0	5900393.0	-4994.0
1215.116	4168.8	-20.4	-3691.9	33682.0	18723460.0	-15542.0
1215.117	-279.8	-14.0	-5694.5	30199.0	23168620.0	-21139.0
1215.118	5985.5	-35.1	-19291.9	59332.0	16926900.0	-8428.0
1215.119	1536.9	-28.6	-21280.8	55769.0	21382060.0	-14025.0
1215.120	20145.4	118.2	16532.5	-75496.0	3115092.0	-5169.0
1215.121	15696.1	124.7	14537.3	-79116.0	7570075.0	-10768.0
1215.122	21949.5	105.8	931.8	-52056.0	1338317.0	1924.0
1215.123	17500.2	112.4	-1059.5	-55730.0	5793301.0	-3674.0
1215.124	4351.0	-27.1	-2129.0	24276.0	18539940.0	-14232.0
1215.125	-97.7	-20.7	-4131.6	20803.0	22995080.0	-19830.0
1215.126	5951.6	-40.4	-21305.6	63688.0	16968250.0	-9750.0
1215.127	1503.1	-33.9	-23298.4	60136.0	21413440.0	-15347.0
1215.128	20151.6	127.3	18519.6	-83382.0	3108673.0	-3896.0
1215.129	15702.6	133.9	16533.1	-87059.0	7563734.0	-9494.0
1215.130	21739.1	116.7	-635.3	-46276.0	1543644.0	563.0
1215.131	17289.9	123.3	-2621.3	-49966.0	5998654.0	-5035.0
1215.132	4243.8	-26.4	-3906.0	31132.0	18642590.0	-15547.0
1215.133	-205.0	-19.9	-5904.9	27625.0	23097700.0	-21145.0
1215.134	6060.1	-41.0	-19507.4	56672.0	16855930.0	-8433.0
1215.135	1611.5	-34.5	-21496.0	53115.0	21311090.0	-14031.0
1215.136	20043.9	128.2	16748.4	-76612.0	3213199.0	-5212.0
1215.137	15594.7	134.7	14754.8	-80223.0	7668208.0	-10810.0
1215.138	21848.5	115.8	1140.1	-53075.0	1436553.0	1882.0
1215.139	17399.3	122.4	-845.2	-56765.0	5891562.0	-3716.0
1215.140	8003.1	42.0	27644.8	-56817.0	14991590.0	-15819.0
1215.141	3555.5	48.3	25647.3	-60174.0	19447010.0	-21415.0
1215.142	13322.4	1.4	-36265.5	71664.0	9746545.0	-908.0
1215.143	8872.4	8.2	-38255.6	67897.0	14203350.0	-6508.0
1215.144	12800.0	82.9	33714.8	-88952.0	10307280.0	-12700.0
1215.145	8352.4	89.2	31717.3	-92306.0	14760700.0	-18296.0
1215.146	18106.7	44.5	-30202.7	37547.0	5073915.0	2189.0
1215.147	13656.8	51.2	-32193.1	33780.0	9529850.0	-3411.0
1215.148	8025.4	40.3	27580.7	-57620.0	14967280.0	-15821.0
1215.149	3576.8	46.7	25581.1	-61116.0	19422440.0	-21419.0
1215.150	13352.9	-1.6	-36330.9	72001.0	9716325.0	-896.0
1215.151	8902.8	5.2	-38321.1	68221.0	14171110.0	-6496.0
1215.152	12776.8	84.8	33781.5	-88244.0	10329360.0	-12700.0
1215.153	8329.4	91.0	31783.9	-91585.0	14784830.0	-18296.0
1215.154	18076.6	47.4	-30136.6	37259.0	5103236.0	2177.0
1215.155	13626.8	54.1	-32127.9	33515.0	9558197.0	-3423.0

1215.156	7647.0	45.0	21731.2	-34142.0	15340750.0	-20201.0
1215.157	3199.6	51.2	19733.5	-37479.0	19796220.0	-25796.0
1215.158	13688.6	-1.2	-30282.3	48750.0	9388962.0	3489.0
1215.159	9238.5	5.5	-32272.5	44966.0	13846740.0	-2111.0
1215.160	12444.1	85.8	27804.8	-66240.0	10653490.0	-17082.0
1215.161	7996.7	92.0	25807.1	-69576.0	15109960.0	-22677.0
1215.162	18473.1	41.8	-24223.8	14636.0	4716590.0	6586.0
1215.163	14023.0	48.6	-26214.0	10852.0	9172267.0	986.0
1215.164	7668.8	43.3	21662.9	-35026.0	15316310.0	-20204.0
1215.165	3220.4	49.7	19663.4	-38496.0	19771520.0	-25801.0
1215.166	13718.8	-4.2	-30344.7	49056.0	9359666.0	3501.0
1215.167	9268.6	2.6	-32335.4	45271.0	13814420.0	-2099.0
1215.168	12421.4	87.6	27874.0	-65472.0	10674700.0	-17080.0
1215.169	7973.9	93.8	25876.3	-68809.0	15124140.0	-22676.0
1215.170	18442.5	44.9	-24160.4	14280.0	4746412.0	6573.0
1215.171	13992.5	51.6	-26150.4	10516.0	9201487.0	973.0
1215.268	15063.2	18.8	7497.7	-6431.0	7950622.0	-4056.0
1215.269	234.5	40.2	835.9	-18090.0	22799820.0	-22715.0
1215.270	16664.0	5.7	-11683.2	32906.0	6371987.0	426.0
1215.271	1832.5	27.8	-18311.2	20612.0	21217470.0	-18237.0
1215.272	19859.2	59.8	13564.3	-38710.0	3267082.0	-939.0
1215.273	5031.9	81.2	6904.8	-50342.0	18113640.0	-19596.0
1215.274	21450.0	48.5	-5619.1	-965.0	1697895.0	3526.0
1215.275	6618.7	70.7	-12247.7	-13315.0	16548430.0	-15137.0
1215.276	14956.1	19.7	5722.3	332.0	8055301.0	-5371.0
1215.277	127.7	41.1	-946.1	-11284.0	22902580.0	-24029.0
1215.278	16773.0	5.1	-9887.9	25915.0	6265793.0	1744.0
1215.279	1942.0	27.1	-16518.8	13719.0	21115400.0	-16918.0
1215.280	19752.5	60.7	11792.1	-31879.0	3370863.0	-2253.0
1215.281	4924.6	82.0	5131.9	-43522.0	18216270.0	-20910.0
1215.282	21559.8	47.7	-3825.9	-7845.0	1590905.0	4845.0
1215.283	6728.1	69.9	-10456.5	-20189.0	16436340.0	-13818.0
1215.284	15085.8	17.0	7434.7	-7193.0	7929388.0	-4057.0
1215.285	257.0	38.4	769.9	-18856.0	22775560.0	-22716.0
1215.286	16687.0	3.9	-11750.6	32179.0	6349854.0	426.0
1215.287	1858.6	25.5	-18384.9	20322.0	21194130.0	-18232.0
1215.288	19832.1	62.3	13632.3	-38564.0	3293169.0	-945.0
1215.289	5001.7	84.2	6975.8	-50671.0	18145930.0	-19607.0
1215.290	21419.3	51.6	-5555.1	-1325.0	1728063.0	3513.0
1215.291	6588.5	73.7	-12176.6	-13636.0	16580730.0	-15149.0
1215.292	14979.0	17.9	5658.5	-397.0	8033143.0	-5371.0
1215.293	150.0	39.3	-1007.1	-12068.0	22878270.0	-24031.0
1215.294	16796.0	3.2	-9956.8	25198.0	6243660.0	1743.0
1215.295	1967.1	24.9	-16585.8	13297.0	21091810.0	-16915.0
1215.296	19725.0	63.2	11860.0	-31799.0	3397848.0	-2260.0
1215.297	4894.3	85.0	5197.9	-43843.0	18248540.0	-20923.0
1215.298	21529.0	50.8	-3759.2	-8216.0	1621048.0	4832.0
1215.299	6698.0	72.8	-10392.9	-20464.0	16468660.0	-13830.0
1226.1	-7148.7	-85.4	-3993.8	71536.0	85846370.0	30510.0
1226.2	-8127.2	-97.7	-4316.0	82609.0	94036750.0	31867.0
1226.3	-10872.0	-170.3	-6037.6	144287.0	170026500.0	58216.0
1226.4	-11850.6	-182.7	-6359.8	155356.0	178276900.0	59572.0
1226.5	-5501.2	-66.6	-3106.8	56013.0	66036640.0	23476.0
1226.6	-6479.7	-79.0	-3429.0	67087.0	74227030.0	24832.0
1226.7	-9224.6	-151.6	-5150.5	128765.0	150246800.0	51181.0
1226.8	-10203.1	-163.9	-5472.8	139831.0	158397200.0	52537.0
1226.9	-9105.4	-110.1	-4638.1	93685.0	102177200.0	33223.0
1226.10	-9755.1	-144.8	-5424.4	122464.0	144811500.0	49904.0
1226.11	-11711.7	-169.6	-6068.9	144607.0	161212400.0	52616.0
1226.12	-7457.9	-91.4	-3751.2	78164.0	82417490.0	26188.0

1226.13	-8107.6	-126.1	-4537.4	106940.0	124931800.0	42869.0
1226.14	-10064.2	-150.9	-5182.0	129084.0	141332600.0	45582.0
1226.15	-10733.5	-157.2	-5746.6	133534.0	152961900.0	51260.0
1226.16	-9086.0	-138.5	-4859.7	118010.0	133182200.0	44226.0
1226.17	-6707.6	-80.3	-3832.1	67022.0	82178900.0	29890.0
1226.18	-7686.3	-92.6	-4154.2	78092.0	90369220.0	31246.0
1226.19	-10430.9	-165.2	-5875.8	139777.0	166339100.0	57595.0
1226.20	-11409.6	-177.5	-6198.0	150840.0	174589400.0	58952.0
1226.21	-5060.1	-61.5	-2945.1	51500.0	62369170.0	22855.0
1226.22	-6038.8	-73.9	-3267.2	62570.0	70559500.0	24212.0
1226.23	-8783.5	-146.5	-4988.8	124252.0	146559300.0	50561.0
1226.24	-9762.2	-158.8	-5311.0	135316.0	154809700.0	51917.0
1226.25	-8664.6	-105.0	-4476.4	89168.0	98589660.0	32602.0
1226.26	-9314.0	-139.7	-5262.6	117952.0	141124000.0	49284.0
1226.27	-11270.9	-164.5	-5907.1	140092.0	157524800.0	51996.0
1226.28	-7017.0	-86.3	-3589.4	73646.0	78749960.0	25568.0
1226.29	-7666.5	-121.0	-4375.7	102429.0	121344300.0	42249.0
1226.30	-9623.3	-145.8	-5020.2	124567.0	137645100.0	44961.0
1226.31	-6413.5	-76.9	-3724.3	64014.0	79733920.0	29476.0
1226.32	-7392.3	-89.2	-4046.4	75082.0	87924220.0	30833.0
1226.33	-9019.9	-136.3	-5154.8	114945.0	138699000.0	48870.0
1226.34	-9998.6	-148.7	-5477.0	126009.0	146849400.0	50226.0
1226.35	-4766.1	-58.2	-2837.3	48492.0	59924170.0	22442.0
1226.36	-5744.8	-70.5	-3159.4	59559.0	68114500.0	23798.0
1226.37	-7372.5	-117.6	-4267.8	99420.0	118819300.0	41835.0
1226.38	-8351.2	-130.0	-4590.0	110484.0	127069600.0	43192.0
1226.39	-10292.6	-152.1	-5584.8	129019.0	149274400.0	50640.0
1226.40	-8645.2	-133.4	-4697.9	113494.0	129494600.0	43605.0
1226.41	-7325.1	-87.4	-4058.5	73342.0	87311370.0	30758.0
1226.42	-8303.5	-99.8	-4380.7	84415.0	95501780.0	32115.0
1226.43	-11048.5	-172.3	-6102.3	146091.0	171481500.0	58464.0
1226.44	-12026.9	-184.7	-6424.5	157162.0	179731900.0	59820.0
1226.45	-5677.6	-68.7	-3171.5	57819.0	67501640.0	23724.0
1226.46	-6656.0	-81.1	-3493.7	68893.0	75692060.0	25080.0
1226.47	-9401.0	-153.6	-5215.2	130568.0	151701800.0	51429.0
1226.48	-10379.4	-166.0	-5537.6	141637.0	159852200.0	52785.0
1226.49	-9281.8	-112.2	-4702.9	95492.0	103732200.0	33471.0
1226.50	-9931.5	-146.9	-5489.1	124269.0	146266500.0	50152.0
1226.51	-11888.1	-171.6	-6133.7	146413.0	162667300.0	52864.0
1226.52	-7634.2	-93.5	-3815.9	79970.0	83882510.0	26436.0
1226.53	-8284.0	-128.1	-4602.1	108744.0	126486800.0	43117.0
1226.54	-10240.5	-152.9	-5246.7	130892.0	142787600.0	45830.0
1226.55	-10909.9	-159.2	-5811.4	135341.0	154416900.0	51508.0
1226.56	-9262.4	-140.5	-4924.4	119816.0	134637200.0	44474.0
1226.57	-7442.7	-88.8	-4101.6	74545.0	88291370.0	30924.0
1226.58	-8421.1	-101.1	-4423.8	85620.0	96471780.0	32280.0
1226.59	-10049.1	-148.2	-5532.3	125473.0	147236500.0	50317.0
1226.60	-11027.4	-160.6	-5854.5	136545.0	155386900.0	51674.0
1226.61	-5795.3	-70.0	-3214.7	59023.0	68481620.0	23889.0
1226.62	-6773.6	-82.4	-3536.8	70098.0	76672060.0	25245.0
1226.63	-8401.6	-129.5	-4645.3	109948.0	127456800.0	43283.0
1226.64	-9379.9	-141.9	-4967.5	121020.0	135607200.0	44639.0
1226.108	9772.6	-124.2	2427.3	40720.0	47582990.0	30991.0
1226.109	3600.7	-147.7	1641.0	63658.0	68348540.0	38591.0
1226.110	7915.4	-271.7	424.0	194760.0	51419220.0	17177.0
1226.111	1743.0	-295.0	-351.5	217668.0	72184640.0	24776.0
1226.112	-15657.2	89.5	-7330.8	-47314.0	127205800.0	44297.0
1226.113	-21829.4	65.9	-8112.6	-24338.0	148031300.0	51898.0
1226.114	-17456.6	-65.9	-9315.3	108634.0	131146800.0	30449.0
1226.115	-23627.5	-89.4	-10086.3	131584.0	151872600.0	38049.0

1226.116	9679.6	-118.3	3522.9	34993.0	47899260.0	28629.0
1226.117	3507.7	-141.8	2737.4	58032.0	68664820.0	36230.0
1226.118	7996.6	-278.2	-666.2	200849.0	51099930.0	19545.0
1226.119	1824.5	-301.5	-1438.8	223719.0	71865430.0	27145.0
1226.120	-15749.8	95.2	-6236.7	-52983.0	127582200.0	41935.0
1226.121	-21921.4	71.7	-7017.7	-30036.0	148307900.0	49535.0
1226.122	-17377.0	-71.7	-10412.0	114226.0	130767100.0	32817.0
1226.123	-23547.5	-95.2	-11186.6	137174.0	151493000.0	40416.0
1226.124	9803.8	-222.3	2900.9	84146.0	48030950.0	30847.0
1226.125	3632.6	-245.7	2111.3	107080.0	68786670.0	38447.0
1226.126	7951.1	-370.7	879.8	238672.0	51868320.0	17031.0
1226.127	1778.7	-394.2	106.1	261680.0	72633740.0	24631.0
1226.128	-15593.0	176.4	-7756.8	-87944.0	126822200.0	44386.0
1226.129	-21766.3	152.8	-8530.7	-64964.0	147547400.0	51987.0
1226.130	-17394.4	21.5	-9729.9	67693.0	130662700.0	30540.0
1226.131	-23565.2	-2.1	-10500.6	90653.0	151388500.0	38139.0
1226.132	9713.5	-216.5	3992.1	78502.0	48347910.0	28485.0
1226.133	3543.0	-239.9	3210.4	101518.0	69113820.0	36084.0
1226.134	8033.0	-377.0	-203.3	244531.0	51549220.0	19399.0
1226.135	1860.7	-400.2	-975.5	267395.0	72314660.0	26998.0
1226.136	-15682.3	181.8	-6654.7	-93318.0	127199400.0	42025.0
1226.137	-21854.8	158.3	-7438.0	-70439.0	147924800.0	49624.0
1226.138	-17313.5	15.6	-10838.7	73407.0	130383300.0	32907.0
1226.139	-23484.7	-7.9	-11610.4	96315.0	151109100.0	40506.0
1226.140	3026.3	127.3	1470.8	-171334.0	70972010.0	51771.0
1226.141	-3152.2	104.5	684.8	-148576.0	91735870.0	59375.0
1226.142	-3100.9	-375.3	-5155.5	345317.0	83808960.0	5693.0
1226.143	-9267.3	-399.2	-5928.1	368368.0	104535900.0	13289.0
1226.144	-4623.3	193.1	-1458.9	-198036.0	94880590.0	55776.0
1226.145	-10801.9	170.3	-2244.8	-175281.0	115644400.0	63380.0
1226.146	-10689.4	-315.6	-8079.4	319915.0	107673100.0	9661.0
1226.147	-16855.8	-339.6	-8852.1	342968.0	128500100.0	17257.0
1226.148	3038.7	97.7	1609.5	-158295.0	71105180.0	51726.0
1226.149	-3133.4	74.2	821.5	-135362.0	91870670.0	59326.0
1226.150	-3125.0	-401.4	-5022.7	357634.0	83942820.0	5670.0
1226.151	-9290.7	-425.4	-5795.9	380674.0	104729900.0	13265.0
1226.152	-4634.9	222.5	-1594.2	-211018.0	94747640.0	55821.0
1226.153	-10814.3	199.7	-2379.9	-188245.0	115541300.0	63426.0
1226.154	-10667.7	-289.4	-8210.4	307614.0	107578700.0	9686.0
1226.155	-16835.5	-313.2	-8983.2	330636.0	128305300.0	17283.0
1226.156	2714.4	147.2	5124.3	-190565.0	72032440.0	43900.0
1226.157	-3465.1	124.4	4338.8	-167786.0	92796050.0	51504.0
1226.158	-2847.2	-394.8	-8800.3	364298.0	82723680.0	13593.0
1226.159	-9012.7	-418.7	-9573.5	387338.0	103500900.0	21188.0
1226.160	-4936.8	213.0	2200.3	-217234.0	95940620.0	47906.0
1226.161	-11116.4	190.2	1414.8	-194455.0	116664200.0	55511.0
1226.162	-10435.4	-335.0	-11729.5	338869.0	106637900.0	17561.0
1226.163	-16601.0	-358.9	-12502.7	361905.0	127365100.0	25156.0
1226.164	2730.8	117.4	5257.1	-177493.0	72166620.0	43852.0
1226.165	-3442.6	94.0	4469.9	-154544.0	92931790.0	51453.0
1226.166	-2869.9	-421.0	-8664.7	376610.0	82857890.0	13568.0
1226.167	-9035.4	-445.0	-9437.8	399671.0	103595100.0	21164.0
1226.168	-4951.3	242.4	2070.1	-230150.0	95806930.0	47953.0
1226.169	-11130.9	219.6	1284.6	-207370.0	116560500.0	55558.0
1226.170	-10410.4	-308.8	-11865.2	326523.0	106544300.0	17583.0
1226.171	-16576.9	-332.7	-12637.8	349568.0	127271200.0	25179.0
1226.268	8053.1	-19.5	-86.7	-17643.0	51234350.0	26791.0
1226.269	-12519.5	-97.8	-2708.7	58886.0	120406300.0	52124.0
1226.270	6195.3	-168.2	-2094.6	136939.0	55090420.0	12980.0
1226.271	-14367.3	-247.1	-4667.5	213501.0	124334900.0	38305.0

1226.272	413.3	45.7	-3021.7	-44232.0	75135430.0	30790.0
1226.273	-20174.2	-31.5	-5632.5	32004.0	144353600.0	56132.0
1226.274	-1400.0	-107.8	-5017.9	111355.0	78992860.0	16952.0
1226.275	-21968.0	-186.3	-7587.4	187842.0	148196000.0	42280.0
1226.276	7961.5	-13.6	1007.0	-23419.0	51550980.0	24429.0
1226.277	-12612.5	-91.9	-1611.9	53278.0	120782600.0	49764.0
1226.278	6275.2	-174.4	-3187.8	142706.0	54760810.0	15348.0
1226.279	-14289.1	-253.1	-5757.7	219276.0	123954800.0	40674.0
1226.280	318.5	51.7	-1922.4	-49973.0	75461250.0	28430.0
1226.281	-20265.8	-25.7	-4536.7	26261.0	144630200.0	53770.0
1226.282	-1323.3	-113.5	-6114.3	117006.0	78662420.0	19321.0
1226.283	-21888.1	-192.2	-8687.7	193462.0	147916400.0	44648.0
1226.284	8063.0	-48.9	53.4	-4649.0	51366870.0	26748.0
1226.285	-12509.4	-127.2	-2569.1	71909.0	120608800.0	52081.0
1226.286	6204.7	-197.5	-1963.4	149975.0	55222820.0	12937.0
1226.287	-14371.1	-275.3	-4538.2	226295.0	124433900.0	38269.0
1226.288	418.6	73.2	-3149.9	-56746.0	75006780.0	30825.0
1226.289	-20155.2	-5.4	-5756.1	19806.0	144258400.0	56159.0
1226.290	-1378.1	-81.9	-5147.4	99158.0	78858440.0	16977.0
1226.291	-21949.6	-160.1	-7712.4	175545.0	148100700.0	42308.0
1226.292	7969.8	-43.0	1147.5	-10379.0	51693100.0	24387.0
1226.293	-12601.2	-121.3	-1469.8	66250.0	120885400.0	49719.0
1226.294	6284.3	-203.8	-3056.6	155818.0	54893120.0	15305.0
1226.295	-14288.8	-281.5	-5624.1	232106.0	124054900.0	40637.0
1226.296	325.8	78.9	-2050.3	-62442.0	75323110.0	28463.0
1226.297	-20246.2	0.4	-4663.5	14085.0	144535200.0	53796.0
1226.298	-1300.4	-87.7	-6243.4	104814.0	78538270.0	19346.0
1226.299	-21870.0	-165.9	-8817.8	181237.0	147721000.0	44676.0
1292.1	44792.6	1.2	1157.3	-8421.0	-22823410.0	-24845.0
1292.2	43310.0	2.1	1844.7	-10401.0	-19441620.0	-23006.0
1292.3	94718.5	4.9	4351.9	-20303.0	-44907310.0	-53001.0
1292.4	93236.0	5.8	5039.6	-22306.0	-41535500.0	-51162.0
1292.5	34457.0	1.0	988.3	-6607.0	-17560020.0	-19100.0
1292.6	32974.4	1.9	1675.7	-8582.0	-14178230.0	-17261.0
1292.7	84382.9	4.7	4182.9	-18488.0	-39643920.0	-47256.0
1292.8	82900.4	5.6	4870.7	-20490.0	-36272110.0	-45417.0
1292.9	41827.3	3.0	2532.3	-12354.0	-16069860.0	-21167.0
1292.10	79740.7	3.8	3393.4	-16738.0	-38278150.0	-44554.0
1292.11	76775.4	5.6	4769.0	-20681.0	-31534600.0	-40877.0
1292.12	31491.6	2.8	2363.3	-10529.0	-10806490.0	-15422.0
1292.13	69405.2	3.6	3224.4	-14926.0	-33014730.0	-38809.0
1292.14	66439.8	5.4	4600.1	-18860.0	-26271210.0	-35132.0
1292.15	78258.2	4.7	4081.2	-18729.0	-34906340.0	-42716.0
1292.16	67922.6	4.5	3912.1	-16913.0	-29642950.0	-36970.0
1292.17	45454.9	0.8	914.0	-7626.0	-24324450.0	-25673.0
1292.18	43972.4	1.7	1601.3	-9631.0	-20952640.0	-23834.0
1292.19	95380.8	4.5	4108.4	-19501.0	-46418360.0	-53829.0
1292.20	93898.4	5.5	4796.1	-21529.0	-43046520.0	-51990.0
1292.21	35119.3	0.7	744.9	-5811.0	-19061070.0	-19928.0
1292.22	33636.8	1.6	1432.3	-7812.0	-15689250.0	-18089.0
1292.23	85045.3	4.4	3939.4	-17696.0	-41154940.0	-48084.0
1292.24	83562.9	5.3	4627.0	-19720.0	-37783100.0	-46245.0
1292.25	42489.8	2.6	2288.8	-11589.0	-17580850.0	-21995.0
1292.26	80403.1	3.4	3149.9	-15942.0	-39789170.0	-45382.0
1292.27	77437.9	5.2	4525.4	-19913.0	-33035590.0	-41705.0
1292.28	32154.1	2.5	2119.8	-9767.0	-12317490.0	-16250.0
1292.29	70067.5	3.3	2980.9	-14125.0	-34525780.0	-39637.0
1292.30	67102.3	5.1	4356.5	-18097.0	-27772200.0	-35960.0
1292.31	45896.5	0.6	751.8	-7093.0	-25331800.0	-26225.0
1292.32	44414.1	1.5	1439.1	-9114.0	-21959960.0	-24386.0

1292.33	80844.6	3.2	2987.7	-15404.0	-40796540.0	-45934.0
1292.34	79362.2	4.1	3675.3	-17428.0	-37424700.0	-44096.0
1292.35	35560.9	0.4	582.7	-5282.0	-20068410.0	-20480.0
1292.36	34078.5	1.4	1270.0	-7299.0	-16696580.0	-18641.0
1292.37	70509.1	3.0	2818.6	-13600.0	-35533130.0	-40189.0
1292.38	69026.7	3.9	3506.2	-15620.0	-32161290.0	-38350.0
1292.39	78920.6	4.3	3837.6	-17954.0	-36417360.0	-43544.0
1292.40	68585.1	4.2	3668.6	-16147.0	-31153940.0	-37798.0
1292.41	44527.6	1.3	1254.7	-8738.0	-22221010.0	-24514.0
1292.42	43045.0	2.2	1942.1	-10709.0	-18839220.0	-22675.0
1292.43	94453.6	5.0	4449.3	-20624.0	-44304880.0	-52670.0
1292.44	92971.0	5.9	5137.1	-22613.0	-40933100.0	-50831.0
1292.45	34192.0	1.1	1085.6	-6924.0	-16957620.0	-18769.0
1292.46	32709.4	2.0	1773.1	-8890.0	-13575830.0	-16930.0
1292.47	84118.0	4.8	4280.2	-18813.0	-39041500.0	-46925.0
1292.48	82635.4	5.7	4968.1	-20796.0	-35669710.0	-45086.0
1292.49	41562.2	3.1	2629.7	-12658.0	-15467480.0	-20836.0
1292.50	79475.8	3.9	3490.8	-17054.0	-37675720.0	-44223.0
1292.51	76510.4	5.7	4866.5	-20987.0	-30932200.0	-40545.0
1292.52	31226.6	2.9	2460.7	-10835.0	-10204100.0	-15091.0
1292.53	69140.2	3.7	3321.8	-15246.0	-32412330.0	-38478.0
1292.54	66174.8	5.5	4697.5	-19163.0	-25658810.0	-34800.0
1292.55	77993.2	4.8	4178.6	-19036.0	-34303940.0	-42384.0
1292.56	67657.6	4.6	4009.6	-17220.0	-29040550.0	-36639.0
1292.57	44351.0	1.4	1319.6	-8949.0	-21816060.0	-24293.0
1292.58	42868.3	2.3	2007.0	-10914.0	-18434300.0	-22454.0
1292.59	79299.2	4.0	3555.8	-17264.0	-37280780.0	-44002.0
1292.60	77816.5	4.9	4243.5	-19240.0	-33899010.0	-42164.0
1292.61	34015.4	1.2	1150.5	-7135.0	-16552670.0	-18548.0
1292.62	32532.7	2.1	1838.0	-9095.0	-13170910.0	-16709.0
1292.63	68963.6	3.8	3386.7	-15457.0	-32017390.0	-38257.0
1292.64	67480.9	4.7	4074.6	-17425.0	-28635620.0	-36418.0
1292.108	49146.5	-48.6	-8237.7	71488.0	-13542730.0	-37290.0
1292.109	57447.4	-43.6	-6275.7	62456.0	-34395170.0	-47715.0
1292.110	44518.7	-5.5	9260.5	12541.0	-2133279.0	-33986.0
1292.111	52820.3	-0.6	11229.8	3663.0	-22985540.0	-44410.0
1292.112	55968.8	-0.8	-6773.7	-14341.0	-29642360.0	-16318.0
1292.113	64268.0	3.8	-4809.9	-22558.0	-50485240.0	-26743.0
1292.114	51293.9	35.3	10732.2	-60100.0	-18124920.0	-13003.0
1292.115	59592.8	39.8	12692.9	-68169.0	-38967880.0	-23428.0
1292.116	49373.2	-39.8	-9103.4	62669.0	-14084900.0	-37345.0
1292.117	57673.8	-34.8	-7138.3	53608.0	-34937410.0	-47770.0
1292.118	44299.5	-14.5	10150.3	21854.0	-1609197.0	-33932.0
1292.119	52600.8	-9.6	12120.2	12954.0	-22461540.0	-44356.0
1292.120	56194.5	7.9	-7637.7	-23110.0	-30184780.0	-16373.0
1292.121	64493.4	12.5	-5683.1	-31387.0	-51037740.0	-26798.0
1292.122	51078.3	26.6	11580.0	-51267.0	-17599920.0	-12950.0
1292.123	59376.8	31.1	13542.0	-59362.0	-38452980.0	-23375.0
1292.124	49120.3	-79.9	-8338.7	128439.0	-13499410.0	-37093.0
1292.125	57420.8	-74.8	-6377.7	119368.0	-34351950.0	-47517.0
1292.126	44489.4	-37.1	9139.1	70213.0	-2090754.0	-33789.0
1292.127	52790.5	-32.1	11114.1	61249.0	-22943140.0	-44214.0
1292.128	55904.6	19.8	-6627.5	-51069.0	-29468740.0	-16498.0
1292.129	64204.5	24.4	-4667.9	-59237.0	-50311430.0	-26923.0
1292.130	51230.3	56.2	10872.9	-97302.0	-17951150.0	-13184.0
1292.131	59529.1	60.7	12832.6	-105372.0	-38794120.0	-23609.0
1292.132	49344.8	-71.0	-9217.2	119507.0	-14042140.0	-37148.0
1292.133	57644.6	-66.0	-7248.3	110485.0	-34894860.0	-47573.0
1292.134	44270.0	-46.1	10025.7	79513.0	-1556723.0	-33735.0
1292.135	52571.3	-41.1	11996.6	70555.0	-22409060.0	-44159.0

1292.136	56127.1	28.6	-7489.0	-59853.0	-30001980.0	-16554.0
1292.137	64426.6	33.2	-5541.2	-68122.0	-50854780.0	-26979.0
1292.138	51013.3	47.5	11738.3	-88586.0	-17426510.0	-13130.0
1292.139	59312.6	52.0	13697.5	-96658.0	-38279360.0	-23555.0
1292.140	56949.2	-79.4	-28118.0	105092.0	-32512260.0	-33809.0
1292.141	65254.0	-74.1	-26159.5	95336.0	-53373710.0	-44234.0
1292.142	41459.6	55.4	30244.7	-74771.0	5648344.0	-22784.0
1292.143	49755.8	59.7	32206.7	-82405.0	-15197300.0	-33208.0
1292.144	59008.9	-63.3	-27676.7	75869.0	-37376830.0	-27522.0
1292.145	67313.8	-57.9	-25718.3	66097.0	-58238250.0	-37947.0
1292.146	43475.5	65.7	30677.3	-92757.0	890599.5	-16486.0
1292.147	51771.7	70.0	32639.9	-100391.0	-19953040.0	-26910.0
1292.148	56940.1	-88.9	-28154.9	122367.0	-32504580.0	-33749.0
1292.149	65241.2	-83.9	-26193.2	113354.0	-53356970.0	-44173.0
1292.150	41479.7	49.3	30201.3	-63733.0	5593472.0	-22732.0
1292.151	49775.5	53.5	32165.0	-71317.0	-15242270.0	-33155.0
1292.152	59015.0	-54.0	-27631.6	58954.0	-37385280.0	-27581.0
1292.153	67320.2	-48.6	-25675.7	49151.0	-58246620.0	-38007.0
1292.154	43456.8	72.0	30716.1	-104007.0	945830.1	-16540.0
1292.155	51753.7	76.3	32679.8	-111763.0	-19897630.0	-26964.0
1292.156	57705.8	-50.1	-30994.2	75288.0	-34339250.0	-33990.0
1292.157	66011.2	-44.7	-29039.2	65471.0	-55210540.0	-44416.0
1292.158	40746.4	26.5	33152.0	-45800.0	7372406.0	-22605.0
1292.159	49042.1	30.7	35116.5	-53369.0	-13469360.0	-33029.0
1292.160	59766.3	-33.7	-30553.5	45779.0	-39203620.0	-27703.0
1292.161	68071.6	-28.3	-28598.5	35961.0	-60074940.0	-38130.0
1292.162	42762.7	36.7	33580.9	-63639.0	2613765.0	-16307.0
1292.163	51058.4	40.9	35545.3	-71208.0	-18225000.0	-26731.0
1292.164	57694.8	-59.8	-31029.7	93078.0	-34322060.0	-33929.0
1292.165	65996.6	-54.8	-29071.5	83969.0	-55184270.0	-44354.0
1292.166	40765.4	20.3	33115.2	-34757.0	7320254.0	-22552.0
1292.167	49061.0	24.5	35080.6	-42326.0	-13524540.0	-32975.0
1292.168	59773.7	-24.3	-30514.4	28563.0	-39221730.0	-27764.0
1292.169	68079.0	-18.9	-28559.3	18746.0	-60083050.0	-38190.0
1292.170	42742.3	42.8	33625.1	-74541.0	2669561.0	-16360.0
1292.171	51038.6	47.0	35587.2	-82188.0	-18170050.0	-26783.0
1292.268	41870.7	-35.4	-10031.8	47579.0	5104215.0	-17791.0
1292.269	69540.2	-18.7	-3491.7	17505.0	-64400290.0	-52540.0
1292.270	37240.9	7.3	7479.1	-10682.0	16513150.0	-14487.0
1292.271	64901.7	22.5	14026.4	-37822.0	-52973580.0	-49234.0
1292.272	43927.1	-19.6	-9583.6	19079.0	255803.1	-11502.0
1292.273	71602.8	-2.9	-3044.5	-11094.0	-69274130.0	-46252.0
1292.274	39262.7	18.4	7918.0	-30183.0	11741920.0	-8190.0
1292.275	66924.7	33.2	14460.5	-56824.0	-57747510.0	-42937.0
1292.276	42096.8	-26.7	-10891.8	38844.0	4558894.0	-17845.0
1292.277	69766.5	-10.0	-4349.8	8664.0	-64952570.0	-52595.0
1292.278	37023.9	-1.7	8353.8	-1387.0	17037800.0	-14433.0
1292.279	64685.8	13.8	14909.5	-29112.0	-52448650.0	-49180.0
1292.280	44154.7	-10.7	-10448.4	9963.0	-296135.5	-11556.0
1292.281	71828.0	5.9	-3923.1	-19936.0	-69816670.0	-46307.0
1292.282	39048.8	9.6	8789.6	-21410.0	12259350.0	-8136.0
1292.283	66708.6	24.4	15324.1	-47935.0	-57222640.0	-42883.0
1292.284	41862.6	-44.8	-10069.5	64631.0	5116149.0	-17732.0
1292.285	69531.8	-28.1	-3525.2	34578.0	-64392440.0	-52481.0
1292.286	37234.3	-2.0	7441.3	6266.0	16522470.0	-14428.0
1292.287	64905.6	14.4	13995.8	-23309.0	-52992580.0	-49177.0
1292.288	43919.1	-12.0	-9545.6	5379.0	273762.8	-11558.0
1292.289	71583.9	3.3	-3007.7	-22159.0	-69218940.0	-46307.0
1292.290	39241.8	24.5	7965.1	-41118.0	11798580.0	-8243.0
1292.291	66905.8	39.5	14503.9	-68031.0	-57692330.0	-42992.0

1292.292	42089.5	-36.0	-10935.2	55822.0	4568032.0	-17787.0
1292.293	69757.6	-19.4	-4384.1	25768.0	-64934840.0	-52535.0
1292.294	37017.1	-10.9	8317.9	15523.0	17047060.0	-14374.0
1292.295	64686.6	5.4	14874.7	-13902.0	-52458450.0	-49123.0
1292.296	44145.0	-3.3	-10410.8	-3363.0	-268610.5	-11613.0
1292.297	71808.5	12.1	-3884.4	-30991.0	-69761650.0	-46362.0
1292.298	39027.3	15.7	8832.5	-32276.0	12316860.0	-8190.0
1292.299	66689.6	30.8	15368.8	-59282.0	-57177480.0	-42938.0
1298.1	49868.7	60.1	-2200.2	-66146.0	50421510.0	47715.0
1298.2	52365.4	71.3	-2408.7	-78818.0	54378410.0	51944.0
1298.3	101600.0	121.1	-3096.1	-134243.0	102568200.0	93026.0
1298.4	104100.0	132.3	-3304.8	-146913.0	106525900.0	97256.0
1298.5	38364.1	47.6	-1745.7	-52466.0	38786680.0	36706.0
1298.6	40860.9	58.8	-1954.2	-65139.0	42743620.0	40936.0
1298.7	90105.3	108.7	-2641.6	-120562.0	90925860.0	82018.0
1298.8	92602.1	119.9	-2850.3	-133235.0	94882790.0	86247.0
1298.9	54862.2	82.5	-2617.2	-91495.0	58335350.0	56173.0
1298.10	86087.5	102.8	-2827.3	-113812.0	86920920.0	79433.0
1298.11	91081.0	125.2	-3244.6	-139166.0	94834760.0	87892.0
1298.12	43357.6	70.1	-2162.7	-77819.0	46700520.0	45165.0
1298.13	74583.0	90.3	-2372.8	-100133.0	75286130.0	68424.0
1298.14	79576.5	112.8	-2790.1	-125489.0	83199960.0	76883.0
1298.15	88584.3	114.0	-3036.0	-126485.0	90877860.0	83662.0
1298.16	77079.7	101.6	-2581.5	-112806.0	79243030.0	72654.0
1298.17	48750.4	55.6	-2096.9	-61129.0	48656230.0	45828.0
1298.18	51247.2	66.8	-2305.5	-73796.0	52613160.0	50057.0
1298.19	100500.0	116.7	-2992.8	-129225.0	100797600.0	91140.0
1298.20	103000.0	127.9	-3201.5	-141893.0	104755300.0	95369.0
1298.21	37245.9	43.2	-1642.4	-47449.0	37011430.0	34820.0
1298.22	39742.7	54.4	-1850.9	-60117.0	40968360.0	39049.0
1298.23	88987.0	104.2	-2538.3	-115544.0	89160580.0	80131.0
1298.24	91483.8	115.4	-2747.0	-128211.0	93117520.0	84361.0
1298.25	53743.9	78.0	-2514.0	-86472.0	56570070.0	54287.0
1298.26	84969.2	98.4	-2724.0	-108793.0	85155640.0	77546.0
1298.27	89962.8	120.8	-3141.3	-134142.0	93069510.0	86005.0
1298.28	42239.4	65.6	-2059.4	-72794.0	44925270.0	43279.0
1298.29	73464.7	85.9	-2269.5	-95115.0	73510840.0	66538.0
1298.30	78458.2	108.3	-2686.8	-120465.0	81424690.0	74997.0
1298.31	48004.9	52.7	-2028.1	-57784.0	47476050.0	44570.0
1298.32	50501.7	63.9	-2236.6	-70449.0	51432980.0	48800.0
1298.33	84223.7	95.4	-2655.1	-105449.0	83975470.0	76288.0
1298.34	86720.5	106.6	-2863.8	-118117.0	87932400.0	80518.0
1298.35	36500.4	40.2	-1573.5	-44103.0	35831250.0	33562.0
1298.36	38997.2	51.4	-1782.1	-56770.0	39788180.0	37791.0
1298.37	72719.2	82.9	-2200.6	-91768.0	72330670.0	65280.0
1298.38	75216.0	94.1	-2409.2	-104438.0	76287600.0	69509.0
1298.39	87466.0	109.6	-2932.7	-121463.0	89112580.0	81775.0
1298.40	75961.5	97.1	-2478.1	-107784.0	77467780.0	70767.0
1298.41	50316.0	61.9	-2241.5	-68153.0	51135610.0	48469.0
1298.42	52812.7	73.1	-2450.0	-80826.0	55092520.0	52699.0
1298.43	102100.0	122.9	-3137.4	-136250.0	103285700.0	93781.0
1298.44	104600.0	134.1	-3346.1	-148922.0	107243500.0	98010.0
1298.45	38811.4	49.4	-1787.0	-54473.0	39490790.0	37461.0
1298.46	41308.2	60.6	-1995.5	-67147.0	43447720.0	41690.0
1298.47	90552.6	110.4	-2682.9	-122568.0	91629970.0	82773.0
1298.48	93049.4	121.6	-2891.6	-135245.0	95586900.0	87002.0
1298.49	55309.5	84.3	-2658.5	-93505.0	59049460.0	56928.0
1298.50	86534.8	104.6	-2868.6	-115820.0	87635030.0	80187.0
1298.51	91528.3	127.0	-3285.9	-141176.0	95548870.0	88646.0
1298.52	43804.9	71.8	-2204.0	-79828.0	47404630.0	45920.0

1298.53	75030.3	92.1	-2414.1	-102141.0	75990230.0	69179.0
1298.54	80023.8	114.6	-2831.4	-127498.0	83904070.0	77638.0
1298.55	89031.6	115.8	-3077.3	-128495.0	91591960.0	84417.0
1298.56	77527.0	103.3	-2622.8	-114816.0	79947140.0	73408.0
1298.57	50614.2	63.0	-2269.0	-69491.0	51601680.0	48972.0
1298.58	53110.9	74.3	-2477.5	-82165.0	55558590.0	53202.0
1298.59	86833.0	105.8	-2896.2	-117158.0	88101100.0	80690.0
1298.60	89329.8	117.0	-3104.8	-129834.0	92058030.0	84920.0
1298.61	39109.6	50.6	-1814.5	-55811.0	39966860.0	37964.0
1298.62	41606.4	61.8	-2023.0	-68487.0	43923790.0	42194.0
1298.63	75328.5	93.3	-2441.7	-103479.0	76466300.0	69682.0
1298.64	77825.2	104.5	-2650.3	-116156.0	80423210.0	73912.0
1298.108	65621.3	-1.5	-5151.9	16107.0	74309990.0	61800.0
1298.109	71676.5	26.0	-5771.6	-14821.0	88544670.0	70045.0
1298.110	67628.3	199.6	-8098.1	-207646.0	79781980.0	72683.0
1298.111	73683.4	227.2	-8706.0	-238640.0	94006640.0	80928.0
1298.112	44423.3	-81.0	4723.8	79052.0	25302380.0	28762.0
1298.113	50478.4	-53.2	4110.7	47923.0	39537040.0	37008.0
1298.114	46423.9	124.5	1825.8	-147113.0	30792740.0	39666.0
1298.115	52478.1	152.2	1221.7	-178034.0	45027160.0	47912.0
1298.116	65595.3	8.8	-4898.7	6601.0	73693360.0	59492.0
1298.117	71650.6	36.4	-5517.5	-24369.0	87918070.0	67738.0
1298.118	67656.8	189.3	-8359.2	-198086.0	80399250.0	74990.0
1298.119	73711.8	216.9	-8963.4	-229078.0	94633880.0	83235.0
1298.120	44397.1	-70.6	4974.8	69557.0	24685700.0	26454.0
1298.121	50451.7	-43.0	4361.2	38618.0	38920230.0	34700.0
1298.122	46451.0	113.6	1556.2	-136937.0	31419650.0	41969.0
1298.123	52505.2	141.3	949.8	-167943.0	45644080.0	50215.0
1298.124	65491.3	-44.9	-5360.6	58784.0	74076830.0	61795.0
1298.125	71546.2	-17.4	-5983.5	27848.0	88311440.0	70040.0
1298.126	67497.1	156.1	-8331.4	-164663.0	79538510.0	72679.0
1298.127	73552.3	183.7	-8937.8	-195694.0	93773190.0	80924.0
1298.128	44541.3	-31.0	5019.9	32765.0	25592490.0	28811.0
1298.129	50595.8	-3.4	4411.2	1884.0	39826990.0	37057.0
1298.130	46541.1	174.1	2132.7	-193086.0	31082630.0	39715.0
1298.131	52595.3	201.8	1529.2	-224003.0	45317060.0	47960.0
1298.132	65464.0	-34.8	-5114.3	49508.0	73449870.0	59487.0
1298.133	71519.2	-7.2	-5729.1	18527.0	87684550.0	67733.0
1298.134	67525.2	145.8	-8582.3	-155062.0	80165680.0	74985.0
1298.135	73580.2	173.3	-9185.9	-186054.0	94400300.0	83230.0
1298.136	44514.4	-20.8	5276.0	23410.0	24965620.0	26505.0
1298.137	50568.7	6.8	4659.1	-7432.0	39200080.0	34751.0
1298.138	46568.8	163.6	1856.2	-183428.0	31699700.0	42019.0
1298.139	52623.0	191.2	1251.8	-214342.0	45934130.0	50264.0
1298.140	55861.2	-266.1	1866.2	300498.0	50770190.0	37531.0
1298.141	61916.8	-238.8	1245.1	269724.0	65004980.0	45774.0
1298.142	62544.0	410.4	-7860.9	-448890.0	69034980.0	73840.0
1298.143	68597.8	438.3	-8464.0	-479976.0	83259300.0	82086.0
1298.144	49503.3	-291.1	4817.6	320026.0	36058290.0	27613.0
1298.145	55558.9	-263.8	4196.5	289254.0	50293080.0	35857.0
1298.146	56179.8	388.9	-4881.3	-431147.0	54341470.0	63941.0
1298.147	62233.6	416.8	-5484.4	-462243.0	68575790.0	72188.0
1298.148	55821.7	-279.1	1800.1	313353.0	50700120.0	37529.0
1298.149	61876.9	-251.6	1177.9	282439.0	64934800.0	45774.0
1298.150	62508.8	395.4	-7944.0	-435027.0	68945990.0	73825.0
1298.151	68562.7	423.4	-8547.6	-466141.0	83180340.0	82072.0
1298.152	49542.4	-277.9	4887.3	307057.0	36138260.0	27617.0
1298.153	55597.9	-250.7	4266.5	276322.0	50363020.0	35860.0
1298.154	56214.9	403.7	-4796.5	-444921.0	54430420.0	63955.0
1298.155	62269.0	431.6	-5399.5	-476029.0	68664820.0	72202.0

1298.156	55774.8	-231.6	2709.9	268775.0	48698150.0	29837.0
1298.157	61830.4	-204.4	2089.3	238053.0	62922940.0	38081.0
1298.158	62639.4	374.8	-8741.6	-416173.0	71099310.0	81519.0
1298.159	68693.2	402.7	-9345.3	-447299.0	85333640.0	89766.0
1298.160	49416.9	-256.7	5667.4	288359.0	33986250.0	19920.0
1298.161	55472.5	-229.5	5046.8	257636.0	48221040.0	28163.0
1298.162	56275.2	353.3	-5767.8	-398427.0	56405810.0	71620.0
1298.163	62329.1	381.2	-6371.4	-429552.0	70640160.0	79867.0
1298.164	55735.2	-244.5	2637.8	281531.0	48628050.0	29837.0
1298.165	61790.4	-217.0	2016.3	250675.0	62852730.0	38081.0
1298.166	62604.1	359.9	-8821.5	-402378.0	71010300.0	81505.0
1298.167	68658.0	387.9	-9425.3	-433511.0	85244660.0	89752.0
1298.168	49455.8	-243.6	5742.7	275514.0	34056180.0	19922.0
1298.169	55511.4	-216.4	5122.2	244792.0	48290960.0	28165.0
1298.170	56310.5	368.3	-5687.9	-412332.0	56494810.0	71635.0
1298.171	62364.3	396.2	-6291.0	-443416.0	70729130.0	79882.0
1298.268	51140.4	-63.0	-997.0	75096.0	40545920.0	40607.0
1298.269	71324.1	28.6	-3067.6	-27879.0	87984780.0	68091.0
1298.270	53148.1	138.6	-3946.1	-149007.0	46018080.0	51492.0
1298.271	73329.0	231.1	-5957.2	-252431.0	93456220.0	78979.0
1298.272	44782.5	-87.6	1949.9	94411.0	25834020.0	30691.0
1298.273	64967.3	4.0	-106.9	-8662.0	73273160.0	58173.0
1298.274	46785.0	116.7	-967.8	-131131.0	31324850.0	41591.0
1298.275	66966.2	209.3	-2974.2	-234592.0	78763070.0	69078.0
1298.276	51114.5	-52.5	-746.4	65511.0	39919310.0	38299.0
1298.277	71298.4	39.1	-2811.7	-37534.0	87358220.0	65783.0
1298.278	53176.3	128.2	-4209.4	-139300.0	46635280.0	53797.0
1298.279	73357.6	220.6	-6216.4	-242782.0	94073530.0	81283.0
1298.280	44756.5	-77.4	2206.6	84947.0	25217380.0	28382.0
1298.281	64940.5	14.3	147.7	-18022.0	72656320.0	55865.0
1298.282	46813.7	106.1	-1235.4	-121329.0	31942180.0	43895.0
1298.283	66993.9	198.7	-3244.3	-224755.0	79390140.0	71382.0
1298.284	51100.9	-76.1	-1062.1	87999.0	40475840.0	40605.0
1298.285	71284.8	15.6	-3132.6	-15060.0	87914750.0	68089.0
1298.286	53109.0	125.4	-4024.1	-136006.0	45938110.0	51489.0
1298.287	73291.8	217.4	-6037.7	-239279.0	93376740.0	78972.0
1298.288	44819.2	-73.5	2033.2	81037.0	25913380.0	30700.0
1298.289	65002.3	18.8	-15.1	-22370.0	73362090.0	58187.0
1298.290	46820.0	131.8	-880.0	-145067.0	31413780.0	41606.0
1298.291	67001.4	224.2	-2883.7	-248365.0	78852060.0	69092.0
1298.292	51075.0	-65.7	-810.9	78496.0	39849230.0	38297.0
1298.293	71258.9	26.1	-2874.5	-24659.0	87288140.0	65782.0
1298.294	53137.1	115.0	-4287.9	-126295.0	46565280.0	53795.0
1298.295	73319.7	206.9	-6291.9	-229610.0	94003860.0	81278.0
1298.296	44793.0	-63.2	2290.7	71523.0	25296690.0	28392.0
1298.297	64975.6	29.2	236.5	-31804.0	72735270.0	55880.0
1298.298	46848.4	121.1	-1147.8	-135188.0	32031020.0	43910.0
1298.299	67029.1	213.5	-3159.2	-238571.0	79469130.0	71396.0
1299.1	32167.2	-6.4	-1590.3	12661.0	11764850.0	22483.0
1299.2	33866.5	-6.2	-1691.0	12687.0	15144340.0	24887.0
1299.3	66806.9	-10.4	-1416.1	22220.0	24685440.0	41678.0
1299.4	68506.1	-10.1	-1517.2	22255.0	28065910.0	44082.0
1299.5	24745.8	-4.8	-1266.0	9528.0	9041654.0	17300.0
1299.6	26445.0	-4.5	-1366.8	9555.0	12421120.0	19705.0
1299.7	59385.5	-8.7	-1092.1	19088.0	21962240.0	36495.0
1299.8	61084.7	-8.5	-1193.0	19127.0	25341710.0	38900.0
1299.9	35565.7	-5.9	-1791.7	12715.0	18524810.0	27292.0
1299.10	56415.0	-9.2	-1468.2	19347.0	20809470.0	35919.0
1299.11	59813.4	-8.7	-1670.1	19419.0	27568400.0	40728.0
1299.12	28144.2	-4.3	-1467.4	9584.0	15801590.0	22109.0

1299.13	48993.6	-7.6	-1144.1	16217.0	18085270.0	30737.0
1299.14	52392.0	-7.1	-1345.9	16290.0	24845200.0	35546.0
1299.15	58114.2	-8.9	-1569.2	19382.0	24188930.0	38324.0
1299.16	50692.8	-7.3	-1245.1	16253.0	21465730.0	33141.0
1299.17	31406.1	-6.5	-1525.4	12540.0	10254700.0	21402.0
1299.18	33105.3	-6.2	-1626.1	12566.0	13634160.0	23807.0
1299.19	66045.8	-10.4	-1351.2	22093.0	23175280.0	40597.0
1299.20	67745.0	-10.2	-1452.2	22131.0	26554750.0	43002.0
1299.21	23984.7	-4.8	-1201.2	9407.0	7531497.0	16220.0
1299.22	25683.9	-4.6	-1301.9	9433.0	10910960.0	18624.0
1299.23	58624.3	-8.8	-1027.1	18964.0	20452060.0	35415.0
1299.24	60323.5	-8.5	-1128.1	19001.0	23831520.0	37819.0
1299.25	34804.5	-5.9	-1726.9	12594.0	17014630.0	26211.0
1299.26	55653.9	-9.2	-1403.3	19222.0	19299310.0	34838.0
1299.27	59052.3	-8.7	-1605.2	19293.0	26054240.0	39648.0
1299.28	27383.1	-4.3	-1402.7	9461.0	14290430.0	21029.0
1299.29	48232.5	-7.6	-1079.1	16091.0	16576110.0	29656.0
1299.30	51630.8	-7.1	-1281.1	16166.0	23331020.0	34466.0
1299.31	30898.7	-6.5	-1482.2	12458.0	9248259.0	20682.0
1299.32	32597.9	-6.2	-1582.9	12485.0	12627720.0	23086.0
1299.33	55146.5	-9.2	-1360.0	19138.0	18291870.0	34118.0
1299.34	56845.7	-9.0	-1461.0	19174.0	21672340.0	36523.0
1299.35	23477.3	-4.9	-1158.0	9326.0	6524556.0	15499.0
1299.36	25176.5	-4.6	-1258.7	9352.0	9904525.0	17904.0
1299.37	47725.0	-7.6	-1035.8	16008.0	15568650.0	28936.0
1299.38	49424.2	-7.4	-1136.8	16045.0	18948110.0	31341.0
1299.39	57353.1	-9.0	-1504.2	19257.0	22678780.0	37243.0
1299.40	49931.6	-7.3	-1180.1	16128.0	19955550.0	32061.0
1299.41	32471.7	-6.4	-1616.2	12709.0	12368530.0	22915.0
1299.42	34170.9	-6.2	-1716.9	12736.0	15749000.0	25319.0
1299.43	67111.4	-10.4	-1442.1	22270.0	25289120.0	42110.0
1299.44	68810.5	-10.1	-1543.2	22306.0	28673560.0	44514.0
1299.45	25050.3	-4.8	-1292.0	9576.0	9645331.0	17733.0
1299.46	26749.5	-4.5	-1392.7	9604.0	13024800.0	20137.0
1299.47	59689.9	-8.7	-1118.1	19139.0	22565890.0	36928.0
1299.48	61389.1	-8.5	-1219.0	19178.0	25950360.0	39332.0
1299.49	35870.1	-5.9	-1817.6	12764.0	19128460.0	27724.0
1299.50	56719.5	-9.2	-1494.2	19397.0	21413150.0	36351.0
1299.51	60117.9	-8.7	-1696.1	19470.0	28176080.0	41160.0
1299.52	28448.7	-4.3	-1493.3	9634.0	16405260.0	22542.0
1299.53	49298.0	-7.5	-1170.0	16268.0	18689920.0	31169.0
1299.54	52696.4	-7.0	-1371.8	16338.0	25452850.0	35978.0
1299.55	58418.7	-8.9	-1595.2	19432.0	24792610.0	38756.0
1299.56	50997.2	-7.3	-1271.1	16304.0	22069390.0	33574.0
1299.57	32674.7	-6.4	-1633.5	12741.0	12771320.0	23203.0
1299.58	34373.9	-6.1	-1734.2	12769.0	16150780.0	25607.0
1299.59	56922.4	-9.2	-1511.5	19430.0	21815900.0	36639.0
1299.60	58621.6	-8.9	-1612.5	19465.0	25194370.0	39044.0
1299.61	25253.2	-4.8	-1309.2	9609.0	10048090.0	18021.0
1299.62	26952.4	-4.5	-1410.0	9636.0	13427560.0	20425.0
1299.63	49501.0	-7.5	-1187.4	16301.0	19092700.0	31457.0
1299.64	51200.2	-7.3	-1288.4	16337.0	22472170.0	33862.0
1299.108	23053.8	78.2	5458.8	-53401.0	8168024.0	-2984.0
1299.109	29530.8	75.2	4896.7	-51254.0	18953310.0	12509.0
1299.110	27960.0	55.5	4179.5	-29648.0	15264600.0	4565.0
1299.111	34436.6	52.5	3622.9	-27419.0	26054780.0	20058.0
1299.112	42770.8	-63.7	-5865.2	53961.0	2423831.0	29853.0
1299.113	49248.1	-66.7	-6432.3	56148.0	13212820.0	45345.0
1299.114	47681.3	-83.8	-7149.9	77086.0	9556499.0	37378.0
1299.115	54158.3	-86.7	-7703.1	79189.0	20344780.0	52869.0

1299.116	23457.2	96.1	5755.8	-71872.0	9014932.0	-2759.0
1299.117	29934.5	93.2	5196.4	-69840.0	19806290.0	12734.0
1299.118	27556.3	37.5	3846.8	-11006.0	14410610.0	4345.0
1299.119	34032.9	34.5	3295.9	-8763.0	25201790.0	19837.0
1299.120	43174.2	-45.7	-5565.6	35452.0	3271738.0	30077.0
1299.121	49651.4	-48.6	-6131.0	37571.0	14061070.0	45568.0
1299.122	47276.1	-102.0	-7490.5	95856.0	8697133.0	37157.0
1299.123	53753.1	-104.9	-8045.9	97978.0	19486420.0	52647.0
1299.124	23152.6	84.2	4607.5	-42022.0	8261228.0	-2904.0
1299.125	29629.6	81.3	4042.8	-39871.0	19048510.0	12589.0
1299.126	28059.2	62.4	3332.9	-19047.0	15361900.0	4644.0
1299.127	34536.2	59.4	2779.9	-16899.0	26150180.0	20137.0
1299.128	42680.4	-66.5	-5005.4	41978.0	2394770.0	29720.0
1299.129	49157.6	-69.4	-5566.8	44099.0	13183010.0	45212.0
1299.130	47591.0	-86.9	-6284.5	65414.0	9526464.0	37245.0
1299.131	54068.0	-89.8	-6836.7	67488.0	20314750.0	52736.0
1299.132	23556.5	102.3	4903.8	-60735.0	9112263.0	-2680.0
1299.133	30033.8	99.4	4350.7	-58672.0	19901620.0	12813.0
1299.134	27655.2	44.3	3015.1	-276.0	14507840.0	4423.0
1299.135	34131.9	41.2	2465.5	1974.0	25297050.0	19915.0
1299.136	43085.1	-48.2	-4692.1	23079.0	3249009.0	29944.0
1299.137	49562.0	-51.1	-5261.4	25226.0	14036270.0	45435.0
1299.138	47186.3	-105.1	-6633.6	84235.0	8669225.0	37025.0
1299.139	53663.1	-108.1	-7187.9	86378.0	19457460.0	52515.0
1299.140	24228.0	53.4	3134.7	-42971.0	-2134437.0	-291.0
1299.141	30704.7	50.2	2568.6	-40739.0	8649662.0	15204.0
1299.142	40591.3	-18.1	-1115.3	34644.0	21574840.0	24844.0
1299.143	47068.5	-20.9	-1670.6	36739.0	32367180.0	40333.0
1299.144	30142.7	10.5	-250.2	-10879.0	-3870597.0	9567.0
1299.145	36619.4	7.3	-816.4	-8645.0	6917609.0	25062.0
1299.146	46508.8	-59.3	-4522.0	66539.0	19875400.0	34678.0
1299.147	52986.0	-62.1	-5077.4	68637.0	30666730.0	50168.0
1299.148	24257.6	55.3	2876.6	-39584.0	-2105886.0	-267.0
1299.149	30734.6	52.3	2310.0	-37398.0	8681789.0	15226.0
1299.150	40618.7	-17.1	-1360.3	37962.0	21581830.0	24883.0
1299.151	47095.8	-19.9	-1918.1	40114.0	32374140.0	40372.0
1299.152	30113.5	8.5	6.7	-14170.0	-3898046.0	9542.0
1299.153	36590.3	5.4	-556.2	-12019.0	6890186.0	25036.0
1299.154	46481.5	-60.2	-4269.9	63066.0	19866430.0	34639.0
1299.155	52958.6	-63.1	-4825.7	65191.0	30659740.0	50129.0
1299.156	25572.1	112.7	4107.1	-104132.0	687442.6	458.0
1299.157	32048.8	109.6	3545.3	-102008.0	11471650.0	15953.0
1299.158	39240.8	-79.1	-2241.2	97538.0	18707330.0	24112.0
1299.159	45717.9	-81.9	-2799.7	99708.0	29492640.0	39601.0
1299.160	31486.8	69.9	729.8	-72140.0	-1044718.0	10317.0
1299.161	37963.6	66.7	168.1	-70017.0	9739695.0	25811.0
1299.162	45158.3	-120.3	-5652.4	129427.0	17006880.0	33947.0
1299.163	51635.4	-123.1	-6210.9	131600.0	27802190.0	49436.0
1299.164	25601.7	114.6	3841.8	-100672.0	717993.4	481.0
1299.165	32078.7	111.7	3279.8	-98596.0	11505280.0	15975.0
1299.166	39268.1	-78.1	-2488.5	100993.0	18715290.0	24151.0
1299.167	45745.3	-81.0	-3047.0	103147.0	29509620.0	39640.0
1299.168	31457.7	68.2	999.9	-75692.0	-1072141.0	10292.0
1299.169	37934.5	65.0	438.2	-73568.0	9711946.0	25786.0
1299.170	45130.9	-121.4	-5412.9	126192.0	16998890.0	33908.0
1299.171	51608.0	-124.2	-5968.4	128292.0	27785200.0	49397.0
1299.268	22395.6	31.2	2146.4	-18032.0	-6446883.0	-9555.0
1299.269	43985.8	21.3	265.0	-10886.0	29510780.0	42089.0
1299.270	27303.5	9.1	874.6	5272.0	657123.1	-2004.0
1299.271	48893.1	-0.7	-983.5	12552.0	36622630.0	49631.0

1299.272	28310.1	-11.7	-1248.9	14216.0	-8178094.0	303.0
1299.273	49900.0	-22.0	-3133.1	21526.0	27779490.0	51948.0
1299.274	33220.5	-32.3	-2534.8	37334.0	-1047450.0	7834.0
1299.275	54810.2	-42.2	-4386.7	44526.0	34912080.0	59469.0
1299.276	22798.8	48.9	2432.5	-36277.0	-5594027.0	-9330.0
1299.277	44389.5	39.3	568.7	-29484.0	30363760.0	42314.0
1299.278	26898.5	-9.1	534.1	24179.0	-201192.4	-2225.0
1299.279	48488.6	-19.0	-1315.4	31416.0	35759440.0	49411.0
1299.280	28713.4	6.1	-951.1	-4237.0	-7325212.0	528.0
1299.281	50303.3	-4.0	-2829.6	2923.0	28632370.0	52171.0
1299.282	32815.2	-50.7	-2877.8	56274.0	-1908842.0	7615.0
1299.283	54405.1	-60.5	-4728.7	63431.0	34058740.0	59248.0
1299.284	22425.2	33.0	1889.4	-14646.0	-6419331.0	-9531.0
1299.285	44015.5	23.1	8.3	-7496.0	29548350.0	42112.0
1299.286	27332.8	11.0	613.3	8592.0	684597.4	-1979.0
1299.287	48921.7	0.8	-1238.0	15917.0	36639920.0	49662.0
1299.288	28282.2	-12.9	-986.0	10621.0	-8195211.0	269.0
1299.289	49872.8	-22.8	-2870.0	17842.0	27772550.0	51908.0
1299.290	33193.5	-33.2	-2279.1	33854.0	-1054338.0	7794.0
1299.291	54783.0	-43.2	-4129.2	41062.0	34905140.0	59429.0
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1299.293	44419.1	41.1	314.0	-26043.0	30391310.0	42337.0
1299.294	26928.1	-7.1	276.5	27395.0	-173641.5	-2200.0
1299.295	48517.4	-17.3	-1564.0	34737.0	35786790.0	49440.0
1299.296	28685.5	5.0	-688.9	-7842.0	-7342329.0	493.0
1299.297	50276.3	-4.7	-2571.7	-737.0	28615480.0	52131.0
1299.298	32788.3	-51.5	-2621.4	52756.0	-1915705.0	7574.0
1299.299	54378.2	-61.4	-4476.0	59899.0	34041880.0	59208.0
1300.1	21307.7	-68.2	-1199.1	75133.0	17515590.0	1452.0
1300.2	20872.0	-79.3	-1290.7	87194.0	17654450.0	334.0
1300.3	47179.5	-139.1	-1432.9	152168.0	39455490.0	2930.0
1300.4	46743.7	-150.2	-1524.5	164230.0	39594320.0	1811.0
1300.5	16387.6	-53.5	-937.3	58957.0	13467480.0	1118.0
1300.6	15951.8	-64.6	-1028.8	71019.0	13610310.0	0.0
1300.7	42259.4	-124.5	-1171.2	135994.0	35400370.0	2596.0
1300.8	41823.6	-135.5	-1262.6	148052.0	35549200.0	1478.0
1300.9	20436.2	-90.3	-1382.1	99253.0	17803280.0	-785.0
1300.10	39418.0	-117.8	-1362.8	129059.0	32865530.0	2486.0
1300.11	38546.5	-140.0	-1545.5	153175.0	33153210.0	250.0
1300.12	15516.1	-75.7	-1120.1	83075.0	13752160.0	-1118.0
1300.13	34497.8	-103.2	-1101.0	112883.0	28820390.0	2153.0
1300.14	33626.3	-125.3	-1283.6	136997.0	29108070.0	-84.0
1300.15	38982.2	-128.9	-1454.3	141119.0	33014360.0	1368.0
1300.16	34062.1	-114.3	-1192.5	124943.0	28969240.0	1035.0
1300.17	21502.6	-63.7	-1138.7	70222.0	17455310.0	1938.0
1300.18	21066.8	-74.8	-1230.4	82286.0	17594140.0	819.0
1300.19	47374.4	-134.6	-1372.6	147260.0	39385210.0	3415.0
1300.20	46938.6	-145.7	-1464.2	159321.0	39524040.0	2297.0
1300.21	16582.4	-49.0	-876.9	54047.0	13403170.0	1604.0
1300.22	16146.7	-60.1	-968.6	66110.0	13546020.0	486.0
1300.23	42454.2	-120.0	-1110.8	131085.0	35340060.0	3082.0
1300.24	42018.4	-131.0	-1202.4	143146.0	35478890.0	1964.0
1300.25	20631.1	-85.8	-1321.9	94346.0	17732990.0	-299.0
1300.26	39612.8	-113.3	-1302.5	124151.0	32805220.0	2972.0
1300.27	38741.3	-135.5	-1485.4	148269.0	33092910.0	735.0
1300.28	15710.9	-71.2	-1060.0	78170.0	13687850.0	-633.0
1300.29	34692.7	-98.7	-1040.6	107974.0	28760110.0	2638.0
1300.30	33821.2	-120.8	-1223.5	132091.0	29047790.0	402.0
1300.31	21632.5	-60.7	-1098.5	66949.0	17408450.0	2261.0
1300.32	21196.7	-71.8	-1190.2	79014.0	17547280.0	1143.0

1300.33	39742.7	-110.4	-1262.2	120878.0	32758360.0	3296.0
1300.34	39306.9	-121.4	-1353.9	132939.0	32907190.0	2178.0
1300.35	16712.3	-46.0	-836.7	50774.0	13360310.0	1928.0
1300.36	16276.5	-57.1	-928.4	62838.0	13503140.0	810.0
1300.37	34822.6	-95.7	-1000.4	104702.0	28713240.0	2962.0
1300.38	34386.8	-106.8	-1092.0	116763.0	28862070.0	1844.0
1300.39	39177.0	-124.4	-1394.1	136212.0	32944050.0	1854.0
1300.40	34256.9	-109.8	-1132.2	120035.0	28898930.0	1520.0
1300.41	21229.8	-70.0	-1223.2	77097.0	17545720.0	1258.0
1300.42	20794.0	-81.1	-1314.8	89158.0	17684550.0	139.0
1300.43	47101.6	-140.9	-1457.0	154132.0	39475620.0	2735.0
1300.44	46665.8	-152.0	-1548.6	166192.0	39614450.0	1617.0
1300.45	16309.7	-55.3	-961.4	60921.0	13493610.0	924.0
1300.46	15873.9	-66.4	-1053.0	72982.0	13635430.0	-194.0
1300.47	42181.4	-126.3	-1195.3	137958.0	35430480.0	2402.0
1300.48	41745.7	-137.3	-1286.6	150014.0	35569330.0	1284.0
1300.49	20358.3	-92.1	-1406.1	101216.0	17823400.0	-979.0
1300.50	39340.0	-119.6	-1386.9	131023.0	32895630.0	2292.0
1300.51	38468.5	-141.8	-1569.6	155137.0	33183320.0	55.0
1300.52	15438.2	-77.5	-1144.1	85038.0	13778280.0	-1313.0
1300.53	34419.9	-105.0	-1125.1	114846.0	28850520.0	1959.0
1300.54	33548.4	-127.1	-1307.7	138959.0	29128200.0	-278.0
1300.55	38904.3	-130.7	-1478.4	143082.0	33034490.0	1174.0
1300.56	33984.1	-116.1	-1216.5	126905.0	28989340.0	840.0
1300.57	21177.9	-71.2	-1239.3	78406.0	17562480.0	1128.0
1300.58	20742.1	-82.3	-1330.9	90467.0	17701310.0	9.7
1300.59	39288.1	-120.8	-1403.0	132332.0	32912390.0	2162.0
1300.60	38852.3	-131.9	-1494.4	144390.0	33051220.0	1044.0
1300.61	16257.7	-56.5	-977.5	62230.0	13510340.0	795.0
1300.62	15822.0	-67.6	-1069.0	74290.0	13653190.0	-324.0
1300.63	34367.9	-106.2	-1141.2	116155.0	28867250.0	1829.0
1300.64	33932.2	-117.3	-1232.6	128213.0	29006100.0	711.0
1300.108	29185.9	15.4	-404.2	-21816.0	35875320.0	7210.0
1300.109	26912.7	-10.2	-1079.4	6325.0	45085430.0	12506.0
1300.110	27276.5	-193.7	-4029.9	208320.0	31218230.0	-6284.0
1300.111	25003.2	-219.3	-4693.7	236464.0	40418320.0	-988.0
1300.112	28476.3	56.9	2809.9	-58707.0	4073304.0	4373.0
1300.113	26203.0	31.3	2135.0	-30530.0	13274390.0	9669.0
1300.114	26569.8	-152.1	-767.5	170990.0	-581044.1	-9151.0
1300.115	24296.7	-177.7	-1431.0	199145.0	8621088.0	-3856.0
1300.116	28952.3	15.3	-672.8	-21397.0	35195730.0	4669.0
1300.117	26679.1	-10.4	-1352.4	6874.0	44395840.0	9965.0
1300.118	27509.3	-194.1	-3788.8	208453.0	31907620.0	-3738.0
1300.119	25236.1	-219.7	-4445.5	236542.0	41107730.0	1558.0
1300.120	28242.8	56.9	2542.4	-58298.0	33877738.0	1832.0
1300.121	25969.6	31.2	1866.4	-30153.0	12589850.0	7128.0
1300.122	26802.7	-152.1	-527.3	170670.0	103368.8	-6603.0
1300.123	24529.6	-177.7	-1193.0	198817.0	9304501.0	-1308.0
1300.124	29189.7	-14.6	-1065.1	7481.0	35726290.0	3785.0
1300.125	26916.5	-40.2	-1743.7	35618.0	44936400.0	9081.0
1300.126	27280.5	-224.0	-4724.4	237920.0	31069260.0	-9711.0
1300.127	25007.2	-249.7	-5389.6	266180.0	40269340.0	-4415.0
1300.128	28477.4	86.9	3554.8	-88396.0	4229585.0	7749.0
1300.129	26204.1	61.2	2884.3	-60198.0	13430670.0	13046.0
1300.130	26570.9	-121.9	-0.5	141006.0	-424763.2	-5774.0
1300.131	24297.7	-147.5	-664.2	169167.0	8777343.0	-479.0
1300.132	28956.3	-14.8	-1349.0	8014.0	35046750.0	1243.0
1300.133	26683.1	-40.5	-2020.5	36245.0	44246860.0	6538.0
1300.134	27513.4	-224.2	-4459.2	237766.0	31758670.0	-7165.0
1300.135	25240.2	-249.7	-5114.4	265846.0	40958780.0	-1869.0

1300.136	28244.0	86.5	3280.7	-87660.0	3545044.0	5206.0
1300.137	25970.8	60.9	2602.8	-59584.0	12746150.0	10502.0
1300.138	26803.7	-122.0	229.6	140811.0	259624.2	-3227.0
1300.139	24530.6	-147.6	-432.6	168914.0	9460756.0	2069.0
1300.140	31165.2	274.6	5118.9	-303883.0	30180240.0	21968.0
1300.141	28891.5	249.0	4439.5	-275722.0	39380220.0	27268.0
1300.142	24803.2	-423.0	-6913.0	463559.0	14656300.0	-23048.0
1300.143	22530.3	-448.6	-7575.2	491671.0	23857480.0	-17755.0
1300.144	30951.1	286.9	6071.3	-314679.0	20635630.0	21127.0
1300.145	28677.5	261.3	5391.8	-286518.0	29835630.0	26427.0
1300.146	24592.5	-410.4	-5931.6	452180.0	5118547.0	-23919.0
1300.147	22319.6	-436.1	-6593.7	480294.0	14320730.0	-18626.0
1300.148	31166.5	265.7	4918.0	-295155.0	30140580.0	20940.0
1300.149	28893.2	240.1	4239.9	-267015.0	39340660.0	26236.0
1300.150	24802.6	-432.1	-7135.6	472615.0	14609140.0	-24058.0
1300.151	22529.7	-457.7	-7797.5	500711.0	23807330.0	-18765.0
1300.152	30949.8	295.9	6278.7	-323423.0	20685290.0	22156.0
1300.153	28676.1	270.3	5598.5	-295241.0	29885270.0	27455.0
1300.154	24593.0	-401.4	-5709.5	443170.0	5165675.0	-22908.0
1300.155	22320.0	-427.0	-6371.9	471292.0	14367830.0	-17614.0
1300.156	30386.5	274.5	4225.8	-302564.0	27891600.0	13500.0
1300.157	28112.8	248.8	3545.4	-274375.0	37101580.0	18800.0
1300.158	25578.6	-423.4	-6088.2	462909.0	16935100.0	-14549.0
1300.159	23305.7	-449.0	-6750.1	491003.0	26135280.0	-9256.0
1300.160	30172.3	286.7	5182.8	-313328.0	18356950.0	12660.0
1300.161	27898.7	261.1	4502.4	-285139.0	27556960.0	17960.0
1300.162	25367.9	-410.8	-5113.8	451537.0	7396314.0	-15421.0
1300.163	23095.0	-436.5	-5775.5	479627.0	16601530.0	-10128.0
1300.164	30388.0	265.5	4020.9	-293872.0	27851980.0	12470.0
1300.165	28114.7	239.9	3342.0	-265702.0	37052060.0	17766.0
1300.166	25578.0	-432.5	-6304.9	471923.0	16884950.0	-15560.0
1300.167	23305.1	-458.1	-6967.6	500043.0	26085130.0	-10267.0
1300.168	30170.9	295.6	5392.5	-322002.0	18396600.0	13690.0
1300.169	27897.2	270.0	4712.1	-293813.0	27596580.0	18990.0
1300.170	25368.6	-401.7	-4893.9	442461.0	7443871.0	-14411.0
1300.171	23095.7	-427.3	-5556.1	470571.0	16641710.0	-9117.0
1300.268	31588.8	60.1	1496.2	-67733.0	14010300.0	49.0
1300.269	24011.3	-25.4	-764.2	26181.0	44685280.0	17702.0
1300.270	29679.1	-149.3	-2137.1	162693.0	9351138.0	-13446.0
1300.271	22102.3	-234.7	-4344.4	256423.0	40028300.0	4202.0
1300.272	31375.3	72.4	2448.6	-78613.0	4467839.0	-797.0
1300.273	23796.9	-13.1	192.3	15342.0	35140590.0	16863.0
1300.274	29468.0	-136.7	-1155.9	151349.0	-187713.1	-14314.0
1300.275	21890.9	-222.2	-3362.9	245119.0	30484370.0	3337.0
1300.276	31355.3	60.1	1227.4	-67367.0	13324740.0	-2492.0
1300.277	23777.7	-25.6	-1034.0	26737.0	43995690.0	15161.0
1300.278	29911.9	-149.4	-1887.5	162468.0	10034530.0	-10899.0
1300.279	22335.0	-234.9	-4091.6	256290.0	40707660.0	6751.0
1300.280	31141.6	72.4	2182.8	-78188.0	3782222.0	-3337.0
1300.281	23563.5	-13.1	-73.4	15652.0	34451050.0	14322.0
1300.282	29700.7	-136.8	-911.7	151136.0	495648.7	-11765.0
1300.283	22123.8	-222.2	-3118.3	244793.0	31163780.0	5885.0
1300.284	31589.9	51.1	1295.2	-58987.0	13965580.0	-979.0
1300.285	24012.5	-34.4	-965.3	34958.0	44635590.0	16674.0
1300.286	29680.3	-158.3	-2349.8	171521.0	9306445.0	-14474.0
1300.287	22102.7	-243.8	-4559.5	265357.0	39978400.0	3182.0
1300.288	31374.9	81.4	2665.6	-87434.0	4513737.0	223.0
1300.289	23797.3	-4.1	418.1	6421.0	35180690.0	17876.0
1300.290	29468.5	-127.7	-928.2	142351.0	-140585.4	-13303.0
1300.291	21891.2	-213.1	-3133.8	236127.0	30534450.0	4350.0

1300.292	31356.4	51.0	1024.3	-58567.0	13280020.0	-3519.0
1300.293	23778.9	-34.6	-1229.8	35448.0	43956000.0	14132.0
1300.294	29913.0	-158.5	-2103.0	171383.0	9990806.0	-11926.0
1300.295	22335.7	-243.9	-4298.8	265138.0	40657840.0	5728.0
1300.296	31141.3	81.3	2400.4	-87023.0	3828145.0	-2318.0
1300.297	23563.8	-4.1	147.4	6767.0	34501120.0	15335.0
1300.298	29701.2	-127.8	-684.2	142118.0	543776.4	-10754.0
1300.299	22124.0	-213.2	-2900.3	235922.0	31213830.0	6898.0
1301.1	-7182.2	88.7	-3939.5	-73417.0	85877820.0	-30538.0
1301.2	-8165.8	101.2	-4245.4	-84512.0	94056900.0	-31897.0
1301.3	-10948.0	175.4	-5822.5	-146573.0	170107200.0	-58264.0
1301.4	-11931.4	188.0	-6128.5	-157676.0	178356300.0	-59623.0
1301.5	-5527.2	69.2	-3063.7	-57459.0	66060010.0	-23497.0
1301.6	-6510.8	81.8	-3369.6	-68554.0	74239100.0	-24856.0
1301.7	-9292.9	156.0	-4946.6	-130615.0	150329400.0	-51223.0
1301.8	-10276.4	168.6	-5252.6	-141719.0	158478500.0	-52582.0
1301.9	-9149.5	113.8	-4551.3	-95604.0	102266000.0	-33256.0
1301.10	-9818.2	149.4	-5257.6	-124625.0	144895400.0	-49946.0
1301.11	-11785.5	174.5	-5869.4	-146820.0	161193500.0	-52664.0
1301.12	-7494.6	94.3	-3675.4	-79645.0	82428130.0	-26215.0
1301.13	-8163.2	129.9	-4381.7	-108668.0	125017600.0	-42905.0
1301.14	-10130.6	155.1	-4993.5	-130863.0	141415700.0	-45623.0
1301.15	-10801.7	162.0	-5563.6	-135725.0	153044500.0	-51305.0
1301.16	-9146.7	142.5	-4687.7	-119768.0	133266700.0	-44264.0
1301.17	-6739.1	83.5	-3783.2	-68882.0	82210860.0	-29917.0
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1301.19	-10504.9	170.2	-5666.2	-142035.0	166520200.0	-57642.0
1301.20	-11488.1	182.8	-5972.2	-153142.0	174669400.0	-59001.0
1301.21	-5084.1	64.0	-2907.4	-52924.0	62393040.0	-22876.0
1301.22	-6067.4	76.6	-3213.4	-64023.0	70582210.0	-24235.0
1301.23	-8849.7	150.8	-4790.4	-126080.0	146642400.0	-50601.0
1301.24	-9833.0	163.4	-5096.4	-137186.0	154891600.0	-51960.0
1301.25	-8706.2	108.6	-4395.1	-91073.0	98579050.0	-32635.0
1301.26	-9375.1	144.2	-5101.4	-120088.0	141208400.0	-49325.0
1301.27	-11342.2	169.4	-5713.2	-142288.0	157606600.0	-52043.0
1301.28	-7051.2	89.1	-3519.2	-75114.0	78761240.0	-25594.0
1301.29	-7720.1	124.7	-4225.5	-104130.0	121330600.0	-42283.0
1301.30	-9687.2	149.9	-4837.3	-126331.0	137728800.0	-45002.0
1301.31	-6443.7	80.0	-3679.0	-65858.0	79766220.0	-29502.0
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1301.33	-9079.7	140.7	-4997.2	-117062.0	138783800.0	-48910.0
1301.34	-10063.0	153.3	-5303.2	-128168.0	146932900.0	-50269.0
1301.35	-4788.6	60.5	-2803.2	-49900.0	59948430.0	-22461.0
1301.36	-5771.9	73.1	-3109.2	-61002.0	68137580.0	-23820.0
1301.37	-7424.6	121.3	-4121.3	-101107.0	118906000.0	-41869.0
1301.38	-8407.9	133.9	-4427.3	-112213.0	127155200.0	-43228.0
1301.39	-10358.4	156.8	-5407.3	-131192.0	149357600.0	-50684.0
1301.40	-8703.4	137.3	-4531.5	-115236.0	129579800.0	-43642.0
1301.41	-7359.5	90.7	-4002.0	-75231.0	87342590.0	-30787.0
1301.42	-8343.1	103.3	-4307.9	-86324.0	95521670.0	-32146.0
1301.43	-11125.2	177.5	-5885.0	-148389.0	171562000.0	-58512.0
1301.44	-12108.7	190.1	-6190.9	-159488.0	179811100.0	-59871.0
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1301.46	-6688.1	83.8	-3432.1	-70366.0	75703870.0	-25105.0
1301.47	-9470.1	158.1	-5009.2	-132431.0	151784200.0	-51471.0
1301.48	-10453.7	170.6	-5315.0	-143532.0	159933300.0	-52830.0
1301.49	-9326.9	115.9	-4613.8	-97416.0	103720700.0	-33505.0
1301.50	-9995.5	151.5	-5320.1	-126439.0	146350100.0	-50195.0
1301.51	-11962.9	176.6	-5931.9	-148633.0	162648300.0	-52913.0
1301.52	-7671.9	96.4	-3737.9	-81458.0	83892900.0	-26464.0

1301.53	-8340.4	132.0	-4444.3	-110483.0	126472400.0	-43153.0
1301.54	-10307.9	157.2	-5056.0	-132674.0	142870400.0	-45872.0
1301.55	-10979.1	164.1	-5626.0	-137538.0	154499200.0	-51554.0
1301.56	-9324.0	144.6	-4750.2	-121581.0	134721500.0	-44513.0
1301.57	-7477.7	92.1	-4043.7	-76440.0	88312440.0	-30952.0
1301.58	-8461.3	104.7	-4349.6	-87533.0	96501530.0	-32312.0
1301.59	-10113.7	152.9	-5361.8	-127648.0	147320000.0	-50360.0
1301.60	-11097.3	165.4	-5667.7	-138746.0	155469100.0	-51719.0
1301.61	-5822.6	72.7	-3167.8	-60482.0	68494660.0	-23911.0
1301.62	-6806.3	85.2	-3473.7	-71574.0	76683710.0	-25270.0
1301.63	-8458.6	133.4	-4485.9	-111693.0	127442200.0	-43319.0
1301.64	-9442.3	146.0	-4791.8	-122790.0	135691300.0	-44678.0
1301.108	-16032.9	-52.1	-5440.4	39176.0	128010000.0	-42253.0
1301.109	-22191.7	-26.1	-6191.8	15455.0	148738900.0	-49857.0
1301.110	-17617.4	130.5	-9379.9	-131903.0	131205800.0	-32983.0
1301.111	-23775.4	156.6	-10119.6	-155638.0	152034900.0	-40587.0
1301.112	9604.5	42.6	2677.3	-14543.0	47500110.0	-28645.0
1301.113	3442.1	68.3	1930.9	-38168.0	68288080.0	-36252.0
1301.114	7944.8	217.1	-1221.7	-183438.0	50746720.0	-19422.0
1301.115	1782.5	242.5	-1959.5	-206921.0	71534720.0	-27028.0
1301.116	-15940.9	-44.5	-6572.0	32450.0	127733500.0	-44603.0
1301.117	-22100.1	-18.4	-7323.9	8703.0	148462300.0	-52207.0
1301.118	-17699.7	122.7	-8249.9	-125240.0	131484800.0	-30630.0
1301.119	-23858.1	148.7	-8986.0	-148975.0	152313800.0	-38234.0
1301.120	9694.7	50.2	1544.1	-21258.0	47223120.0	-30996.0
1301.121	3532.1	75.8	796.9	-44778.0	68001040.0	-38602.0
1301.122	7868.7	209.2	-99.3	-176481.0	51027310.0	-17063.0
1301.123	1705.9	234.6	-839.5	-200009.0	71815180.0	-24669.0
1301.124	-16097.4	-112.1	-5784.0	71333.0	127493600.0	-42409.0
1301.125	-22256.7	-86.0	-6538.5	47602.0	148222300.0	-50013.0
1301.126	-17685.4	69.8	-9752.8	-99365.0	130688400.0	-33140.0
1301.127	-23844.0	95.9	-10491.7	-123149.0	151517400.0	-40744.0
1301.128	9520.2	90.1	3106.0	-43468.0	47978600.0	-28582.0
1301.129	3359.1	115.6	2364.2	-66967.0	68756900.0	-36187.0
1301.130	7861.0	264.8	-777.1	-212316.0	51225340.0	-19358.0
1301.131	1698.6	290.2	-1514.8	-235789.0	72013310.0	-26964.0
1301.132	-16007.6	-104.5	-6924.3	64740.0	127216500.0	-44758.0
1301.133	-22168.0	-78.4	-7671.8	40985.0	147944900.0	-52363.0
1301.134	-17768.3	61.9	-8612.4	-92661.0	130967300.0	-30787.0
1301.135	-23926.6	88.0	-9347.7	-116412.0	151796300.0	-38390.0
1301.136	9606.3	97.6	1974.8	-50104.0	47700560.0	-30934.0
1301.137	3444.6	123.1	1224.6	-73566.0	68478720.0	-38540.0
1301.138	7783.5	257.2	337.4	-205663.0	51505570.0	-17001.0
1301.139	1621.6	282.6	-400.4	-229141.0	72283670.0	-24606.0
1301.140	-5187.1	-229.0	2118.4	219364.0	95996770.0	-48290.0
1301.141	-11340.4	-202.5	1365.3	195535.0	116807100.0	-55891.0
1301.142	-10571.9	369.6	-10943.5	-348335.0	106903100.0	-17456.0
1301.143	-16738.3	394.8	-11680.2	-371772.0	127630100.0	-25065.0
1301.144	2524.8	-198.5	4541.3	202677.0	71854070.0	-44194.0
1301.145	-3628.4	-172.0	3788.1	178845.0	92644390.0	-51795.0
1301.146	-2928.9	393.1	-8492.4	-363029.0	82712840.0	-13403.0
1301.147	-9095.2	418.3	-9229.1	-386473.0	103479800.0	-21011.0
1301.148	-5207.9	-247.2	2012.2	229106.0	95851460.0	-48337.0
1301.149	-11366.6	-221.1	1259.0	205387.0	116600400.0	-55941.0
1301.150	-10546.1	355.3	-11071.0	-339641.0	106709700.0	-17475.0
1301.151	-16713.1	380.5	-11807.3	-363090.0	127536500.0	-25084.0
1301.152	2539.9	-180.5	4652.7	192939.0	72007930.0	-44151.0
1301.153	-3612.6	-154.0	3898.8	169131.0	92788420.0	-51751.0
1301.154	-2952.5	407.4	-8365.6	-371703.0	82856820.0	-13383.0
1301.155	-9117.9	432.7	-9102.3	-395188.0	103674000.0	-20990.0

1301.156	-4880.1	-203.2	-1649.0	196766.0	95085090.0	-56122.0
1301.157	-11032.4	-176.6	-2403.1	172966.0	115885600.0	-63722.0
1301.158	-10819.9	344.4	-7183.8	-326090.0	107839800.0	-9595.0
1301.159	-16987.1	369.5	-7920.0	-349545.0	128566600.0	-17204.0
1301.160	2832.9	-172.5	778.2	180060.0	70942670.0	-52026.0
1301.161	-3319.4	-145.9	24.1	156260.0	91723220.0	-59626.0
1301.162	-3176.0	367.7	-4738.4	-340749.0	83649800.0	-5541.0
1301.163	-9343.2	392.9	-5474.6	-364203.0	104416600.0	-13150.0
1301.164	-4903.6	-221.6	-1759.3	206564.0	94929100.0	-56171.0
1301.165	-11061.0	-195.5	-2513.4	182870.0	115678300.0	-63774.0
1301.166	-10796.1	330.1	-7306.1	-317451.0	107645900.0	-9615.0
1301.167	-16963.5	355.3	-8042.5	-340912.0	128472600.0	-17224.0
1301.168	2850.4	-154.4	891.4	170359.0	71087140.0	-51980.0
1301.169	-3301.9	-127.9	137.3	146559.0	91867690.0	-59581.0
1301.170	-3202.4	382.0	-4612.9	-349445.0	83793070.0	-5523.0
1301.171	-9368.6	407.2	-5349.6	-372885.0	104610100.0	-13131.0
1301.268	159.6	-46.7	-1744.0	47393.0	75560710.0	-28598.0
1301.269	-20370.3	40.1	-4252.4	-31640.0	144803500.0	-53945.0
1301.270	-1428.2	135.6	-5690.9	-123689.0	78815670.0	-19331.0
1301.271	-21972.2	220.6	-8144.6	-202184.0	148094900.0	-44686.0
1301.272	7866.8	-16.5	678.2	30748.0	51416820.0	-24505.0
1301.273	-12655.4	70.5	-1820.9	-48368.0	120671600.0	-49849.0
1301.274	6224.1	160.1	-3239.7	-138718.0	54667770.0	-15272.0
1301.275	-14319.3	244.8	-5692.2	-217102.0	123947200.0	-40627.0
1301.276	250.1	-39.0	-2875.0	40609.0	75283800.0	-30949.0
1301.277	-20278.7	47.9	-5383.5	-38446.0	144526900.0	-56295.0
1301.278	-1507.4	127.7	-4561.0	-116931.0	79095460.0	-16976.0
1301.279	-22049.4	213.1	-7011.9	-195602.0	148375200.0	-42329.0
1301.280	7959.9	-8.7	-450.1	23973.0	51140570.0	-26854.0
1301.281	-12565.7	78.0	-2952.6	-54960.0	120394500.0	-52200.0
1301.282	6149.7	152.5	-2114.2	-132043.0	54958790.0	-12914.0
1301.283	-14396.2	237.1	-4569.4	-210340.0	124227500.0	-38270.0
1301.284	140.0	-64.7	-1849.7	57105.0	75405710.0	-28644.0
1301.285	-20390.2	22.1	-4358.2	-21974.0	144698500.0	-53992.0
1301.286	-1444.9	117.6	-5808.7	-113993.0	78671410.0	-19375.0
1301.287	-21972.1	204.3	-8266.2	-193017.0	147994900.0	-44721.0
1301.288	7859.7	-0.7	800.3	21672.0	51565010.0	-24475.0
1301.289	-12679.7	84.7	-1690.1	-56945.0	120865400.0	-49829.0
1301.290	6196.5	174.3	-3109.7	-147408.0	54810720.0	-15254.0
1301.291	-14344.1	259.2	-5559.7	-225783.0	124140800.0	-40608.0
1301.292	232.2	-57.1	-2982.7	50375.0	75129230.0	-30993.0
1301.293	-20299.5	29.8	-5486.1	-28748.0	144421600.0	-56343.0
1301.294	-1524.4	109.7	-4680.2	-107244.0	78951130.0	-17020.0
1301.295	-22054.2	196.3	-7128.4	-186239.0	148274000.0	-42367.0
1301.296	7950.2	6.9	-327.1	14968.0	51288100.0	-26825.0
1301.297	-12591.1	92.2	-2824.7	-63578.0	120588000.0	-52181.0
1301.298	6121.5	166.6	-1984.4	-140666.0	55091590.0	-12896.0
1301.299	-14420.8	251.5	-4443.1	-219077.0	124421200.0	-38250.0
1302.1	736.9	-5.2	164.9	2742.0	17007980.0	-75157.0
1302.2	-570.2	-6.4	453.8	3507.0	23104540.0	-78005.0
1302.3	5917.3	-12.0	2352.6	6630.0	33089500.0	-149388.0
1302.4	4610.2	-13.2	2641.3	7395.0	39186060.0	-152235.0
1302.5	567.8	-4.1	144.9	2180.0	13074850.0	-57815.0
1302.6	-739.4	-5.3	433.7	2947.0	19171380.0	-60663.0
1302.7	5748.2	-10.9	2332.5	6070.0	29166370.0	-132046.0
1302.8	4441.1	-12.1	2621.1	6836.0	35252920.0	-134894.0
1302.9	-1877.6	-7.7	742.5	4282.0	29201020.0	-80853.0
1302.10	4363.2	-10.0	1696.5	5461.0	28273050.0	-127119.0
1302.11	1748.6	-12.4	2273.6	7011.0	40456070.0	-132814.0
1302.12	-2046.8	-6.6	722.5	3727.0	25267860.0	-63511.0

1302.13	4194.1	-8.8	1676.3	4901.0	24339920.0	-109777.0
1302.14	1579.4	-11.3	2253.5	6455.0	36522910.0	-115473.0
1302.15	3056.0	-11.2	1985.2	6230.0	34359580.0	-129966.0
1302.16	2886.9	-10.1	1965.0	5670.0	30426450.0	-112625.0
1302.17	1322.5	-4.8	77.9	2451.0	14287370.0	-73881.0
1302.18	15.6	-5.9	366.9	3208.0	20373980.0	-76728.0
1302.19	6502.8	-11.6	2265.8	6339.0	30368870.0	-148111.0
1302.20	5196.0	-12.7	2554.4	7096.0	36465500.0	-150959.0
1302.21	1153.4	-3.6	57.9	1890.0	10354230.0	-56539.0
1302.22	-153.6	-4.8	346.8	2648.0	16450820.0	-59387.0
1302.23	6333.8	-10.4	2245.6	5776.0	26435750.0	-130769.0
1302.24	5026.9	-11.6	2534.3	6534.0	32532360.0	-133617.0
1302.25	-1291.8	-7.2	655.6	3981.0	26470460.0	-79576.0
1302.26	4948.8	-9.5	1609.6	5168.0	25542440.0	-125842.0
1302.27	2334.4	-11.9	2186.8	6709.0	37725510.0	-131538.0
1302.28	-1460.9	-6.0	635.5	3422.0	22537320.0	-62235.0
1302.29	4779.7	-8.4	1589.5	4609.0	21609300.0	-108500.0
1302.30	2165.3	-10.8	2166.6	6151.0	33802370.0	-114196.0
1302.31	1712.9	-4.4	19.9	2258.0	12466960.0	-73029.0
1302.32	406.1	-5.6	308.9	3010.0	18563600.0	-75877.0
1302.33	5339.1	-9.2	1551.7	4976.0	23722000.0	-124991.0
1302.34	4032.3	-10.4	1840.4	5733.0	29818640.0	-127838.0
1302.35	1543.9	-3.3	-0.1	1696.0	8536849.0	-55688.0
1302.36	237.0	-4.5	288.8	2450.0	14630460.0	-58535.0
1302.37	5170.1	-8.0	1531.5	4412.0	19798890.0	-107649.0
1302.38	3863.2	-9.2	1820.2	5171.0	25885500.0	-110497.0
1302.39	3641.8	-10.7	1898.3	5930.0	31639020.0	-128690.0
1302.40	3472.8	-9.6	1878.2	5368.0	27705910.0	-111348.0
1302.41	502.7	-5.4	199.8	2858.0	18098240.0	-75668.0
1302.42	-804.6	-6.6	488.6	3626.0	24194750.0	-78516.0
1302.43	5683.0	-12.2	2387.4	6747.0	34179740.0	-149898.0
1302.44	4375.9	-13.4	2676.0	7516.0	40276290.0	-152746.0
1302.45	333.6	-4.3	179.7	2297.0	14165100.0	-58326.0
1302.46	-973.7	-5.5	468.5	3066.0	20261610.0	-61174.0
1302.47	5514.0	-11.1	2367.3	6184.0	30256620.0	-132557.0
1302.48	4206.7	-12.3	2655.8	6958.0	36343130.0	-135404.0
1302.49	-2112.0	-7.9	777.3	4404.0	30291230.0	-81364.0
1302.50	4128.9	-10.2	1731.3	5579.0	29363280.0	-127629.0
1302.51	1514.2	-12.6	2308.4	7133.0	41546270.0	-133325.0
1302.52	-2281.2	-6.8	757.2	3847.0	26358070.0	-64022.0
1302.53	3959.8	-9.0	1711.1	5017.0	25430150.0	-110287.0
1302.54	1345.1	-11.5	2288.3	6577.0	37613140.0	-115983.0
1302.55	2821.7	-11.4	2019.9	6351.0	35449820.0	-130477.0
1302.56	2652.6	-10.3	1999.7	5791.0	31516680.0	-113135.0
1302.57	346.5	-5.6	223.0	2936.0	18828390.0	-76008.0
1302.58	-960.8	-6.8	511.7	3706.0	24924900.0	-78856.0
1302.59	3972.7	-10.3	1754.4	5658.0	30083430.0	-127970.0
1302.60	2665.4	-11.5	2043.0	6432.0	36179940.0	-130818.0
1302.61	177.4	-4.4	202.9	2375.0	14895260.0	-58667.0
1302.62	-1129.9	-5.6	491.6	3146.0	20991760.0	-61515.0
1302.63	3803.7	-9.2	1734.3	5096.0	26150320.0	-110628.0
1302.64	2496.4	-10.4	2022.8	5872.0	32246830.0	-113476.0
1302.108	-3439.5	-111.3	642.3	39274.0	27302580.0	-82857.0
1302.109	-7674.1	-117.1	1353.1	42222.0	47562340.0	-101471.0
1302.110	-5792.8	-113.7	7577.1	48292.0	37632260.0	-89797.0
1302.111	-10025.4	-119.4	8293.4	51237.0	57882520.0	-108408.0
1302.112	15212.0	99.5	-6218.1	-41476.0	-18819420.0	-66698.0
1302.113	10976.2	93.6	-5510.9	-38466.0	1436029.0	-85314.0
1302.114	12784.4	87.9	686.9	-28989.0	-8468700.0	-73707.0
1302.115	8548.1	82.2	1405.6	-26087.0	11786620.0	-92323.0

1302.116	-3686.1	-88.5	1389.1	16480.0	27359680.0	-83040.0
1302.117	-7921.9	-94.2	2106.3	19348.0	47619120.0	-101656.0
1302.118	-5531.8	-136.8	6826.8	71157.0	37568840.0	-89601.0
1302.119	-9765.2	-142.4	7545.9	74107.0	57828900.0	-108214.0
1302.120	14964.5	122.1	-5468.9	-64195.0	-18762560.0	-66882.0
1302.121	10728.0	116.3	-4762.0	-61247.0	1491713.0	-85498.0
1302.122	13051.3	65.2	-88.1	-6289.0	-8540613.0	-73504.0
1302.123	8814.6	59.5	628.0	-3358.0	11721610.0	-92120.0
1302.124	-3602.2	-209.1	411.3	80921.0	27151080.0	-83093.0
1302.125	-7837.6	-214.8	1119.5	83876.0	47410630.0	-101708.0
1302.126	-5961.4	-211.8	7359.3	89793.0	37489250.0	-90039.0
1302.127	-10195.6	-217.4	8082.8	92696.0	57739100.0	-108652.0
1302.128	15245.3	184.5	-6007.8	-78189.0	-18630920.0	-66589.0
1302.129	11010.5	178.7	-5294.0	-75266.0	1631779.0	-85204.0
1302.130	12818.5	173.0	892.4	-65645.0	-8280001.0	-73598.0
1302.131	8581.9	167.2	1611.8	-62754.0	11981240.0	-92214.0
1302.132	-3853.9	-186.1	1159.7	57949.0	27216870.0	-83281.0
1302.133	-8090.9	-191.8	1881.3	60835.0	47476010.0	-101898.0
1302.134	-5701.1	-234.8	6611.4	112699.0	37425650.0	-89844.0
1302.135	-9934.3	-240.5	7331.5	115654.0	57685760.0	-108456.0
1302.136	14989.6	207.3	-5236.4	-101132.0	-18566150.0	-66782.0
1302.137	10755.0	201.4	-4535.0	-98187.0	1691601.0	-85397.0
1302.138	13083.0	150.2	113.8	-42832.0	-8342527.0	-73398.0
1302.139	8847.6	144.4	829.7	-39903.0	11918020.0	-92013.0
1302.140	5854.3	-30.1	-9743.4	-1139.0	-899568.1	-69084.0
1302.141	1627.0	-35.1	-9034.7	1540.0	19355050.0	-87691.0
1302.142	-2089.0	-49.5	13381.1	32947.0	33567100.0	-92315.0
1302.143	-6330.0	-55.8	14095.5	36088.0	53825220.0	-110935.0
1302.144	11471.3	35.6	-11777.8	-26345.0	-14743670.0	-64218.0
1302.145	7244.2	30.5	-11069.1	-23672.0	5513996.0	-82825.0
1302.146	3456.9	8.6	11297.4	10674.0	19741850.0	-87513.0
1302.147	-784.1	2.2	12011.7	13818.0	39999980.0	-106133.0
1302.148	5802.7	-59.6	-9817.9	11440.0	-943731.1	-69156.0
1302.149	1568.5	-65.5	-9110.6	14415.0	19310120.0	-87770.0
1302.150	-2095.7	-74.7	13333.8	43769.0	33505390.0	-92347.0
1302.151	-6337.1	-81.1	14045.8	46956.0	53773410.0	-110967.0
1302.152	11520.4	64.8	-11703.9	-38734.0	-14691150.0	-64149.0
1302.153	7293.6	59.8	-10992.1	-36121.0	5559598.0	-82756.0
1302.154	3465.5	34.0	11351.8	-301.0	19804050.0	-87480.0
1302.155	-774.0	27.8	12066.2	2798.0	40062550.0	-106099.0
1302.156	5035.8	45.7	-7269.2	-76934.0	-719367.4	-69690.0
1302.157	809.2	40.8	-6556.3	-74341.0	19536430.0	-88298.0
1302.158	-1186.7	-125.2	10827.8	108892.0	33347270.0	-91631.0
1302.159	-5428.4	-131.6	11539.1	112094.0	53605210.0	-110251.0
1302.160	10654.1	111.4	-9296.2	-102205.0	-14562140.0	-64824.0
1302.161	6427.5	106.4	-8583.3	-99612.0	5693655.0	-83431.0
1302.162	4359.1	-67.0	8740.1	86562.0	19532010.0	-86828.0
1302.163	117.5	-73.4	9451.2	89766.0	39789980.0	-105448.0
1302.164	4980.5	15.8	-7351.0	-64190.0	-763474.4	-69766.0
1302.165	747.2	10.1	-6639.2	-61314.0	19490610.0	-88379.0
1302.166	-1194.4	-150.7	10777.9	119862.0	33295310.0	-91663.0
1302.167	-5436.3	-157.1	11490.1	123056.0	53553200.0	-110283.0
1302.168	10705.1	140.8	-9209.7	-114777.0	-14519130.0	-64753.0
1302.169	6478.5	135.9	-8496.7	-112184.0	5740665.0	-83361.0
1302.170	4365.2	-41.8	8782.1	75784.0	19583560.0	-86797.0
1302.171	124.3	-48.1	9496.3	78920.0	39841710.0	-105417.0
1302.268	8059.1	-28.2	-2594.8	6641.0	-12484120.0	-55454.0
1302.269	-6057.4	-47.4	-227.2	16442.0	55034760.0	-117501.0
1302.270	5700.6	-31.4	4356.7	15879.0	-2152777.0	-62400.0
1302.271	-8425.1	-51.6	6735.2	26066.0	65370760.0	-124456.0

1302.272	13668.0	36.5	-4640.8	-18130.0	-26323290.0	-50593.0
1302.273	-433.6	18.5	-2273.7	-8756.0	41189390.0	-112630.0
1302.274	11255.7	27.3	2273.8	-6627.0	-15978670.0	-57589.0
1302.275	-2865.8	7.8	4658.0	3301.0	51548940.0	-119642.0
1302.276	7811.9	-5.6	-1858.0	-15987.0	-12437180.0	-55637.0
1302.277	-6305.2	-24.5	529.7	-6428.0	55091540.0	-117686.0
1302.278	5966.8	-54.6	3587.3	38861.0	-2216869.0	-62199.0
1302.279	-8158.5	-74.4	5976.4	48896.0	65308770.0	-124255.0
1302.280	13423.4	59.3	-3892.7	-40940.0	-26275690.0	-50775.0
1302.281	-682.1	41.1	-1527.0	-31539.0	41246000.0	-112815.0
1302.282	11526.2	4.7	1502.7	16164.0	-16049670.0	-57383.0
1302.283	-2599.2	-15.1	3882.5	26160.0	51476940.0	-119440.0
1302.284	8009.7	-57.5	-2667.6	19118.0	-12526730.0	-55525.0
1302.285	-6107.2	-76.8	-298.5	28928.0	54992060.0	-117573.0
1302.286	5653.2	-60.6	4284.6	28264.0	-2198869.0	-62469.0
1302.287	-8456.2	-79.3	6674.0	37920.0	65322820.0	-124510.0
1302.288	13695.1	63.7	-4568.7	-29827.0	-26276380.0	-50545.0
1302.289	-423.4	44.0	-2207.1	-19843.0	41251990.0	-112597.0
1302.290	11262.4	52.5	2332.0	-17450.0	-15916960.0	-57559.0
1302.291	-2855.2	33.3	4718.7	-7698.0	51601640.0	-119609.0
1302.292	7763.4	-34.8	-1923.3	-3658.0	-12479560.0	-55708.0
1302.293	-6355.9	-53.9	458.1	6090.0	55048610.0	-117758.0
1302.294	5918.8	-83.7	3521.3	51179.0	-2261114.0	-62269.0
1302.295	-8194.9	-102.5	5916.5	60880.0	65259480.0	-124313.0
1302.296	13447.9	86.2	-3822.1	-52547.0	-26219440.0	-50729.0
1302.297	-672.8	66.6	-1463.5	-42605.0	41308370.0	-112783.0
1302.298	11531.8	29.7	1560.6	5345.0	-15988240.0	-57354.0
1302.299	-2588.9	10.6	3942.8	15091.0	51539570.0	-119407.0
1303.1	27135.2	-51.1	729.4	45654.0	10440190.0	1907.0
1303.2	26916.9	-60.4	481.0	53473.0	9745501.0	1679.0
1303.3	57319.9	-100.9	873.2	88582.0	26692310.0	4280.0
1303.4	57101.6	-110.2	624.8	96400.0	25996620.0	4052.0
1303.5	20876.0	-40.5	459.0	36055.0	8020468.0	1473.0
1303.6	20657.7	-49.9	210.6	43873.0	7325780.0	1245.0
1303.7	51060.7	-90.3	602.8	78983.0	24275580.0	3845.0
1303.8	50842.4	-99.6	354.5	86799.0	23579900.0	3617.0
1303.9	26698.6	-69.8	232.8	61290.0	9051813.0	1451.0
1303.10	48264.5	-85.9	830.0	75705.0	21817280.0	3568.0
1303.11	47827.9	-104.6	333.6	91336.0	20427900.0	3112.0
1303.12	20439.4	-59.2	-37.5	51688.0	6632091.0	1017.0
1303.13	42005.3	-75.4	559.7	66105.0	19397550.0	3134.0
1303.14	41568.7	-94.0	63.4	81734.0	18008180.0	2678.0
1303.15	48046.2	-95.3	581.7	83522.0	21122590.0	3340.0
1303.16	41787.0	-84.7	311.3	73922.0	18702860.0	2906.0
1303.17	27232.4	-47.4	816.5	42513.0	10750990.0	2000.0
1303.18	27014.2	-56.7	568.0	50333.0	10056320.0	1772.0
1303.19	57417.1	-97.2	960.3	85442.0	27007100.0	4373.0
1303.20	57198.9	-106.5	711.9	93260.0	26311440.0	4145.0
1303.21	20973.2	-36.8	546.1	32913.0	8331264.0	1566.0
1303.22	20755.0	-46.2	297.6	40733.0	7636601.0	1338.0
1303.23	51157.9	-86.6	689.8	75843.0	24580380.0	3938.0
1303.24	50939.7	-95.9	441.4	83661.0	23884720.0	3710.0
1303.25	26795.9	-66.1	319.7	58150.0	9361634.0	1544.0
1303.26	48361.7	-82.2	917.1	72565.0	22127070.0	3661.0
1303.27	47925.2	-100.9	420.5	88198.0	20737720.0	3205.0
1303.28	20536.7	-55.5	49.4	48550.0	6941912.0	1110.0
1303.29	42102.5	-71.7	646.7	62965.0	19707350.0	3227.0
1303.30	41666.0	-90.3	150.2	78596.0	18318000.0	2771.0
1303.31	27297.2	-44.9	874.5	40419.0	10957520.0	2062.0
1303.32	27079.0	-54.3	626.0	48239.0	10262850.0	1834.0

1303.33	48426.5	-79.8	975.1	70471.0	22333600.0	3723.0
1303.34	48208.3	-89.1	726.7	78289.0	21638940.0	3495.0
1303.35	21038.1	-34.4	604.1	30820.0	8537820.0	1628.0
1303.36	20819.8	-43.7	355.6	38640.0	7843131.0	1400.0
1303.37	42167.4	-69.2	704.7	60872.0	19913900.0	3289.0
1303.38	41949.1	-78.5	456.3	68689.0	19219220.0	3061.0
1303.39	48143.5	-91.6	668.7	80383.0	21432410.0	3433.0
1303.40	41884.3	-81.0	398.3	70782.0	19012690.0	2999.0
1303.41	27096.3	-52.6	694.6	46911.0	10316270.0	1870.0
1303.42	26878.0	-61.9	446.2	54729.0	9621578.0	1642.0
1303.43	57281.0	-102.4	838.4	89838.0	26572380.0	4243.0
1303.44	57062.7	-111.7	590.1	97655.0	25876700.0	4015.0
1303.45	20837.1	-42.0	424.2	37311.0	7896544.0	1436.0
1303.46	20618.8	-51.4	175.8	45129.0	7201856.0	1208.0
1303.47	51021.8	-91.8	568.0	80239.0	24145660.0	3808.0
1303.48	50803.5	-101.1	319.8	88054.0	23449970.0	3580.0
1303.49	26659.7	-71.2	198.1	62545.0	8927889.0	1414.0
1303.50	48225.6	-87.4	795.2	76961.0	21693350.0	3531.0
1303.51	47789.0	-106.1	298.9	92590.0	20303970.0	3075.0
1303.52	20400.5	-60.7	-72.2	52943.0	6508168.0	980.0
1303.53	41966.4	-76.9	524.9	67361.0	19273630.0	3097.0
1303.54	41529.8	-95.5	28.6	82990.0	17884250.0	2640.0
1303.55	48007.3	-96.8	547.0	84777.0	20998660.0	3303.0
1303.56	41748.1	-86.2	276.6	75177.0	18578940.0	2868.0
1303.57	27070.3	-53.6	671.3	47748.0	10233630.0	1845.0
1303.58	26852.1	-62.9	423.0	55566.0	9538970.0	1617.0
1303.59	48199.6	-88.4	772.0	77798.0	21610720.0	3506.0
1303.60	47981.3	-97.7	523.8	85614.0	20916030.0	3278.0
1303.61	20811.2	-43.0	400.9	38149.0	7813938.0	1411.0
1303.62	20592.9	-52.3	152.7	45966.0	7119249.0	1183.0
1303.63	41940.5	-77.8	501.7	68198.0	19191020.0	3072.0
1303.64	41722.2	-87.2	253.5	76013.0	18496330.0	2844.0
1303.108	27188.8	121.2	8222.9	-89740.0	24195860.0	8999.0
1303.109	31258.8	98.1	9218.4	-70830.0	38944120.0	13926.0
1303.110	28180.4	-76.8	-7.0	73643.0	21028820.0	-2797.0
1303.111	32250.6	-100.0	997.5	92570.0	35767130.0	2130.0
1303.112	33633.1	-18.8	293.5	12658.0	-6700196.0	2693.0
1303.113	37703.2	-41.9	1289.6	31595.0	8037087.0	7619.0
1303.114	34613.1	-215.9	-7900.2	175786.0	-9870198.0	-9117.0
1303.115	38682.9	-239.0	-6894.3	194733.0	4872008.0	-4190.0
1303.116	27220.5	117.2	8764.9	-83521.0	24083950.0	6742.0
1303.117	31290.4	94.0	9757.2	-64515.0	38822180.0	11669.0
1303.118	28151.2	-73.3	-570.4	67844.0	21141370.0	-537.0
1303.119	32221.3	-96.4	439.5	86736.0	35879650.0	4390.0
1303.120	33664.7	-22.7	835.9	18874.0	-6822135.0	436.0
1303.121	37734.7	-45.8	1832.7	37793.0	7921122.0	5362.0
1303.122	34584.3	-212.0	-8459.9	169647.0	-9757545.0	-6857.0
1303.123	38654.1	-235.1	-7456.1	188579.0	4985661.0	-1930.0
1303.124	27170.1	99.1	8030.5	-65057.0	24031090.0	2513.0
1303.125	31239.9	76.0	9023.6	-46157.0	38779300.0	7439.0
1303.126	28160.5	-99.1	-228.3	98559.0	20863740.0	-9284.0
1303.127	32230.6	-122.4	774.9	117573.0	35602020.0	-4357.0
1303.128	33632.6	4.4	561.7	-12225.0	-6530324.0	9158.0
1303.129	37703.0	-18.7	1562.1	6750.0	8213035.0	14085.0
1303.130	34613.1	-192.4	-7609.5	150697.0	-9690198.0	-2651.0
1303.131	38682.9	-215.6	-6603.7	169650.0	5048008.0	2275.0
1303.132	27201.0	95.1	8563.5	-58759.0	23918980.0	255.0
1303.133	31270.7	71.9	9561.6	-39775.0	38657160.0	5182.0
1303.134	28131.2	-95.4	-773.5	92562.0	20976270.0	-7024.0
1303.135	32201.4	-118.5	237.6	111447.0	35714580.0	-2098.0

1303.136	33663.3	0.2	1100.5	-5749.0	-6642492.0	6900.0
1303.137	37733.5	-22.9	2095.9	13119.0	8098817.0	11827.0
1303.138	34584.0	-188.6	-8180.5	144615.0	-9577622.0	-392.0
1303.139	38654.0	-211.7	-7173.6	163524.0	5161635.0	4535.0
1303.140	28290.4	303.4	15185.4	-244814.0	17082880.0	20557.0
1303.141	32361.8	280.2	16177.8	-225893.0	31825490.0	25485.0
1303.142	31582.7	-356.3	-12212.2	300163.0	6514747.0	-18778.0
1303.143	35651.6	-379.3	-11204.8	319074.0	21254720.0	-13853.0
1303.144	30227.9	261.0	12792.7	-213888.0	7809278.0	18669.0
1303.145	34299.3	237.8	13785.1	-194967.0	22549750.0	23598.0
1303.146	33507.7	-397.7	-14572.8	330674.0	-2752186.0	-20679.0
1303.147	37576.6	-420.7	-13565.5	349586.0	11991790.0	-15754.0
1303.148	28284.2	296.9	15126.7	-237457.0	17034300.0	18610.0
1303.149	32354.2	273.7	16120.3	-218551.0	31773560.0	23537.0
1303.150	31583.8	-363.4	-12295.1	307756.0	6461027.0	-20717.0
1303.151	35652.6	-386.4	-11287.3	326652.0	21204980.0	-15791.0
1303.152	30234.0	267.6	12855.8	-221251.0	7858010.0	20616.0
1303.153	34305.6	244.4	13847.4	-202312.0	22601360.0	25544.0
1303.154	33507.1	-390.6	-14490.9	323123.0	-2692339.0	-18740.0
1303.155	37576.3	-413.7	-13484.1	342039.0	12044710.0	-13814.0
1303.156	28396.4	290.2	16995.1	-224150.0	16696920.0	13033.0
1303.157	32468.0	267.0	17986.4	-205204.0	31442590.0	17962.0
1303.158	31489.3	-343.7	-14073.8	280013.0	6890921.0	-11242.0
1303.159	35558.1	-366.8	-13066.0	298907.0	21630870.0	-6317.0
1303.160	30334.2	247.8	14605.8	-193188.0	7423177.0	11146.0
1303.161	34405.8	224.6	15597.1	-174242.0	22166920.0	16075.0
1303.162	33414.3	-385.1	-16439.9	310519.0	-2376012.0	-13143.0
1303.163	37483.1	-408.2	-15431.9	329410.0	12367940.0	-8218.0
1303.164	28389.4	283.7	16933.9	-216832.0	16649140.0	11086.0
1303.165	32459.6	260.6	17926.4	-197898.0	31390440.0	16013.0
1303.166	31490.2	-350.8	-14151.7	287576.0	6837150.0	-13181.0
1303.167	35559.0	-373.9	-13144.6	306489.0	21581100.0	-8256.0
1303.168	30340.9	254.3	14669.8	-200481.0	7471622.0	13093.0
1303.169	34412.5	231.1	15661.1	-181535.0	22208630.0	18022.0
1303.170	33413.0	-378.0	-16358.7	302903.0	-2316344.0	-11205.0
1303.171	37481.9	-401.1	-15351.4	321812.0	12421630.0	-6279.0
1303.268	24700.1	99.2	4274.3	-76115.0	-3819004.0	1048.0
1303.269	38266.6	22.0	7586.6	-13000.0	45321810.0	17471.0
1303.270	25691.6	-99.1	-3967.7	87495.0	-6996074.0	-10747.0
1303.271	39256.4	-176.1	-610.1	150542.0	42154310.0	5673.0
1303.272	26635.5	56.9	1883.1	-45265.0	-13095280.0	-841.0
1303.273	40205.2	-20.4	5196.7	17886.0	36046350.0	15584.0
1303.274	27618.1	-140.5	-6329.7	118027.0	-16254620.0	-12647.0
1303.275	41184.0	-217.6	-2972.7	181108.0	32886040.0	3774.0
1303.276	24731.5	95.3	4816.9	-69946.0	-3930995.0	-1209.0
1303.277	38298.2	17.9	8126.5	-6679.0	45209870.0	15214.0
1303.278	25662.9	-95.2	-4523.9	81427.0	-6873394.0	-8488.0
1303.279	39227.9	-172.3	-1165.0	144543.0	42267040.0	7933.0
1303.280	26667.6	52.9	2427.4	-39035.0	-13207100.0	-3098.0
1303.281	40236.6	-24.2	5742.4	24031.0	35934360.0	13327.0
1303.282	27590.0	-136.7	-6890.4	111960.0	-16141790.0	-10386.0
1303.283	41155.2	-213.7	-3532.0	174952.0	32998690.0	6034.0
1303.284	24694.3	92.6	4215.4	-68745.0	-3870485.0	-898.0
1303.285	38260.8	15.4	7527.0	-5608.0	45270330.0	15525.0
1303.286	25686.0	-105.7	-4037.7	94921.0	-7037501.0	-12693.0
1303.287	39253.4	-182.9	-685.5	158038.0	42093540.0	3730.0
1303.288	26638.2	63.7	1956.8	-52666.0	-13044600.0	1102.0
1303.289	40205.1	-13.4	5280.0	10423.0	36096320.0	17524.0
1303.290	27617.4	-133.5	-6245.0	110489.0	-16204800.0	-10708.0
1303.291	41184.0	-210.6	-2886.3	173583.0	32936040.0	5714.0

1303.292	24726.1	88.6	4755.8	-62527.0	-3982372.0	-3155.0
1303.293	38292.2	11.3	8071.6	669.0	45158340.0	13267.0
1303.294	25657.2	-102.0	-4596.4	88921.0	-6924849.0	-10433.0
1303.295	39224.1	-179.1	-1232.8	151987.0	42216070.0	5989.0
1303.296	26669.8	59.7	2502.0	-46446.0	-13156530.0	-1155.0
1303.297	40236.4	-17.3	5821.7	16586.0	35984310.0	15267.0
1303.298	27589.1	-129.7	-6805.0	104411.0	-16092020.0	-8448.0
1303.299	41155.3	-206.8	-3454.3	167505.0	33048720.0	7974.0
1304.1	11497.7	40.3	3185.5	-36880.0	23733060.0	-33897.0
1304.2	8028.1	47.3	3797.8	-43180.0	29267970.0	-40996.0
1304.3	27883.9	86.8	7946.1	-80827.0	45673180.0	-59144.0
1304.4	24414.2	93.8	8558.4	-87160.0	51208060.0	-66243.0
1304.5	8846.4	31.6	2466.3	-28864.0	18256720.0	-26082.0
1304.6	5376.8	38.6	3078.6	-35156.0	23781620.0	-33181.0
1304.7	25232.6	78.1	7226.9	-72808.0	40186840.0	-51329.0
1304.8	21762.8	85.2	7839.3	-79144.0	45721690.0	-58428.0
1304.9	4558.8	54.3	4410.1	-49443.0	34792950.0	-48095.0
1304.10	22968.0	72.9	6517.8	-67640.0	39089140.0	-51570.0
1304.11	16029.1	86.8	7742.7	-80224.0	50159020.0	-65768.0
1304.12	1907.5	45.6	3691.0	-41412.0	29316600.0	-40280.0
1304.13	20316.7	64.2	5798.7	-59627.0	33612790.0	-43755.0
1304.14	13377.8	78.1	7023.6	-72200.0	44672680.0	-57953.0
1304.15	19498.4	79.9	7130.2	-73957.0	44624040.0	-58669.0
1304.16	16847.1	71.2	6411.0	-65940.0	39137690.0	-50854.0
1304.17	13047.6	37.5	2942.3	-34358.0	21258440.0	-30709.0
1304.18	9577.8	44.5	3554.5	-40691.0	26793300.0	-37809.0
1304.19	29433.9	84.0	7702.7	-78293.0	43198590.0	-55956.0
1304.20	25963.9	91.1	8315.1	-84662.0	48733390.0	-63056.0
1304.21	10396.2	28.8	2223.1	-26341.0	15782070.0	-22894.0
1304.22	6926.5	35.8	2835.3	-32668.0	21316950.0	-29994.0
1304.23	26782.4	75.4	6983.5	-70289.0	37722190.0	-48141.0
1304.24	23312.5	82.4	7595.9	-76653.0	43257020.0	-55241.0
1304.25	6108.4	51.5	4166.8	-46961.0	32328250.0	-44908.0
1304.26	24517.9	70.1	6274.5	-65114.0	36614520.0	-48382.0
1304.27	17578.7	84.1	7499.3	-77736.0	47684320.0	-62581.0
1304.28	3457.1	42.8	3447.6	-38934.0	26841910.0	-37092.0
1304.29	21866.6	61.4	5555.3	-57094.0	31138170.0	-40567.0
1304.30	14927.4	75.4	6780.2	-69719.0	42207980.0	-54765.0
1304.31	14080.9	35.7	2780.1	-32673.0	19612040.0	-28584.0
1304.32	10611.0	42.7	3392.2	-39028.0	25146870.0	-35684.0
1304.33	25551.3	68.2	6112.3	-63421.0	34968140.0	-46257.0
1304.34	22081.4	75.2	6724.6	-69784.0	40502960.0	-53357.0
1304.35	11429.5	27.0	2060.8	-24659.0	14135670.0	-20769.0
1304.36	7959.6	34.0	2673.0	-31009.0	19670490.0	-27868.0
1304.37	22899.8	59.5	5393.1	-55420.0	29491740.0	-38442.0
1304.38	19430.0	66.6	6005.5	-61778.0	35026590.0	-45541.0
1304.39	21048.1	77.1	6886.8	-71460.0	42149370.0	-55482.0
1304.40	18396.7	68.4	6167.7	-63455.0	36673000.0	-47666.0
1304.41	10877.8	41.4	3282.8	-37887.0	24724930.0	-35172.0
1304.42	7408.3	48.4	3895.1	-44175.0	30249860.0	-42271.0
1304.43	27263.9	87.9	8043.4	-81841.0	46655020.0	-60419.0
1304.44	23794.3	94.9	8655.8	-88155.0	52189920.0	-67518.0
1304.45	8226.4	32.8	2563.6	-29871.0	19238550.0	-27357.0
1304.46	4756.9	39.7	3175.9	-36151.0	24773490.0	-34456.0
1304.47	24612.6	79.3	7324.2	-73829.0	41178680.0	-52604.0
1304.48	21143.0	86.3	7936.7	-80137.0	46713580.0	-59703.0
1304.49	3938.9	55.4	4507.5	-50432.0	35784810.0	-49370.0
1304.50	22348.1	74.0	6615.2	-68646.0	40081000.0	-52845.0
1304.51	15409.2	87.9	7840.1	-81217.0	51140890.0	-67043.0
1304.52	1287.6	46.7	3788.4	-42406.0	30308470.0	-41555.0

1304.53	19696.7	65.3	5896.0	-60639.0	34594630.0	-45030.0
1304.54	12757.9	79.2	7120.9	-73187.0	45664540.0	-59228.0
1304.55	18878.6	81.0	7227.6	-74951.0	45605930.0	-59944.0
1304.56	16227.2	72.3	6508.4	-66935.0	40129560.0	-52129.0
1304.57	10464.5	42.2	3347.7	-38559.0	25379490.0	-36022.0
1304.58	6995.0	49.1	3960.0	-44838.0	30914420.0	-43121.0
1304.59	21934.8	74.7	6680.1	-69317.0	40735570.0	-53695.0
1304.60	18465.3	81.7	7292.5	-75614.0	46270500.0	-60794.0
1304.61	7813.1	33.5	2628.5	-30542.0	19903120.0	-28207.0
1304.62	4343.7	40.5	3240.8	-36815.0	25428080.0	-35306.0
1304.63	19283.4	66.1	5960.9	-61311.0	35259190.0	-45880.0
1304.64	15814.0	73.0	6573.3	-67599.0	40794150.0	-52979.0
1304.108	29750.0	-74.9	496.9	99843.0	3990225.0	-21204.0
1304.109	22708.6	-58.2	1346.5	83662.0	15226960.0	-29895.0
1304.110	27618.3	49.7	3504.1	-11148.0	7359830.0	-27022.0
1304.111	20576.2	66.3	4362.9	-27209.0	18598990.0	-35713.0
1304.112	10334.5	22.5	4472.8	-49461.0	35286330.0	-36513.0
1304.113	3296.2	38.4	5326.4	-64636.0	46510860.0	-45201.0
1304.114	8279.4	134.4	7513.1	-142526.0	38532080.0	-42246.0
1304.115	1242.8	150.1	8369.0	-157444.0	49757040.0	-50931.0
1304.116	29871.1	-83.5	-2313.7	109272.0	3785118.0	-19009.0
1304.117	22829.9	-66.9	-1464.6	93077.0	15022910.0	-27700.0
1304.118	27484.0	57.9	6309.1	-19872.0	7585111.0	-29234.0
1304.119	20442.5	74.4	7170.8	-35983.0	18824880.0	-37924.0
1304.120	10457.5	13.7	1660.9	-39922.0	35077710.0	-34316.0
1304.121	3420.5	29.6	2510.9	-55088.0	46302570.0	-43002.0
1304.122	8142.2	142.8	10306.1	-151779.0	38757080.0	-44459.0
1304.123	1106.0	158.6	11162.1	-166762.0	49992140.0	-53143.0
1304.124	29959.7	-145.7	-580.6	189989.0	3652720.0	-21000.0
1304.125	22919.2	-129.0	267.3	173758.0	14888690.0	-29689.0
1304.126	27833.8	-22.2	2394.6	80471.0	7014214.0	-26811.0
1304.127	20792.1	-5.6	3254.2	64315.0	18254060.0	-35502.0
1304.128	10275.1	74.2	5620.9	-112498.0	35381180.0	-36551.0
1304.129	3236.8	90.0	6473.2	-127511.0	46615710.0	-45238.0
1304.130	8220.9	186.6	8672.4	-206262.0	38627150.0	-42281.0
1304.131	1184.3	202.3	9528.2	-221166.0	49852120.0	-50966.0
1304.132	30085.4	-154.4	-3401.6	199447.0	3441786.0	-18799.0
1304.133	23045.5	-137.7	-2549.0	183272.0	14676910.0	-27488.0
1304.134	27700.6	-14.0	5208.0	71634.0	7237693.0	-29020.0
1304.135	20658.9	2.7	6070.5	55442.0	18480080.0	-37711.0
1304.136	10403.5	65.3	2805.8	-102782.0	35163930.0	-34347.0
1304.137	3366.0	81.2	3652.3	-117912.0	46398660.0	-43033.0
1304.138	8083.7	195.3	11468.7	-215835.0	38852150.0	-44495.0
1304.139	1046.7	211.0	12324.9	-230770.0	50087010.0	-53180.0
1304.140	25419.5	-180.9	-1539.0	169640.0	11045510.0	-19797.0
1304.141	18372.4	-163.6	-691.6	152439.0	22296800.0	-28494.0
1304.142	18416.5	218.3	8538.7	-177554.0	22118050.0	-39078.0
1304.143	11384.0	233.6	9397.6	-191877.0	33334060.0	-47758.0
1304.144	19574.4	-148.5	-358.7	120266.0	20463430.0	-24413.0
1304.145	12527.2	-131.2	488.6	103043.0	31715690.0	-33110.0
1304.146	12642.5	240.0	9742.7	-211754.0	31425100.0	-43613.0
1304.147	5610.0	255.3	10601.9	-226082.0	42651110.0	-52293.0
1304.148	25484.6	-202.4	-1865.3	196998.0	10941120.0	-19732.0
1304.149	18443.0	-185.8	-1017.1	180843.0	22174810.0	-28423.0
1304.150	18433.6	202.7	8192.6	-158541.0	22092410.0	-39068.0
1304.151	11401.6	218.0	9052.5	-172824.0	33308550.0	-47748.0
1304.152	19514.9	-127.3	-26.9	93346.0	20558250.0	-24471.0
1304.153	12467.2	-110.0	818.8	76119.0	31810380.0	-33169.0
1304.154	12623.7	255.7	10086.2	-230980.0	31450310.0	-43624.0
1304.155	5589.9	271.2	10945.8	-245502.0	42675980.0	-52306.0

1304.156	25821.8	-209.2	-10900.9	200381.0	10367140.0	-12482.0
1304.157	18773.9	-191.9	-10055.7	183148.0	21619220.0	-21180.0
1304.158	17944.2	247.5	17880.2	-209571.0	22907570.0	-46475.0
1304.159	10912.4	262.7	18740.5	-223841.0	34123750.0	-55155.0
1304.160	19975.9	-176.6	-9718.7	150682.0	19785850.0	-17099.0
1304.161	12928.0	-159.2	-8873.4	133449.0	31037930.0	-25797.0
1304.162	12169.4	269.0	19079.8	-243587.0	32214410.0	-51011.0
1304.163	5137.6	284.3	19940.1	-257859.0	43440600.0	-59691.0
1304.164	25889.4	-231.2	-11228.9	228397.0	10258390.0	-12414.0
1304.165	18846.9	-214.5	-10382.8	212164.0	21497840.0	-21106.0
1304.166	17963.0	231.9	17539.8	-190605.0	22872360.0	-46464.0
1304.167	10931.2	247.2	18399.9	-204870.0	34098550.0	-55143.0
1304.168	19914.7	-155.2	-9388.7	123488.0	19890240.0	-17159.0
1304.169	12866.9	-137.9	-8543.5	106255.0	31132350.0	-25857.0
1304.170	12152.6	284.5	19425.3	-262463.0	32240130.0	-51021.0
1304.171	5120.0	299.8	20284.3	-276806.0	43466110.0	-59701.0
1304.268	31135.0	-56.0	880.2	60532.0	1887539.0	-16462.0
1304.269	7664.4	-0.7	3707.2	6702.0	39345190.0	-45429.0
1304.270	29005.0	67.8	3882.1	-49350.0	5254176.0	-22279.0
1304.271	5551.6	120.5	6748.5	-99487.0	42686210.0	-51226.0
1304.272	25293.9	-24.3	2063.6	12092.0	11301470.0	-21073.0
1304.273	1814.3	31.4	4896.8	-42125.0	48772830.0	-50052.0
1304.274	23220.8	91.0	5088.2	-85653.0	14577630.0	-26826.0
1304.275	-233.7	143.3	7952.9	-135196.0	52010380.0	-55775.0
1304.276	31256.9	-64.7	-1927.5	69981.0	1681635.0	-14266.0
1304.277	7785.4	-9.3	898.3	16088.0	39136060.0	-43235.0
1304.278	28868.2	76.0	6686.8	-58158.0	5484278.0	-24493.0
1304.279	5412.5	129.3	9557.1	-109122.0	42920730.0	-53443.0
1304.280	25413.9	-32.6	-744.9	21134.0	11099090.0	-18879.0
1304.281	1939.0	22.6	2083.7	-32606.0	48564640.0	-47853.0
1304.282	23078.9	99.7	7889.4	-95188.0	14815430.0	-29045.0
1304.283	-371.6	151.8	10752.3	-144533.0	52235210.0	-57989.0
1304.284	31198.9	-77.3	553.8	87582.0	1784839.0	-16399.0
1304.285	7728.3	-21.9	3381.9	33750.0	39241490.0	-45367.0
1304.286	29066.0	46.6	3545.0	-22381.0	5156737.0	-22219.0
1304.287	5594.4	101.7	6411.6	-75865.0	42617130.0	-51188.0
1304.288	25258.0	-6.2	2400.8	-10371.0	11359320.0	-21104.0
1304.289	1796.5	46.8	5239.7	-61010.0	48798290.0	-50063.0
1304.290	23205.6	106.4	5436.1	-104480.0	14602750.0	-26834.0
1304.291	-251.6	159.0	8300.1	-154390.0	52035820.0	-55786.0
1304.292	31319.7	-86.0	-2257.9	97020.0	1580655.0	-14204.0
1304.293	7850.5	-30.6	574.8	43169.0	39032660.0	-43171.0
1304.294	28929.6	54.8	6348.1	-31203.0	5384941.0	-24433.0
1304.295	5460.8	109.8	9222.2	-84530.0	42843050.0	-53398.0
1304.296	25380.7	-15.0	-407.1	-820.0	11152620.0	-18907.0
1304.297	1921.8	38.1	2425.6	-51501.0	48590250.0	-47863.0
1304.298	23064.9	115.0	8235.8	-113873.0	14838860.0	-29051.0
1304.299	-389.7	167.7	11095.6	-163893.0	52270590.0	-58001.0
1305.1	44857.5	0.4	4.4	5382.0	-22946850.0	25068.0
1305.2	43380.1	-0.3	425.7	6826.0	-19583740.0	23234.0
1305.3	94856.9	-1.6	1932.0	13549.0	-45192000.0	53434.0
1305.4	93379.4	-2.2	2353.2	14977.0	-41818910.0	51600.0
1305.5	34507.1	0.2	59.6	4201.0	-17657240.0	19272.0
1305.6	33029.6	-0.4	480.8	5650.0	-14294150.0	17438.0
1305.7	84506.4	-1.7	1987.2	12370.0	-39892420.0	47638.0
1305.8	83028.9	-2.4	2408.3	13795.0	-36529330.0	45804.0
1305.9	41902.7	-0.9	846.8	8301.0	-16220620.0	21401.0
1305.10	79857.0	-1.0	1353.9	11099.0	-38518480.0	44925.0
1305.11	76902.3	-2.3	2195.9	14019.0	-31782220.0	41257.0
1305.12	31552.4	-1.1	901.9	7137.0	-10930980.0	15604.0

1305.13	69506.6	-1.1	1409.0	9916.0	-33218870.0	39128.0
1305.14	66551.9	-2.4	2251.0	12846.0	-26492610.0	35460.0
1305.15	78379.6	-1.6	1775.0	12542.0	-35155360.0	43091.0
1305.16	68029.2	-1.8	1830.1	11360.0	-29855750.0	37294.0
1305.17	45517.7	0.6	-134.1	4821.0	-24448430.0	25894.0
1305.18	44040.1	0.0	287.3	6240.0	-21085370.0	24060.0
1305.19	95517.1	-1.3	1793.6	12996.0	-46693590.0	54260.0
1305.20	94039.5	-2.0	2214.8	14393.0	-43330520.0	52426.0
1305.21	35167.3	0.5	-78.9	3641.0	-19158820.0	20098.0
1305.22	33689.7	-0.2	342.4	5063.0	-15795760.0	18264.0
1305.23	85166.6	-1.5	1848.7	11803.0	-41394000.0	48464.0
1305.24	83689.0	-2.1	2269.9	13206.0	-38030940.0	46630.0
1305.25	42562.8	-0.7	708.4	7706.0	-17722230.0	22226.0
1305.26	80517.2	-0.7	1215.4	10537.0	-40020060.0	45750.0
1305.27	77562.4	-2.0	2057.6	13428.0	-33293830.0	42083.0
1305.28	32212.4	-0.8	763.5	6535.0	-12432620.0	16430.0
1305.29	70166.8	-0.9	1270.6	9361.0	-34730450.0	39954.0
1305.30	67211.9	-2.2	2112.6	12248.0	-27994240.0	36286.0
1305.31	45957.9	0.8	-226.4	4450.0	-25456140.0	26445.0
1305.32	44480.2	0.1	195.0	5851.0	-22093100.0	24611.0
1305.33	80957.4	-0.6	1123.1	10173.0	-41017760.0	46301.0
1305.34	79479.8	-1.2	1544.3	11575.0	-37654700.0	44467.0
1305.35	35607.4	0.6	-171.2	3267.0	-20166550.0	20648.0
1305.36	34129.8	0.0	250.1	4672.0	-16793490.0	18814.0
1305.37	70606.9	-0.7	1178.3	8978.0	-35728180.0	40504.0
1305.38	69129.3	-1.4	1599.4	10386.0	-32365120.0	38670.0
1305.39	79039.7	-1.4	1636.6	11957.0	-36656970.0	43916.0
1305.40	68689.2	-1.5	1691.7	10767.0	-31357380.0	38120.0
1305.41	44593.4	0.3	59.9	5608.0	-22344220.0	24738.0
1305.42	43116.0	-0.4	481.0	7061.0	-18981110.0	22904.0
1305.43	94592.8	-1.6	1987.4	13770.0	-44589380.0	53104.0
1305.44	93115.3	-2.3	2408.5	15214.0	-41226290.0	51270.0
1305.45	34243.0	0.1	115.0	4428.0	-17054610.0	18941.0
1305.46	32765.6	-0.5	536.2	5885.0	-13691500.0	17107.0
1305.47	84242.3	-1.8	2042.6	12585.0	-39289790.0	47307.0
1305.48	82764.9	-2.4	2463.6	14035.0	-35926670.0	45474.0
1305.49	41638.7	-1.0	902.1	8543.0	-15617970.0	21070.0
1305.50	79593.0	-1.1	1409.3	11328.0	-37915820.0	44594.0
1305.51	76638.3	-2.4	2251.2	14257.0	-31189570.0	40927.0
1305.52	31288.3	-1.2	957.2	7373.0	-10328360.0	15274.0
1305.53	69242.5	-1.2	1464.3	10139.0	-32626240.0	38798.0
1305.54	66287.9	-2.5	2306.4	13089.0	-25889960.0	35130.0
1305.55	78115.6	-1.7	1830.3	12779.0	-34552710.0	42760.0
1305.56	67765.1	-1.9	1885.4	11596.0	-29253120.0	36964.0
1305.57	44417.4	0.2	96.8	5759.0	-21949120.0	24518.0
1305.58	42940.0	-0.4	517.9	7218.0	-18586010.0	22684.0
1305.59	79416.9	-1.1	1446.2	11480.0	-37510750.0	44374.0
1305.60	77939.6	-1.8	1867.2	12938.0	-34147610.0	42540.0
1305.61	34066.9	0.1	152.0	4579.0	-16649530.0	18721.0
1305.62	32589.6	-0.6	573.1	6042.0	-13286390.0	16887.0
1305.63	69066.5	-1.3	1501.3	10291.0	-32221140.0	38577.0
1305.64	67589.1	-1.9	1922.3	11754.0	-28858020.0	36744.0
1305.108	56290.7	-79.9	-4217.2	162751.0	-30370240.0	16655.0
1305.109	64534.5	-84.2	-3035.4	170810.0	-51087250.0	27260.0
1305.110	51157.4	-85.2	7731.1	163916.0	-17749750.0	13235.0
1305.111	59400.6	-89.5	8918.3	171833.0	-38466910.0	23840.0
1305.112	49661.6	83.9	-7298.8	-148154.0	-14751330.0	37426.0
1305.113	57905.7	79.5	-6118.3	-139923.0	-35468260.0	48032.0
1305.114	44569.4	71.7	4611.6	-133987.0	-2230346.0	34019.0
1305.115	52814.3	67.4	5798.7	-125937.0	-22947070.0	44624.0

1305.116	56071.5	-71.1	-3478.3	154463.0	-29846160.0	16603.0
1305.117	64315.4	-75.4	-2289.4	162433.0	-50563140.0	27207.0
1305.118	51368.2	-94.3	7006.0	172631.0	-18265970.0	13286.0
1305.119	59611.7	-98.5	8193.9	180501.0	-38973060.0	23892.0
1305.120	49442.8	92.5	-6558.5	-156145.0	-14227140.0	37374.0
1305.121	57687.4	88.1	-5380.3	-147929.0	-34943940.0	47980.0
1305.122	44778.6	63.0	3855.8	-125863.0	-2736980.0	34070.0
1305.123	53023.6	58.7	5041.3	-117803.0	-23453680.0	44675.0
1305.124	56309.8	-149.3	-4152.5	289258.0	-30395370.0	16831.0
1305.125	64554.0	-153.6	-2972.8	297316.0	-51112280.0	27436.0
1305.126	51179.3	-155.0	7806.1	291328.0	-17784160.0	13409.0
1305.127	59422.7	-159.3	9000.8	299230.0	-38491270.0	24014.0
1305.128	49713.1	143.9	-7395.1	-256893.0	-14898190.0	37276.0
1305.129	57956.6	139.6	-6210.4	-248713.0	-35615270.0	47881.0
1305.130	44620.5	131.9	4505.1	-242957.0	-2377311.0	33869.0
1305.131	52865.4	127.6	5692.7	-234890.0	-23094040.0	44474.0
1305.132	56092.7	-140.4	-3412.9	280873.0	-29870750.0	16777.0
1305.133	64337.5	-144.7	-2221.4	288806.0	-50587500.0	27382.0
1305.134	51390.8	-164.0	7076.3	299834.0	-18290210.0	13461.0
1305.135	59634.2	-168.2	8264.7	307699.0	-39007320.0	24066.0
1305.136	49497.3	152.6	-6634.5	-264887.0	-14383240.0	37222.0
1305.137	57741.2	148.2	-5462.1	-256686.0	-35090220.0	47828.0
1305.138	44830.4	123.1	3751.9	-234786.0	-2883765.0	33920.0
1305.139	53074.9	118.8	4936.2	-226715.0	-23600590.0	44525.0
1305.140	59950.7	-12.9	-19170.9	45864.0	-39606580.0	27914.0
1305.141	68190.2	-16.7	-17989.5	52902.0	-60314680.0	38518.0
1305.142	42889.1	-39.3	20658.9	66479.0	2340010.0	16526.0
1305.143	51136.8	-44.1	21841.9	75346.0	-18385000.0	27132.0
1305.144	57948.6	37.9	-20071.6	-50574.0	-34897310.0	34140.0
1305.145	66188.1	34.1	-18890.1	-43558.0	-55595410.0	44744.0
1305.146	40928.4	6.0	19703.7	-19522.0	6959835.0	22766.0
1305.147	49176.1	1.3	20886.9	-10655.0	-13765180.0	33372.0
1305.148	59958.2	-33.9	-19157.6	84184.0	-39624660.0	27967.0
1305.149	68201.8	-38.3	-17978.0	92294.0	-60331720.0	38572.0
1305.150	42871.1	-57.2	20701.3	98894.0	2390417.0	16570.0
1305.151	51119.1	-62.0	21882.7	107816.0	-18329520.0	27177.0
1305.152	57942.2	58.7	-20084.7	-88409.0	-34888940.0	34088.0
1305.153	66181.3	54.9	-18901.3	-81454.0	-55587150.0	44692.0
1305.154	40945.1	24.0	19666.2	-52185.0	6913096.0	22720.0
1305.155	49191.8	19.4	20849.9	-43532.0	-13801170.0	33326.0
1305.156	59218.4	16.4	-16716.9	18274.0	-37843390.0	27740.0
1305.157	67457.3	12.7	-15532.8	25209.0	-58541640.0	38344.0
1305.158	43578.2	-68.4	18181.4	93433.0	676798.4	16697.0
1305.159	51826.4	-73.1	19362.5	102378.0	-20049080.0	27304.0
1305.160	57215.4	67.2	-17612.1	-78166.0	-33124350.0	33966.0
1305.161	65454.4	63.5	-16428.0	-71231.0	-53822580.0	44570.0
1305.162	41617.6	-22.9	17223.2	7217.0	5295649.0	22937.0
1305.163	49865.7	-27.7	18404.1	16161.0	-15429260.0	33543.0
1305.164	59228.3	-4.8	-16709.2	56990.0	-37860860.0	27794.0
1305.165	67471.1	-9.1	-15526.6	64956.0	-58568120.0	38398.0
1305.166	43561.0	-86.4	18222.3	126137.0	722411.3	16743.0
1305.167	51809.3	-91.2	19404.6	135084.0	-20003450.0	27349.0
1305.168	57207.5	88.1	-17616.6	-116140.0	-33116370.0	33913.0
1305.169	65446.5	84.3	-16432.5	-109205.0	-53814600.0	44516.0
1305.170	41636.1	-5.0	17177.1	-25211.0	5244369.0	22893.0
1305.171	49883.7	-9.8	18360.1	-16367.0	-15474670.0	33499.0
1305.268	44337.5	-15.6	-6681.1	40829.0	-709503.8	11548.0
1305.269	71817.1	-30.0	-2740.6	67737.0	-69749460.0	46898.0
1305.270	39205.0	-21.7	5284.2	43442.0	11911200.0	8127.0
1305.271	66691.3	-36.8	9229.2	71598.0	-57147050.0	43479.0

1305.272	42340.9	34.5	-7590.7	-54414.0	3997163.0	17777.0
1305.273	69811.5	21.0	-3647.8	-29231.0	-65021090.0	53125.0
1305.274	37239.3	24.2	4332.5	-43622.0	16542750.0	14365.0
1305.275	64722.8	9.6	8281.9	-16276.0	-52509210.0	49717.0
1305.276	44119.0	-6.9	-5948.7	32732.0	-175243.4	11497.0
1305.277	71597.9	-21.2	-1991.3	59315.0	-69215380.0	46845.0
1305.278	39414.3	-30.7	4538.0	52141.0	11406590.0	8179.0
1305.279	66899.8	-45.5	8493.1	79764.0	-57643860.0	43531.0
1305.280	42120.5	43.4	-6850.4	-62730.0	4528939.0	17724.0
1305.281	69593.5	29.7	-2913.5	-37206.0	-64496700.0	53072.0
1305.282	37446.3	15.5	3585.6	-35644.0	16043550.0	14417.0
1305.283	64932.0	0.8	7528.0	-8036.0	-53015840.0	49769.0
1305.284	44343.7	-36.4	-6666.1	78809.0	-717921.8	11601.0
1305.285	71823.3	-50.9	-2723.3	105700.0	-69757870.0	46950.0
1305.286	39210.1	-42.4	5301.7	81191.0	11906500.0	8179.0
1305.287	66687.2	-56.4	9258.9	107346.0	-57128090.0	43529.0
1305.288	42346.7	53.8	-7610.8	-89305.0	3976643.0	17728.0
1305.289	69826.9	39.1	-3675.8	-61862.0	-65067160.0	53079.0
1305.290	37256.6	42.0	4298.5	-75812.0	16495160.0	14321.0
1305.291	64737.9	27.6	8249.7	-49033.0	-52545360.0	49672.0
1305.292	44124.2	-27.7	-5928.7	70549.0	-183916.8	11549.0
1305.293	71604.9	-42.0	-1975.7	97309.0	-69233580.0	46898.0
1305.294	39419.5	-51.4	4561.3	89820.0	11400910.0	8231.0
1305.295	66898.7	-65.4	8520.5	116040.0	-57634140.0	43581.0
1305.296	42127.7	62.4	-6872.1	-97290.0	4504776.0	17676.0
1305.297	69609.2	47.7	-2942.6	-69821.0	-64542690.0	53027.0
1305.298	37464.3	33.3	3550.3	-67717.0	15993140.0	14372.0
1305.299	64947.0	18.9	7498.1	-40923.0	-53052020.0	49723.0
1306.1	9532.3	-26.0	-3294.7	708.0	9310690.0	8043.0
1306.2	10390.7	-29.4	-3769.1	681.0	8439667.0	8201.0
1306.3	18315.5	-56.5	-4741.1	7503.0	22142280.0	16746.0
1306.4	19174.0	-59.8	-5215.6	7479.0	21271290.0	16904.0
1306.5	7336.8	-19.9	-2615.5	257.0	7157618.0	6197.0
1306.6	8195.2	-23.3	-3089.9	230.0	6286596.0	6355.0
1306.7	16120.1	-50.4	-4062.0	7051.0	19992240.0	14899.0
1306.8	16978.5	-53.8	-4536.4	7028.0	19121220.0	15057.0
1306.9	11249.2	-32.7	-4243.4	649.0	7569671.0	8359.0
1306.10	15680.6	-47.3	-4307.1	5465.0	18290120.0	14135.0
1306.11	17397.5	-54.0	-5255.9	5405.0	16558100.0	14451.0
1306.12	9053.7	-26.6	-3564.2	195.0	5416599.0	6512.0
1306.13	13485.1	-41.2	-3628.0	5014.0	16140050.0	12289.0
1306.14	15202.0	-48.0	-4576.7	4952.0	14398030.0	12604.0
1306.15	16539.0	-50.7	-4781.6	5438.0	17419100.0	14293.0
1306.16	14343.5	-44.6	-4102.4	4987.0	15269030.0	12446.0
1306.17	9149.4	-24.6	-3083.1	696.0	9698012.0	7967.0
1306.18	10007.8	-27.9	-3557.6	674.0	8827990.0	8125.0
1306.19	17932.7	-55.0	-4529.5	7490.0	22534630.0	16670.0
1306.20	18791.1	-58.4	-5004.0	7471.0	21663610.0	16828.0
1306.21	6954.0	-18.5	-2404.0	245.0	7545966.0	6121.0
1306.22	7812.4	-21.8	-2878.4	223.0	6674943.0	6279.0
1306.23	15737.2	-48.9	-3850.4	7041.0	20384560.0	14824.0
1306.24	16595.6	-52.3	-4324.9	7021.0	19513540.0	14982.0
1306.25	10866.3	-31.3	-4031.9	643.0	7957993.0	8283.0
1306.26	15297.7	-45.9	-4095.6	5453.0	18682440.0	14059.0
1306.27	17014.5	-52.6	-5044.5	5399.0	16940400.0	14375.0
1306.28	8670.8	-25.2	-3352.8	191.0	5804921.0	6437.0
1306.29	13102.2	-39.8	-3416.4	5001.0	16532370.0	12213.0
1306.30	14819.1	-46.5	-4365.3	4948.0	14790350.0	12528.0
1306.31	8894.2	-23.6	-2942.1	688.0	9956910.0	7917.0
1306.32	9752.6	-27.0	-3416.6	669.0	9086888.0	8075.0

1306.33	15042.5	-44.9	-3954.5	5444.0	18937340.0	14009.0
1306.34	15900.8	-48.3	-4429.1	5424.0	18066290.0	14167.0
1306.35	6698.7	-17.5	-2262.9	237.0	7804839.0	6071.0
1306.36	7557.1	-20.9	-2737.4	218.0	6933817.0	6228.0
1306.37	12847.0	-38.8	-3275.4	4995.0	16787270.0	12162.0
1306.38	13705.4	-42.2	-3749.9	4975.0	15916250.0	12320.0
1306.39	16156.1	-49.3	-4570.1	5431.0	17811420.0	14217.0
1306.40	13960.6	-43.2	-3890.9	4981.0	15661350.0	12371.0
1306.41	9685.5	-26.6	-3379.3	712.0	9154771.0	8074.0
1306.42	10543.9	-29.9	-3853.7	684.0	8284749.0	8231.0
1306.43	18468.7	-57.0	-4825.7	7508.0	21991370.0	16776.0
1306.44	19327.1	-60.4	-5300.2	7481.0	21120340.0	16934.0
1306.45	7490.0	-20.5	-2700.1	261.0	7001699.0	6227.0
1306.46	8348.4	-23.9	-3174.5	232.0	6131677.0	6385.0
1306.47	16273.2	-51.0	-4146.6	7058.0	19841290.0	14930.0
1306.48	17131.6	-54.3	-4621.0	7030.0	18970270.0	15088.0
1306.49	11402.3	-33.3	-4328.0	651.0	7413727.0	8389.0
1306.50	15833.7	-47.9	-4391.8	5468.0	18139180.0	14165.0
1306.51	17550.6	-54.6	-5340.5	5407.0	16397160.0	14481.0
1306.52	9206.9	-27.2	-3648.8	198.0	5260680.0	6543.0
1306.53	13638.2	-41.8	-3712.6	5019.0	15989110.0	12319.0
1306.54	15355.2	-48.5	-4661.3	4954.0	14247110.0	12634.0
1306.55	16692.2	-51.3	-4866.2	5440.0	17268180.0	14323.0
1306.56	14496.7	-45.2	-4187.0	4989.0	15118110.0	12477.0
1306.57	9787.6	-27.0	-3435.7	715.0	9051816.0	8094.0
1306.58	10646.0	-30.3	-3910.1	686.0	8180795.0	8251.0
1306.59	15935.8	-48.3	-4448.2	5471.0	18035220.0	14186.0
1306.60	16794.3	-51.6	-4922.6	5442.0	17164230.0	14343.0
1306.61	7592.1	-20.9	-2756.5	264.0	6898745.0	6247.0
1306.62	8450.5	-24.2	-3230.9	234.0	6027723.0	6405.0
1306.63	13740.3	-42.2	-3769.0	5022.0	15885150.0	12339.0
1306.64	14598.8	-45.6	-4243.4	4991.0	15014150.0	12497.0
1306.108	20121.6	-41.8	11674.8	28449.0	3175020.0	5161.0
1306.109	15663.6	-48.5	10017.0	31400.0	7641785.0	10771.0
1306.110	21931.0	-95.5	2132.9	39794.0	1387598.0	-1911.0
1306.111	17472.8	-102.2	482.3	42797.0	5855312.0	3699.0
1306.112	4234.3	39.3	-6665.8	-37779.0	18720170.0	15625.0
1306.113	-223.7	32.6	-8323.1	-34868.0	23182930.0	21236.0
1306.114	6054.6	-11.7	-16179.3	-28765.0	16924530.0	8535.0
1306.115	1596.7	-18.5	-17826.2	-25786.0	21387320.0	14145.0
1306.116	20233.0	-52.6	14497.7	42820.0	3065439.0	3838.0
1306.117	15775.0	-59.4	12836.7	45796.0	7532203.0	9448.0
1306.118	21817.9	-84.6	-710.2	25314.0	1498746.0	-584.0
1306.119	17359.7	-91.4	-2356.4	28338.0	5966460.0	5026.0
1306.120	4345.7	28.5	-3842.9	-23456.0	18608590.0	14302.0
1306.121	-112.2	21.9	-5497.8	-20542.0	23081380.0	19912.0
1306.122	5940.7	-0.8	-19012.2	-43191.0	17035470.0	9862.0
1306.123	1482.9	-7.5	-20661.7	-40223.0	21498290.0	15472.0
1306.124	20044.7	-37.5	12422.1	16931.0	3248403.0	5164.0
1306.125	15586.8	-44.2	10761.9	19873.0	7716193.0	10774.0
1306.126	21855.0	-91.1	2862.9	28096.0	1461211.0	-1908.0
1306.127	17396.9	-97.9	1210.3	31117.0	5927949.0	3702.0
1306.128	4329.3	38.5	-7364.9	-29418.0	18624400.0	15591.0
1306.129	-128.9	31.8	-9016.3	-26477.0	23097120.0	21202.0
1306.130	6149.0	-12.5	-16861.0	-20343.0	16828610.0	8502.0
1306.131	1691.1	-19.2	-18507.7	-17365.0	21301400.0	14112.0
1306.132	20156.5	-48.4	15239.4	31308.0	3138923.0	3841.0
1306.133	15698.8	-55.2	13583.1	34308.0	7605764.0	9451.0
1306.134	21741.9	-80.2	35.7	13680.0	1572359.0	-582.0
1306.135	17283.7	-87.0	-1609.8	16709.0	6040072.0	5028.0

1306.136	4441.4	27.6	-4544.2	-15049.0	18513000.0	14268.0
1306.137	-16.7	21.0	-6198.8	-12147.0	22985740.0	19879.0
1306.138	6035.6	-1.6	-19708.3	-34800.0	16939680.0	9828.0
1306.139	1577.6	-8.3	-21354.2	-31829.0	21412450.0	15438.0
1306.140	12446.5	47.5	16507.3	-6331.0	10703100.0	17077.0
1306.141	7987.3	40.6	14848.0	-3207.0	15167560.0	22689.0
1306.142	18490.7	-128.4	-15271.7	28609.0	4735000.0	-6514.0
1306.143	14033.7	-135.0	-16918.6	31440.0	9200997.0	-905.0
1306.144	7676.7	71.1	10996.4	-25596.0	15368330.0	20223.0
1306.145	3217.5	64.2	9337.1	-22468.0	19840780.0	25836.0
1306.146	13731.9	-102.5	-20760.4	7398.0	9391008.0	-3387.0
1306.147	9274.8	-109.1	-22407.4	10229.0	13856000.0	2221.0
1306.148	12423.9	48.9	16731.3	-9864.0	10725340.0	17077.0
1306.149	7965.8	42.2	15071.8	-6932.0	15192080.0	22687.0
1306.150	18461.5	-128.3	-15061.5	26171.0	4763488.0	-6502.0
1306.151	14004.6	-134.8	-16708.7	28987.0	9229573.0	-894.0
1306.152	7699.6	69.8	10774.5	-22143.0	15344170.0	20223.0
1306.153	3240.2	62.9	9115.4	-18999.0	19816580.0	25836.0
1306.154	13760.6	-102.7	-20969.6	9896.0	9363329.0	-3398.0
1306.155	9303.3	-109.3	-22617.2	12763.0	13833270.0	2211.0
1306.156	12817.4	11.4	25916.2	41545.0	10339720.0	12666.0
1306.157	8358.0	4.5	24257.3	44696.0	14812130.0	18279.0
1306.158	18109.8	-92.3	-24723.9	-19369.0	5109278.0	-2088.0
1306.159	13652.9	-98.8	-26371.3	-16559.0	9574855.0	3520.0
1306.160	8047.3	35.0	20409.2	22309.0	15002870.0	15813.0
1306.161	3587.9	28.1	18750.3	25459.0	19475270.0	21426.0
1306.162	13351.0	-66.4	-30216.7	-40566.0	9765840.0	1039.0
1306.163	8894.0	-73.0	-31864.0	-37755.0	14228860.0	6647.0
1306.164	12795.5	12.9	26136.6	37915.0	10360130.0	12665.0
1306.165	8337.2	6.2	24477.6	40881.0	14826820.0	18276.0
1306.166	18080.9	-92.1	-24511.2	-21853.0	5137541.0	-2077.0
1306.167	13624.0	-98.7	-26159.3	-19042.0	9603483.0	3532.0
1306.168	8069.7	33.6	20190.9	25822.0	14988580.0	15814.0
1306.169	3610.3	26.7	18532.0	28973.0	19450990.0	21427.0
1306.170	13380.3	-66.5	-30429.3	-38143.0	9736315.0	1026.0
1306.171	8923.2	-73.1	-32076.2	-35309.0	14206310.0	6635.0
1306.268	19758.1	-6.2	7183.7	2462.0	3407292.0	2283.0
1306.269	4898.1	-28.6	1652.8	12279.0	18299500.0	20985.0
1306.270	21567.9	-59.7	-2368.7	13578.0	1620971.0	-4787.0
1306.271	6709.4	-81.9	-7859.8	23266.0	16511570.0	13910.0
1306.272	14990.0	17.6	1670.6	-17040.0	8072949.0	5426.0
1306.273	127.5	-5.0	-3856.6	-6920.0	22962520.0	24133.0
1306.274	16807.7	-34.1	-7859.4	-7434.0	6278644.0	-1659.0
1306.275	1948.5	-56.4	-13348.7	2396.0	21167060.0	17040.0
1306.276	19869.8	-17.0	10004.8	16778.0	3297786.0	960.0
1306.277	5009.6	-39.5	4472.8	26692.0	18187950.0	19662.0
1306.278	21454.3	-48.8	-5203.6	-931.0	1732992.0	-3461.0
1306.279	6595.6	-71.1	-10694.8	8879.0	16622540.0	15237.0
1306.280	15101.0	6.8	4495.5	-2651.0	7964265.0	4104.0
1306.281	239.1	-15.8	-1028.4	7404.0	22860990.0	22809.0
1306.282	16693.5	-23.2	-10697.3	-21826.0	6390512.0	-331.0
1306.283	1834.8	-45.5	-16184.9	-12053.0	21278060.0	18367.0
1306.284	19735.1	-4.9	7408.1	-1007.0	3430424.0	2284.0
1306.285	4875.2	-27.3	1875.7	8814.0	18323660.0	20986.0
1306.286	21544.8	-58.5	-2152.8	10128.0	1643079.0	-4786.0
1306.287	6684.0	-81.1	-7648.7	20200.0	16535090.0	13915.0
1306.288	15015.9	16.9	1458.2	-14105.0	8048556.0	5421.0
1306.289	155.9	-5.3	-4061.9	-4396.0	22939770.0	24123.0
1306.290	16836.7	-34.2	-8067.8	-5007.0	6250042.0	-1670.0
1306.291	1976.8	-56.6	-13554.1	4930.0	21144280.0	17030.0

1306.292	19846.5	-15.7	10229.5	13351.0	3320842.0	961.0
1306.293	4986.8	-38.2	4699.8	23227.0	18212130.0	19663.0
1306.294	21431.2	-47.5	-4989.7	-4359.0	1755099.0	-3459.0
1306.295	6570.8	-70.2	-10476.7	5728.0	16646210.0	15242.0
1306.296	15127.3	6.1	4283.8	222.0	7938974.0	4098.0
1306.297	267.6	-16.0	-1237.9	9913.0	22828260.0	22799.0
1306.298	16722.6	-23.3	-10904.3	-19420.0	6361935.0	-342.0
1306.299	1863.1	-45.8	-16398.1	-9509.0	21255280.0	18357.0
1313.1	21276.3	70.0	-1271.6	-76908.0	17487580.0	-1419.0
1313.2	20840.9	81.1	-1361.6	-88985.0	17636510.0	-303.0
1313.3	47106.4	141.1	-1378.4	-154029.0	39376840.0	-2840.0
1313.4	46671.1	152.2	-1468.3	-166107.0	39525800.0	-1724.0
1313.5	16363.4	54.9	-994.8	-60319.0	13449300.0	-1093.0
1313.6	15928.1	66.0	-1084.8	-72396.0	13595260.0	23.0
1313.7	42193.6	126.1	-1101.5	-137439.0	35333590.0	-2514.0
1313.8	41758.2	137.2	-1191.5	-149519.0	35482520.0	-1398.0
1313.9	20405.6	92.1	-1451.6	-101064.0	17785470.0	813.0
1313.10	39357.4	119.8	-1346.3	-130891.0	32810070.0	-2414.0
1313.11	38486.7	142.0	-1526.3	-155051.0	33107960.0	-182.0
1313.12	15492.7	77.1	-1174.8	-84476.0	13741190.0	1139.0
1313.13	34444.5	104.7	-1069.5	-114303.0	28766790.0	-2088.0
1313.14	33573.8	126.9	-1249.5	-138464.0	29064680.0	144.0
1313.15	38922.0	130.9	-1436.3	-142970.0	32959000.0	-1298.0
1313.16	34009.2	115.8	-1159.4	-126382.0	28915750.0	-972.0
1313.17	21470.9	65.5	-1211.4	-71984.0	17427230.0	-1904.0
1313.18	21035.6	76.5	-1301.3	-84060.0	17576180.0	-788.0
1313.19	47301.1	136.6	-1318.2	-149104.0	39316510.0	-3325.0
1313.20	46865.7	147.7	-1408.1	-161182.0	39455440.0	-2209.0
1313.21	16558.1	50.4	-934.5	-55395.0	13383970.0	-1578.0
1313.22	16122.7	61.5	-1024.5	-67472.0	13529900.0	-462.0
1313.23	42388.2	121.6	-1041.2	-132514.0	35273230.0	-2999.0
1313.24	41952.9	132.6	-1131.1	-144593.0	35422180.0	-1883.0
1313.25	20600.2	87.6	-1391.3	-96138.0	17715110.0	328.0
1313.26	39552.0	115.3	-1286.1	-125966.0	32749720.0	-2899.0
1313.27	38681.3	137.4	-1466.0	-150125.0	33037600.0	-666.0
1313.28	15687.4	72.6	-1114.5	-79550.0	13675860.0	654.0
1313.29	34639.2	100.2	-1009.3	-109378.0	28706460.0	-2573.0
1313.30	33768.5	122.4	-1189.2	-133538.0	28994340.0	-341.0
1313.31	21600.7	62.5	-1171.2	-68701.0	17380340.0	-2228.0
1313.32	21165.4	73.5	-1261.1	-80777.0	17529290.0	-1111.0
1313.33	39681.8	112.3	-1245.9	-122683.0	32702830.0	-3222.0
1313.34	39246.4	123.4	-1335.8	-134761.0	32851760.0	-2106.0
1313.35	16687.8	47.4	-894.3	-52111.0	13340060.0	-1902.0
1313.36	16252.5	58.5	-984.3	-64188.0	13486010.0	-785.0
1313.37	34768.9	97.2	-969.1	-106094.0	28659550.0	-2896.0
1313.38	34333.6	108.3	-1059.0	-118173.0	28808500.0	-1780.0
1313.39	39116.7	126.4	-1376.0	-138045.0	32888670.0	-1783.0
1313.40	34203.8	111.3	-1099.2	-121457.0	28855390.0	-1457.0
1313.41	21198.4	71.8	-1295.7	-78878.0	17517710.0	-1225.0
1313.42	20763.1	82.9	-1385.7	-90955.0	17666670.0	-109.0
1313.43	47028.6	142.9	-1402.5	-155999.0	39407000.0	-2646.0
1313.44	46593.2	154.0	-1492.4	-168077.0	39555920.0	-1530.0
1313.45	16285.6	56.7	-1018.9	-62289.0	13476460.0	-899.0
1313.46	15850.2	67.8	-1108.9	-74366.0	13622390.0	217.0
1313.47	42115.7	127.9	-1125.6	-139409.0	35363720.0	-2320.0
1313.48	41680.4	139.0	-1215.6	-151490.0	35512670.0	-1204.0
1313.49	20327.7	93.9	-1475.8	-103034.0	17805600.0	1007.0
1313.50	39279.5	121.6	-1370.4	-132861.0	32840200.0	-2220.0
1313.51	38408.8	143.8	-1550.5	-157022.0	33128080.0	12.0
1313.52	15414.9	78.9	-1199.0	-86447.0	13768340.0	1333.0

1313.53	34366.7	106.5	-1093.6	-116273.0	28796940.0	-1894.0
1313.54	33496.0	128.7	-1273.6	-140434.0	29084830.0	338.0
1313.55	38844.2	132.7	-1460.4	-144941.0	32989160.0	-1104.0
1313.56	33931.3	117.6	-1183.6	-128353.0	28945880.0	-778.0
1313.57	21146.5	73.0	-1311.8	-80191.0	17534470.0	-1096.0
1313.58	20711.2	84.1	-1401.8	-92269.0	17683430.0	20.0
1313.59	39227.6	122.8	-1386.5	-134175.0	32856960.0	-2091.0
1313.60	38792.3	133.9	-1476.5	-146254.0	33005920.0	-974.0
1313.61	16233.7	57.9	-1034.9	-63602.0	13493220.0	-770.0
1313.62	15798.3	69.0	-1125.0	-75680.0	13639150.0	346.0
1313.63	34314.8	107.7	-1109.7	-117587.0	28813710.0	-1765.0
1313.64	33879.4	118.8	-1199.7	-129667.0	28962630.0	-649.0
1313.108	28206.1	-51.7	2188.9	53679.0	3262376.0	-4821.0
1313.109	25938.5	-25.9	1506.7	25444.0	12463910.0	-10095.0
1313.110	26759.5	156.8	-831.6	-174730.0	-12651.7	3662.0
1313.111	24491.9	182.7	-1501.7	-202995.0	9188884.0	-1612.0
1313.112	28896.5	-17.2	-447.2	21713.0	35211500.0	-1764.0
1313.113	26628.7	8.6	-1132.4	-6599.0	44412980.0	-7040.0
1313.114	27445.9	191.4	-3507.8	-207220.0	31931450.0	6680.0
1313.115	25178.2	217.1	-4172.1	-235361.0	41132960.0	1403.0
1313.116	28439.6	-51.2	2514.8	53798.0	3929942.0	-7338.0
1313.117	26171.9	-25.4	1832.7	25523.0	13130450.0	-12612.0
1313.118	26526.4	156.3	-1132.4	-174790.0	-678115.6	6185.0
1313.119	24258.9	182.1	-1799.1	-203052.0	8523445.0	911.0
1313.120	29129.9	-16.7	-120.3	21845.0	35881040.0	-4282.0
1313.121	26862.1	9.0	-800.1	-6328.0	45082520.0	-9558.0
1313.122	27213.4	190.5	-3810.9	-206846.0	31262140.0	9204.0
1313.123	24945.6	216.2	-4482.6	-235052.0	40463620.0	3928.0
1313.124	28199.9	-78.9	2976.8	81128.0	3416795.0	-5301.0
1313.125	25932.3	-53.1	2290.0	52883.0	12618330.0	-10575.0
1313.126	26753.0	129.4	-54.8	-147018.0	141690.4	3180.0
1313.127	24485.4	155.2	-722.0	-175323.0	9343226.0	-2094.0
1313.128	28894.4	10.2	-1242.7	-6483.0	35040960.0	-1359.0
1313.129	26626.7	35.8	-1909.2	-34605.0	44242470.0	-6635.0
1313.130	27443.9	218.6	-4277.1	-235197.0	31760940.0	7084.0
1313.131	25176.1	244.3	-4941.5	-263334.0	40962420.0	1808.0
1313.132	28433.3	-78.6	3301.6	81402.0	4083335.0	-7819.0
1313.133	26165.5	-52.7	2625.4	53125.0	13284820.0	-13094.0
1313.134	26520.0	128.8	-347.6	-147034.0	-523748.0	5702.0
1313.135	24252.5	154.6	-1013.4	-175301.0	8676812.0	428.0
1313.136	29127.4	10.6	-898.8	-6259.0	35710400.0	-3879.0
1313.137	26859.7	36.2	-1580.4	-34358.0	44911910.0	-9155.0
1313.138	27211.2	218.1	-4610.5	-235229.0	31091580.0	9609.0
1313.139	24943.5	243.7	-5275.9	-263361.0	40293090.0	4333.0
1313.140	30137.1	-283.3	4970.7	309544.0	18267970.0	-13636.0
1313.141	27869.8	-257.5	4289.9	281352.0	27469580.0	-18907.0
1313.142	25309.3	412.3	-5137.4	-452880.0	7340359.0	14588.0
1313.143	23041.3	438.0	-5808.4	-481094.0	16537840.0	9310.0
1313.144	30345.3	-273.0	4194.6	300088.0	27851090.0	-12708.0
1313.145	28078.0	-247.2	3513.9	271897.0	37052700.0	-17980.0
1313.146	25513.9	422.5	-5948.9	-462570.0	16918600.0	15480.0
1313.147	23245.9	448.3	-6620.2	-490793.0	26120030.0	10202.0
1313.148	30135.2	-291.5	5203.7	317839.0	18317490.0	-13781.0
1313.149	27867.6	-265.8	4520.4	289616.0	27519020.0	-19055.0
1313.150	25309.9	404.1	-4896.4	-444448.0	7391544.0	14467.0
1313.151	23041.9	429.8	-5567.9	-472678.0	16587990.0	9188.0
1313.152	30346.9	-264.7	3966.7	291747.0	27811490.0	-12566.0
1313.153	28079.6	-239.0	3286.1	263578.0	37013110.0	-17837.0
1313.154	25513.4	430.7	-6188.1	-470959.0	16868470.0	15602.0
1313.155	23245.5	456.4	-6860.3	-499203.0	26069930.0	10324.0

1313.156	30915.5	-281.6	6061.1	309886.0	20486540.0	-22025.0
1313.157	28648.3	-255.8	5380.7	281725.0	29688180.0	-27296.0
1313.158	24534.3	410.0	-6154.1	-452597.0	5124700.0	23009.0
1313.159	22266.3	435.8	-6825.6	-480834.0	14325130.0	17730.0
1313.160	31123.8	-271.3	5291.3	300449.0	30079680.0	-21097.0
1313.161	28856.5	-245.5	4610.9	272287.0	39281290.0	-26368.0
1313.162	24738.9	420.3	-6972.6	-462278.0	14704890.0	23901.0
1313.163	22470.9	446.0	-7644.2	-490514.0	23902330.0	18622.0
1313.164	30913.5	-289.8	6287.3	318154.0	20536030.0	-22172.0
1313.165	28645.9	-264.0	5604.7	289963.0	29737570.0	-27445.0
1313.166	24534.8	401.9	-5909.0	-444208.0	5175828.0	22887.0
1313.167	22266.8	427.6	-6580.3	-472451.0	14376260.0	17608.0
1313.168	31125.5	-263.1	5068.9	292171.0	30030120.0	-20954.0
1313.169	28858.2	-237.3	4388.4	264009.0	39231730.0	-26225.0
1313.170	24738.3	428.5	-7217.3	-470730.0	14653740.0	24022.0
1313.171	22470.3	454.2	-7888.3	-498944.0	23852170.0	18744.0
1313.268	31095.3	-69.8	2059.5	75670.0	3715411.0	2419.0
1313.269	23536.5	16.1	-209.2	-18360.0	34384160.0	-15161.0
1313.270	29648.4	138.9	-974.3	-152953.0	439307.1	10901.0
1313.271	22089.0	224.7	-3202.2	-247012.0	31104900.0	-6688.0
1313.272	31303.2	-59.4	1276.6	66132.0	13302450.0	3345.0
1313.273	23744.9	26.5	-992.4	-27994.0	43977320.0	-14232.0
1313.274	29853.5	149.2	-1782.0	-162685.0	10020630.0	11798.0
1313.275	22294.1	235.0	-4011.3	-256740.0	40687220.0	-5791.0
1313.276	31328.7	-69.3	2384.0	75742.0	4381952.0	-98.0
1313.277	23769.9	16.7	113.9	-18363.0	35053700.0	-17678.0
1313.278	29415.6	138.2	-1279.6	-152890.0	-225080.3	13425.0
1313.279	21856.3	224.1	-3505.6	-247049.0	30445540.0	-4163.0
1313.280	31536.8	-58.9	1607.2	66259.0	13969040.0	828.0
1313.281	23978.3	26.9	-666.2	-27759.0	44636860.0	-16751.0
1313.282	29621.0	148.5	-2090.5	-162604.0	9356317.0	14324.0
1313.283	22061.5	234.3	-4325.8	-256615.0	40027890.0	-3266.0
1313.284	31093.4	-78.0	2294.4	83979.0	3760927.0	2275.0
1313.285	23534.6	7.9	23.4	-10115.0	34433680.0	-15306.0
1313.286	29646.7	130.6	-743.8	-144597.0	485872.9	10758.0
1313.287	22088.2	216.6	-2974.3	-238777.0	31154700.0	-6822.0
1313.288	31303.6	-51.3	1046.5	57800.0	13252550.0	3475.0
1313.289	23744.3	34.6	-1222.1	-36320.0	43917170.0	-14111.0
1313.290	29852.7	157.4	-2020.8	-171163.0	9969423.0	11918.0
1313.291	22293.5	243.2	-4241.2	-265125.0	40637070.0	-5669.0
1313.292	31327.0	-77.5	2619.0	84099.0	4428518.0	-242.0
1313.293	23768.0	8.5	352.1	-10068.0	35103220.0	-17823.0
1313.294	29413.9	129.9	-1048.1	-144539.0	-178514.4	13282.0
1313.295	21855.3	215.9	-3270.6	-238728.0	30495290.0	-4300.0
1313.296	31537.0	-50.8	1376.5	57925.0	13919090.0	957.0
1313.297	23977.6	35.1	-901.9	-36143.0	44586680.0	-16630.0
1313.298	29620.2	156.7	-2326.9	-171017.0	9305113.0	14444.0
1313.299	22060.9	242.5	-4563.5	-265052.0	39977740.0	-3144.0
1316.1	32165.7	5.9	-1617.3	-12508.0	11791470.0	-22402.0
1316.2	33862.7	5.5	-1729.9	-12417.0	15162380.0	-24800.0
1316.3	66805.7	8.4	-1523.7	-21148.0	24752130.0	-41548.0
1316.4	68502.8	8.0	-1635.8	-21047.0	28125060.0	-43946.0
1316.5	24744.7	4.4	-1287.7	-9395.0	9062373.0	-17238.0
1316.6	26441.8	3.9	-1400.3	-9304.0	12432300.0	-19636.0
1316.7	59384.7	6.9	-1194.0	-18034.0	22022040.0	-36385.0
1316.8	61081.9	6.5	-1306.2	-17930.0	25392990.0	-38783.0
1316.9	35559.8	5.0	-1842.4	-12325.0	18533300.0	-27198.0
1316.10	56413.7	7.7	-1552.0	-18561.0	20864140.0	-35804.0
1316.11	59807.9	6.8	-1776.2	-18359.0	27607000.0	-40600.0
1316.12	28138.8	3.5	-1512.8	-9210.0	15803210.0	-22034.0

1316.13	48992.7	6.2	-1222.4	-15445.0	18134040.0	-30641.0
1316.14	52386.9	5.3	-1446.5	-15242.0	24873900.0	-35437.0
1316.15	58110.8	7.2	-1664.1	-18461.0	24235070.0	-38202.0
1316.16	50689.8	5.7	-1334.5	-15344.0	21504970.0	-33039.0
1316.17	31405.5	6.0	-1548.0	-12428.0	10285540.0	-21324.0
1316.18	33102.6	5.6	-1660.7	-12337.0	13656470.0	-23722.0
1316.19	66045.5	8.5	-1454.7	-21074.0	23246210.0	-40470.0
1316.20	67742.7	8.1	-1566.9	-20971.0	26617160.0	-42868.0
1316.21	23984.5	4.5	-1218.5	-9314.0	7555446.0	-16161.0
1316.22	25681.6	4.0	-1331.2	-9224.0	10926380.0	-18559.0
1316.23	58624.6	7.0	-1125.0	-17957.0	20516140.0	-35307.0
1316.24	60321.7	6.6	-1237.2	-17856.0	23887070.0	-37705.0
1316.25	34799.7	5.1	-1773.3	-12245.0	17027400.0	-26120.0
1316.26	55653.5	7.8	-1482.9	-18485.0	19358210.0	-34726.0
1316.27	59047.7	6.9	-1707.3	-18284.0	26103070.0	-39522.0
1316.28	27378.7	3.6	-1443.7	-9132.0	14297310.0	-20957.0
1316.29	48232.5	6.3	-1153.3	-15371.0	16628110.0	-29563.0
1316.30	51626.7	5.4	-1377.6	-15166.0	23369970.0	-34359.0
1316.31	30898.7	6.1	-1501.8	-12375.0	9281259.0	-20606.0
1316.32	32595.8	5.6	-1614.6	-12284.0	12652190.0	-23004.0
1316.33	55146.7	7.9	-1436.9	-18435.0	18353920.0	-34008.0
1316.34	56843.8	7.4	-1549.2	-18334.0	21724850.0	-36406.0
1316.35	23477.7	4.5	-1172.3	-9262.0	6551696.0	-15442.0
1316.36	25174.8	4.1	-1285.1	-9171.0	9923091.0	-17840.0
1316.37	47725.7	6.3	-1107.3	-15319.0	15623830.0	-28845.0
1316.38	49422.9	5.9	-1219.6	-15218.0	18994780.0	-31243.0
1316.39	57350.6	7.3	-1595.2	-18385.0	22729140.0	-37124.0
1316.40	49929.6	5.8	-1265.6	-15268.0	19999040.0	-31961.0
1316.41	32469.7	5.9	-1644.9	-12540.0	12394020.0	-22833.0
1316.42	34166.8	5.4	-1757.5	-12449.0	15764950.0	-25231.0
1316.43	67109.8	8.4	-1551.3	-21179.0	25354710.0	-41979.0
1316.44	68806.9	7.9	-1663.4	-21078.0	28722640.0	-44377.0
1316.45	25048.7	4.3	-1315.4	-9427.0	9663923.0	-17669.0
1316.46	26745.8	3.9	-1428.0	-9336.0	13034850.0	-20067.0
1316.47	59688.8	6.9	-1221.6	-18064.0	22624610.0	-36816.0
1316.48	61385.9	6.4	-1333.7	-17960.0	25999540.0	-39214.0
1316.49	35863.9	5.0	-1870.0	-12356.0	19135880.0	-27629.0
1316.50	56717.8	7.6	-1579.6	-18592.0	21466710.0	-36235.0
1316.51	60112.0	6.7	-1803.8	-18389.0	28204570.0	-41031.0
1316.52	28442.9	3.5	-1540.4	-9240.0	16405780.0	-22465.0
1316.53	49296.8	6.1	-1250.0	-15475.0	18736610.0	-31072.0
1316.54	52691.0	5.2	-1474.2	-15274.0	25481480.0	-35868.0
1316.55	58414.9	7.2	-1691.7	-18491.0	24837640.0	-38633.0
1316.56	50993.9	5.7	-1362.1	-15374.0	22107540.0	-33470.0
1316.57	32672.4	5.8	-1663.4	-12561.0	12795730.0	-23120.0
1316.58	34369.5	5.4	-1776.0	-12470.0	16166660.0	-25518.0
1316.59	56920.5	7.6	-1598.0	-18612.0	21868420.0	-36522.0
1316.60	58617.6	7.2	-1710.1	-18512.0	25243350.0	-38920.0
1316.61	25251.5	4.3	-1333.8	-9448.0	10065660.0	-17957.0
1316.62	26948.5	3.9	-1446.4	-9356.0	13436560.0	-20355.0
1316.63	49499.5	6.1	-1268.4	-15495.0	19138320.0	-31359.0
1316.64	51196.6	5.6	-1380.4	-15394.0	22509250.0	-33757.0
1316.108	43220.3	24.2	-4650.8	-26385.0	3078498.0	-30263.0
1316.109	49755.9	26.4	-5228.3	-28503.0	13981730.0	-45815.0
1316.110	47340.9	72.6	-6894.8	-82929.0	8550663.0	-37338.0
1316.111	53876.5	74.8	-7460.1	-84989.0	19453900.0	-52889.0
1316.112	23319.2	-61.2	5068.6	58176.0	8997727.0	3088.0
1316.113	29855.1	-58.9	4490.1	56029.0	19896040.0	-12463.0
1316.114	27437.1	-10.1	2807.5	891.0	14434210.0	-4003.0
1316.115	33972.3	-7.6	2240.1	-1390.0	25336330.0	-19553.0

1316.116	42813.1	62.4	-4991.7	-42244.0	2252622.0	-30037.0
1316.117	49348.8	64.7	-5573.7	-44458.0	13155880.0	-45589.0
1316.118	47749.8	34.2	-6512.9	-66821.0	9384974.0	-37562.0
1316.119	54285.4	36.4	-7075.6	-68876.0	20288210.0	-53113.0
1316.120	22912.1	-23.0	4729.6	42310.0	8171877.0	3315.0
1316.121	29447.5	-20.6	4150.3	40073.0	19072060.0	-12236.0
1316.122	27845.0	-48.5	3181.5	16964.0	15268260.0	-4223.0
1316.123	34380.2	-46.1	2609.1	14713.0	26170390.0	-19774.0
1316.124	43112.2	-37.2	-3804.5	39732.0	2987923.0	-30122.0
1316.125	49647.6	-35.0	-4385.3	37623.0	13890100.0	-45673.0
1316.126	47232.0	12.0	-6081.7	-17545.0	8454884.0	-37197.0
1316.127	53767.7	14.2	-6646.9	-19652.0	19358140.0	-52749.0
1316.128	23423.8	4.2	4235.7	-8876.0	9023411.0	2924.0
1316.129	29959.2	6.6	3669.2	-11116.0	19922590.0	-12626.0
1316.130	27541.1	55.0	2000.6	-65899.0	14459730.0	-4165.0
1316.131	34076.3	57.5	1431.5	-68209.0	25362860.0	-19716.0
1316.132	42704.1	1.2	-4158.9	23624.0	2157816.0	-29896.0
1316.133	49239.6	3.5	-4734.5	21435.0	13059960.0	-45448.0
1316.134	47640.7	-26.4	-5691.9	-1375.0	9288142.0	-37421.0
1316.135	54176.3	-24.3	-6253.6	-3417.0	20191370.0	-52972.0
1316.136	23016.0	42.7	3893.9	-25088.0	8193382.0	3148.0
1316.137	29551.3	45.1	3314.0	-27322.0	19098540.0	-12402.0
1316.138	27949.3	16.4	2356.8	-49683.0	15293870.0	-4387.0
1316.139	34484.6	18.9	1789.9	-51932.0	26197020.0	-19938.0
1316.140	31447.2	-63.3	1493.6	69475.0	-1225819.0	-10333.0
1316.141	37983.2	-61.3	917.0	67405.0	9680798.0	-25883.0
1316.142	45180.4	102.2	-6028.6	-120516.0	16969520.0	-33936.0
1316.143	51715.3	104.7	-6599.8	-122768.0	27872570.0	-49488.0
1316.144	25477.6	-89.5	4411.5	94821.0	559335.8	-321.0
1316.145	32013.6	-87.4	3834.8	92751.0	11465670.0	-15871.0
1316.146	39207.7	78.2	-3123.4	-95602.0	18720880.0	-23941.0
1316.147	45742.7	80.7	-3694.5	-97848.0	29618960.0	-39493.0
1316.148	31414.4	-81.7	1743.8	89282.0	-1254187.0	-10291.0
1316.149	37950.0	-79.5	1167.9	87204.0	9648719.0	-25843.0
1316.150	45149.4	82.8	-5787.8	-100674.0	16962610.0	-33885.0
1316.151	51684.4	85.3	-6356.8	-102867.0	27864690.0	-49437.0
1316.152	25510.5	-71.1	4171.6	75130.0	586728.7	-363.0
1316.153	32046.4	-69.0	3591.3	72975.0	11493040.0	-15912.0
1316.154	39238.6	97.6	-3370.3	-115602.0	18727770.0	-23991.0
1316.155	45773.8	100.1	-3941.7	-117828.0	29626900.0	-39543.0
1316.156	30090.4	63.7	378.9	17061.0	-3973939.0	-9579.0
1316.157	36626.3	65.9	-202.6	14877.0	6932369.0	-25128.0
1316.158	46543.7	-26.6	-4753.4	-66333.0	19764300.0	-34673.0
1316.159	53078.7	-24.1	-5321.4	-68507.0	30660380.0	-50226.0
1316.160	24120.8	37.6	3297.1	42337.0	-2187784.0	434.0
1316.161	30656.7	39.7	2715.6	40153.0	8717977.0	-15115.0
1316.162	40571.0	-50.6	-1854.8	-41465.0	21519660.0	-24679.0
1316.163	47106.0	-48.1	-2422.8	-43637.0	32416740.0	-40231.0
1316.164	30057.5	45.4	628.8	36927.0	-4002332.0	-9538.0
1316.165	36593.1	47.6	48.0	34732.0	6898900.0	-25090.0
1316.166	46512.8	-46.1	-4502.3	-46321.0	19757410.0	-34623.0
1316.167	53047.8	-43.6	-5070.6	-48506.0	30652490.0	-50175.0
1316.168	24153.5	56.1	3049.6	22406.0	-2160442.0	393.0
1316.169	30689.4	58.2	2468.1	20222.0	8745395.0	-15156.0
1316.170	40602.0	-31.2	-2095.0	-61243.0	21517570.0	-24730.0
1316.171	47137.0	-28.7	-2666.1	-63490.0	32424650.0	-40282.0
1316.268	28630.8	-9.3	-575.0	6023.0	-7556283.0	-442.0
1316.269	50416.0	-2.0	-2494.0	-1040.0	28791120.0	-52280.0
1316.270	32751.9	39.6	-2834.5	-50810.0	-2084990.0	-7519.0
1316.271	54535.9	47.4	-4722.7	-57974.0	34252110.0	-59356.0

1316.272	22661.0	-35.5	2349.3	31573.0	-5769179.0	9566.0
1316.273	44447.4	-28.2	429.3	24498.0	30578530.0	-42268.0
1316.274	26779.8	15.1	78.9	-25660.0	-326473.1	2478.0
1316.275	48564.2	23.2	-1817.9	-33054.0	36008730.0	-49358.0
1316.276	28223.7	28.8	-906.2	-9601.0	-8380134.0	-216.0
1316.277	50009.1	36.4	-2841.3	-16997.0	27967320.0	-52055.0
1316.278	33160.7	1.0	-2448.6	-34518.0	-1246705.0	-7741.0
1316.279	54944.8	8.8	-4337.8	-41685.0	35086420.0	-59579.0
1316.280	22253.9	2.7	2012.9	15759.0	-6593031.0	9793.0
1316.281	44039.8	10.2	80.4	8502.0	29754550.0	-42041.0
1316.282	27188.8	-23.6	461.2	-9358.0	511862.6	2256.0
1316.283	48972.6	-15.4	-1443.3	-16797.0	36842910.0	-49580.0
1316.284	28598.0	-27.6	-324.9	25816.0	-7584650.0	-399.0
1316.285	50383.4	-20.4	-2244.7	18768.0	28762810.0	-52238.0
1316.286	32719.2	21.2	-2586.7	-31075.0	-2113332.0	-7476.0
1316.287	54504.2	28.6	-4479.0	-38101.0	34234020.0	-59311.0
1316.288	22692.8	-16.3	2099.9	11511.0	-5761067.0	9521.0
1316.289	44478.4	-8.5	181.1	4275.0	30586440.0	-42316.0
1316.290	26810.8	34.6	-165.2	-45633.0	-320564.7	2428.0
1316.291	48595.4	42.7	-2057.1	-53053.0	36016690.0	-49407.0
1316.292	28190.9	10.6	-665.0	9986.0	-8408502.0	-173.0
1316.293	49976.3	18.0	-2586.0	2848.0	27938950.0	-52013.0
1316.294	33128.0	-17.3	-2203.4	-14872.0	-1274047.0	-7698.0
1316.295	54912.7	-9.9	-4090.7	-21900.0	35068230.0	-59534.0
1316.296	22285.6	21.9	1763.1	-4322.0	-6584943.0	9747.0
1316.297	44070.9	29.9	-171.0	-11685.0	29752490.0	-42090.0
1316.298	27219.6	-4.0	216.9	-29376.0	516719.9	2206.0
1316.299	49003.8	4.1	-1690.9	-36840.0	36850870.0	-49629.0

Calcolo resistenze

Resistenza a trazione dei bulloni

$$F_{tb,Rd} = 0.9 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} = 254061.8 \text{ N}$$

Resistenza a punzonamento flangia

$$B_{pf,Rd} = 0.6 \cdot \pi \cdot d_m \cdot t_f \cdot f_{tk} / \gamma_{M2} = 830586.8 \text{ N}$$

Bull.	$F_{f,Rd}$ [N]	$F_{t,Rd}$ [N]
1	235201.9	235201.9
2	81442.9	81442.9
3	134213.8	134213.8
4	134213.8	134213.8
5	81442.9	81442.9
6	235201.9	235201.9
7	235201.9	235201.9
8	81442.9	81442.9
9	134213.8	134213.8
10	134213.8	134213.8
11	81442.9	81442.9
12	235201.9	235201.9

Legenda

$F_{f,Rd} = M_{res,m} / (B_m \cdot R_m)$ resistenza a flessione flangia

$F_{t,Rd} = \min [F_{tb,Rd} , B_{pf,Rd} , F_{f,Rd}]$ resistenza a trazione di progetto

Resistenza a taglio dei bulloni

$$F_{vb,Rd} = 0.5 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} = 141145.5 \text{ N}$$

Bull.	$F_{bf,x,Rd}$ [N]	$F_{v,x,Rd}$ [N]	$F_{bf,y,Rd}$ [N]	$F_{v,y,Rd}$ [N]
1	408000.0	141145.5	494400.0	141145.5
2	225215.9	141145.5	354959.9	141145.5
3	225215.9	141145.5	354959.9	141145.5
4	225215.9	141145.5	354959.9	141145.5
5	225215.9	141145.5	354959.9	141145.5
6	408000.0	141145.5	494400.0	141145.5
7	408000.0	141145.5	494400.0	141145.5
8	225215.9	141145.5	354959.9	141145.5
9	225215.9	141145.5	354959.9	141145.5

10	225215.9	141145.5	354959.9	141145.5
11	225215.9	141145.5	354959.9	141145.5
12	408000.0	141145.5	494400.0	141145.5

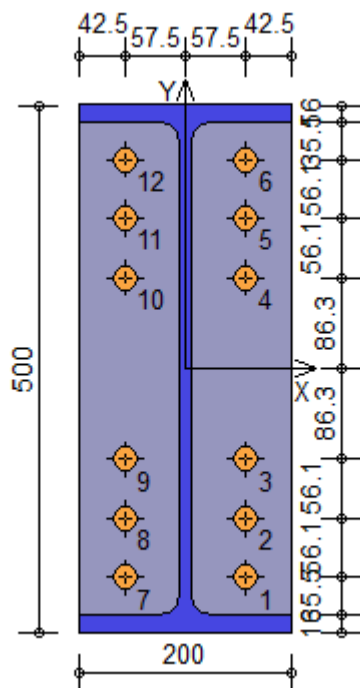
Legenda

$F_{bf,x,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \emptyset \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione x

$F_{v,x,Rd} = \min [F_{vb,Rd} , F_{bf,x,Rd}]$ resistenza a taglio di progetto in direzione x

$F_{bf,y,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \emptyset \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione y

$F_{v,y,Rd} = \min [F_{vb,Rd} , F_{bf,y,Rd}]$ resistenza a taglio di progetto in direzione y



Verifiche sui bulloni

1-Taglio e trazione (Nodo n. 1301, CMB n. 44)

Bull.	X [mm]	Y [mm]	$F_{v,Ed}$ [N]	$F_{v,Rd}$ [N]	$F_{t,Ed}$ [N]	$F_{t,Rd}$ [N]	FV_1	VER
1	57.50	-198.50	998.1	141145.5	91515.8	235201.9	0.284996	Ok
2	57.50	-142.40	998.0	141145.5	77321.8	81442.9	0.685212	Ok
3	57.50	-86.30	997.9	141145.5	63127.7	134213.8	0.343036	Ok
4	57.50	86.30	998.4	141145.5	19457.7	134213.8	0.110627	Ok
5	57.50	142.40	998.8	141145.5	5263.6	81442.9	0.053241	Ok
6	57.50	198.50	999.4	141145.5	0.0	235201.9	0.007080	Ok
7	-57.50	-198.50	1020.5	141145.5	91612.3	235201.9	0.285448	Ok
8	-57.50	-142.40	1020.3	141145.5	77418.3	81442.9	0.686217	Ok
9	-57.50	-86.30	1020.2	141145.5	63224.2	134213.8	0.343707	Ok
10	-57.50	86.30	1020.8	141145.5	19554.2	134213.8	0.111299	Ok
11	-57.50	142.40	1021.2	141145.5	5360.1	81442.9	0.054245	Ok
12	-57.50	198.50	1021.7	141145.5	0.0	235201.9	0.007238	Ok

2-Trazione (Nodo n. 1301, CMB n. 44)

Bull.	X [mm]	Y [mm]	$F_{t,Ed}$ [N]	$F_{t,Rd}$ [N]	FV_2	VER
1	57.50	-198.50	91515.8	235201.9	0.389095	Ok
2	57.50	-142.40	77321.8	81442.9	0.949399	Ok
3	57.50	-86.30	63127.7	134213.8	0.470352	Ok
4	57.50	86.30	19457.7	134213.8	0.144975	Ok
5	57.50	142.40	5263.6	81442.9	0.064630	Ok
6	57.50	198.50	0.0	235201.9	0.000000	Ok
7	-57.50	-198.50	91612.3	235201.9	0.389505	Ok
8	-57.50	-142.40	77418.3	81442.9	0.950584	Ok
9	-57.50	-86.30	63224.2	134213.8	0.471071	Ok
10	-57.50	86.30	19554.2	134213.8	0.145694	Ok
11	-57.50	142.40	5360.1	81442.9	0.065815	Ok

12 -57.50 198.50 0.0 235201.9 0.000000 Ok

Legenda

$F_{v,Ed}$ forza di taglio agente sul bullone
 $F_{v,Rd}$ resistenza a taglio di progetto del bullone
 $F_{t,Ed}$ forza di trazione agente sul bullone
 $F_{t,Rd}$ resistenza a trazione di progetto del bullone
 $FV_1 = F_{v,Ed} / F_{v,Rd} + F_{t,Ed} / (1.4 \cdot F_{t,Rd})$
 $FV_2 = F_{t,Ed} / F_{t,Rd}$
 $VER \rightarrow FV_i \leq 1$

Verifiche sulle saldature profilo-flangia (versione beta)

Si considera la sezione di gola (avente altezza $a = s_c / 2^{0.5} = 7.071$) in posizione ribaltata: vengono considerate positive le tensioni normali di trazione e le tensioni tangenziali agenti verso destra e verso il basso. Tutte le tensioni sono espresse in N/mm².

Verifica formula (4.2.84) (Nodo n. 1301, CMB n. 44)

Cordoni	n_{\perp}	t_{\perp}	τ_{\parallel}	FV_1	VER_1
Ala inferiore interno lato destro	203.80	0.00	0.09	203.80	Ok
Ala inferiore interno lato sinistro	205.97	0.00	0.09	205.97	Ok
Anima lato destro	-190.24	0.00	-2.01	190.25	Ok
Anima lato sinistro	-190.24	0.00	-2.01	190.25	Ok
Ala superiore interno lato destro	-207.50	0.00	0.09	207.50	Ok
Ala superiore interno lato sinistro	-205.32	0.00	0.09	205.32	Ok

Verifica formula (4.2.85) (Nodo n. 1301, CMB n. 44)

Cordoni	n_{\perp}	t_{\perp}	τ_{\parallel}	FV_2	VER_2
Ala inferiore interno lato destro	203.80	0.00	0.09	203.80	Ok
Ala inferiore interno lato sinistro	205.97	0.00	0.09	205.97	Ok
Anima lato destro	-190.24	0.00	-2.01	190.24	Ok
Anima lato sinistro	-190.24	0.00	-2.01	190.24	Ok
Ala superiore interno lato destro	-207.50	0.00	0.09	207.50	Ok
Ala superiore interno lato sinistro	-205.32	0.00	0.09	205.32	Ok

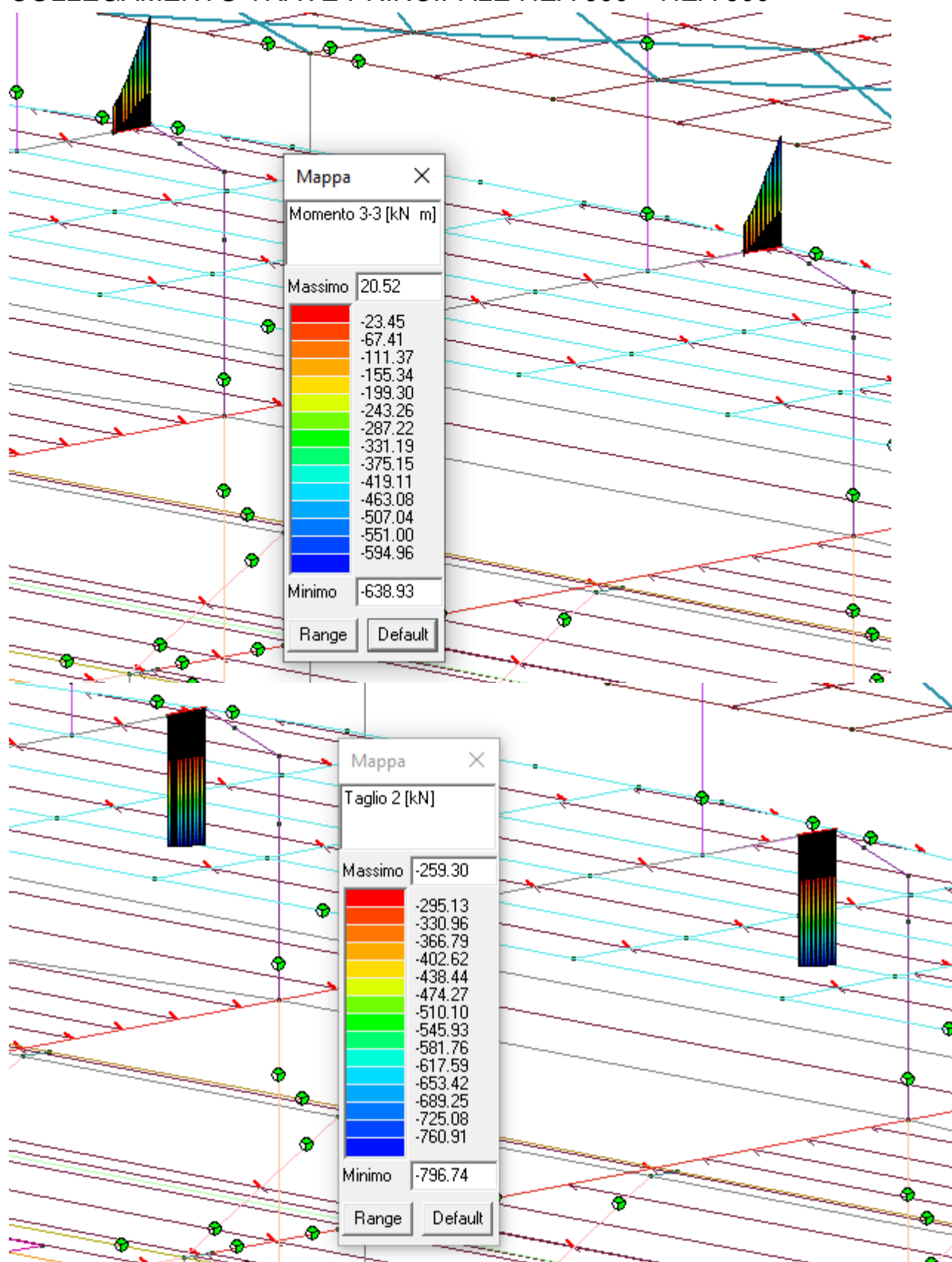
Legenda

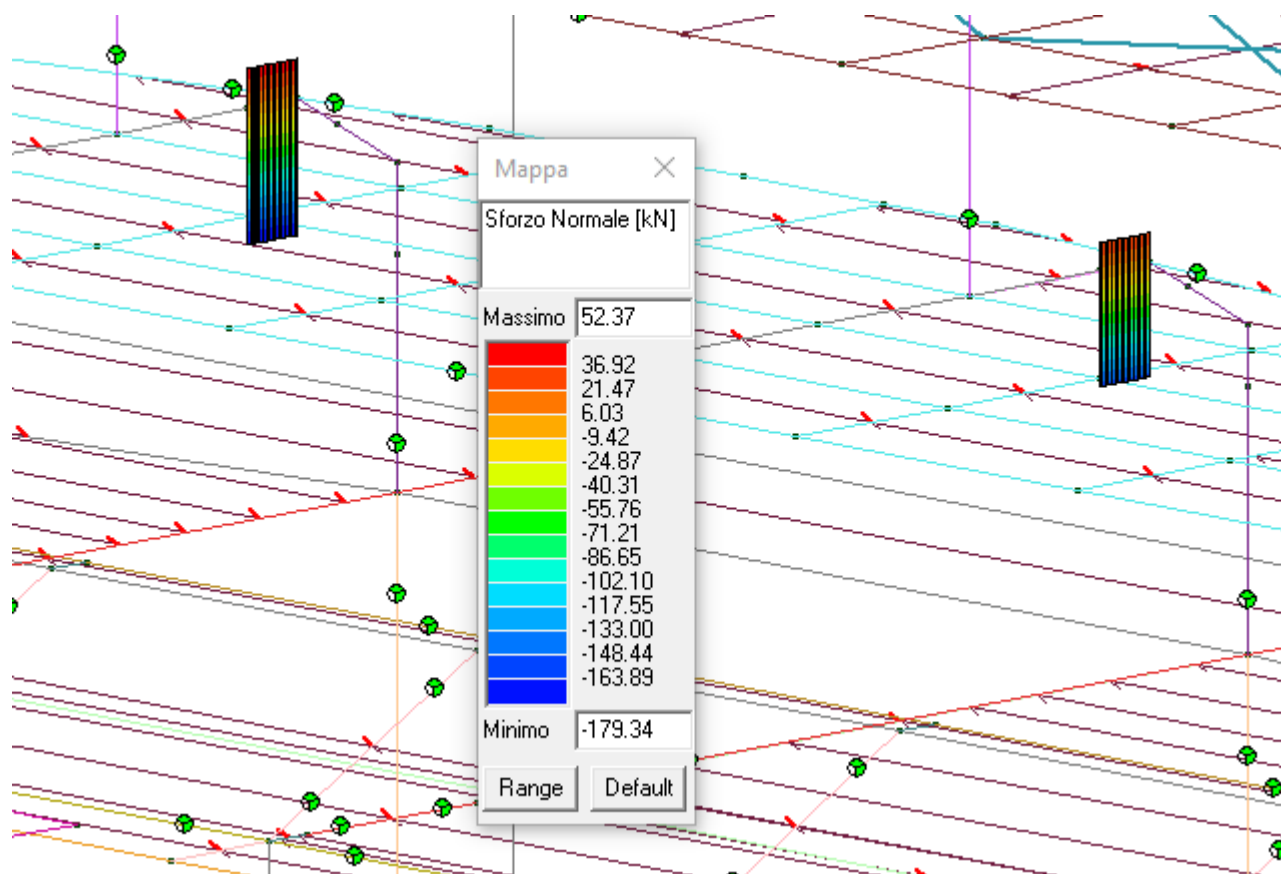
n_{\perp} tensione normale perpendicolare all'asse del cordone
 t_{\perp} tensione tangenziale perpendicolare all'asse del cordone
 τ_{\parallel} tensione tangenziale parallela all'asse del cordone
 $FV_1 = (n_{\perp}^2 + t_{\perp}^2 + \tau_{\parallel}^2)^{0.5}$
 $FV_2 = |n_{\perp}| + |t_{\perp}|$
 $VER_i \rightarrow FV_i \leq \beta_i \cdot f_{yk} \quad (\beta_1 \cdot f_{yk} = 248.50 \text{ N/mm}^2 \quad \beta_2 \cdot f_{yk} = 301.75 \text{ N/mm}^2)$

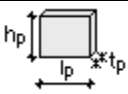
Verifica del momento di progetto del giunto (Nodo n. 1301, CMB n. 44)

Momento resistente del giunto $M_{j,Rd} = 388149900.0 \text{ N mm}$
Momento di progetto $M_{j,Ed} = 178442100.0 \text{ N mm}$
 $M_{j,Ed} / M_{j,Rd} = 0.459725 \text{ Ok}$

COLLEGAMENTO TRAVE PRINCIPALE HEA 600 – HEA 600





	l_p	h_p	t_p
	300.00[mm]	630.00[mm]	35.00[mm]
Materiale	Grado	f_y	f_u
	S 355	355.00[MPa]	490.00[MPa]

Bulloni di collegamento piastre frontali

Grado bullone	Grado	10.9
Limite di snervamento	$f_{yb} =$	900.00 [MPa]
Resistenza a tensione	$f_{ub} =$	1000.00 [MPa]
Diametro bullone	$d =$	24.00 [mm]
Diametro apertura bullone	$d_0 =$	27.00 [mm]
Area sezione bullone	$A =$	4.52 [cm ²]
Area effettiva sezione bullone	$A_s =$	3.53 [cm ²]
Numero righe	$w =$	6.00
Distanza dal bordo orizzontale	$e_1 =$	90.00 [mm]
Spaziatura orizzontale	$w_1 =$	170.00 [mm]
Numero di bulloni nelle righe $m_1=2$; $m_2=2$; $m_3=2$; $m_4=2$; $m_5=2$; $m_6=2$		
Spaziatura verticale tra le righe $p_1=90.00$ [mm]; $p_2=90.00$ [mm]; $p_3=90.00$ [mm]; $p_4=90.00$ [mm]; $p_5=90.00$ [mm]		

Saldature

Lato sinistro

Spessore saldature dell'angolare che collegano flange trave e piastra frontale $a_f =$ 13.00 [mm]

Spessore saldature dell'angolare che collegano anima trave e piastra frontale $a_w =$ 8.00 [mm]

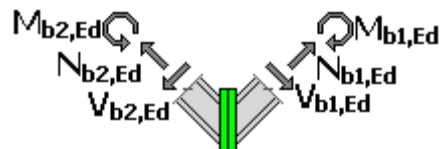
Lato destro

Spessore saldature dell'angolare che collegano flange trave e piastra frontale $a_f =$ 13.00 [mm]

Spessore saldature dell'angolare che collegano anima trave e piastra frontale $a_w =$ 8.00 [mm]

Forze

Forza assiale	$N_{b1,Ed} =$	53.00	[kN]
Forza di taglio	$V_{b1,Ed} =$	797.00	[kN]
Momento flettente	$M_{b1,Ed} =$	-639.00	[kNm]
Forza assiale	$N_{b2,Ed} =$	53.00	[kN]
Forza di taglio	$V_{b2,Ed} =$	797.00	[kN]
Momento flettente	$M_{b2,Ed} =$	-639.00	[kNm]



Risultati

Lato sinistro

Bulloni di collegamento piastre frontali

Resistenza a trazione di un bullone

$$F_{t,Rd} = (k_2 \cdot f_{ub} \cdot A_s) / \gamma_{M2} = (0.90 \cdot 1000.00 [MPa] \cdot 3.53 [cm^2]) / 1.25 = 254.16 [kN]$$

Area della sezione di taglio del bullone

$$A = A_s = 3.53 [cm^2]$$

Resistenza al taglio del bullone in una superficie

$$F_{v,Rd} = (\alpha_v \cdot m \cdot f_{ub} \cdot A) / \gamma_{M2} = (0.60 \cdot 1 \cdot 1000.00 [MPa] \cdot 3.53 [cm^2]) / 1.25 = 169.44 [kN]$$

Resistenza a punzonatura per taglio di un bullone

$$B_{p,Rd} = (0.6 \cdot \pi \cdot d_m \cdot t_p \cdot f_{up}) / \gamma_{M2} = (0.6 \cdot \pi \cdot 37.99 [mm] \cdot 35.00 [mm] \cdot 490.00 [MPa]) / 1.25 = 982.48 [kN]$$

Flangia e anima della trave in compressione

Modulo di resistenza di plastica

$$W_{pl} = 5185.20 [cm^3]$$

La resistenza di progetto per la piegatura della sezione

$$M_{c,Rd} = (W_{pl} \cdot f_{yb}) / \gamma_{M0} = (5185.20 [cm^3] \cdot 355.00 [MPa]) / 1.00 = 1840.75 [kNm]$$

Distanza tra le flange della trave

$$h_f = 565.00 [mm]$$

Resistenza di progetto della flangia colonna soggetta a compressione trasversale

$$F_{c,fb,Rd} = M_{c,Rd} / h_f = 1840.75 [kNm] / 565.00 [mm] = 3257.96 [kN]$$

Zona tesa

FILA BULLONI 1

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00 [mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00 [mm] - 13.00 [mm] - 0.8 \cdot \sqrt{2} \cdot 8.00 [mm]) = 69.45 [mm]$$

Distanza min

$$e_{min} = 65.00 [mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00 [mm]; 1.25 \cdot 69.45 [mm]) = 65.00 [mm]$$

parametro di calcolo

$$m_2 = p_1 + e_1 - e_{p1} - t_{fb} - 0.8 \cdot a_f \cdot \sqrt{2} = 90.00 [mm] + 90.00 [mm] - 20.00 [mm] - 25.00 [mm] - 0.8 \cdot 13.00 [mm] \cdot \sqrt{2} = 492.79 [mm]$$

$$\lambda_1 = m_{ep} / (m_{ep} + e_{ep}) = 69.45 [mm] / (69.45 [mm] + 65.00 [mm]) = 0.52$$

$$\lambda_2 = m_2 / (m_{ep} + e_{ep}) = 492.79 [mm] / (69.45 [mm] + 65.00 [mm]) = 3.67$$

$$\alpha = 5.18$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45 [mm] = 436.36 [mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = \alpha \cdot m_{ep} = 5.18 \cdot 69.45 [mm] = 360.02 [mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 360.02 [mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 360.02 [mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 360.02 [mm] \cdot (35.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 39.14 [kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.14 [kNm] / 69.45 [mm] = 2254.36 [kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30 [mm] = 11.00 [mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)] = [(8 \cdot 65.00 [mm] - 2 \cdot 11.00 [mm]) \cdot 39.14 [kNm]] / [2 \cdot 69.45 [mm] \cdot 65.00 [mm] - 11.00 [mm] \cdot (69.45 [mm] + 65.00 [mm])] = 2581.92 [kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2254.36 [kN]; 2581.92 [kN]) = 2254.36 [kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 360.02 [mm] \cdot (35.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 39.14 [kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.14 [kNm] + 65.00 [mm] \cdot 2 \cdot 254.16 [kN]) / (69.45 [mm] + 65.00 [mm]) = 827.99 [kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16 [kN] = 508.32 [kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2254.36 [kN]; 827.99 [kN]; 508.32 [kN]) = 508.32 [kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(1)} = 360.02 [mm]$$

Componente di resistenza

$$F_{t,wb,Rd(1)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.02 [mm] \cdot 13.00 [mm] \cdot 355.00 [MPa]) / 1.00 = 1661.48 [kN]$$

Resistenza riga di bulloni 1

$$F_{t,Rd(1)N} = \min[F_{t,ep,Rd(1)}; F_{t,wb,Rd(1)}] = \min[508.32 [kN]; 1661.48 [kN]] = 508.32 [kN]$$

$$F_{t,Rd(1)M} = \min \left[\begin{matrix} F_{t,ep,Rd(1)}; F_{t,wb,Rd(1)} \\ F_{cfb,Rd} \end{matrix} \right] = \min \left[\begin{matrix} 508.32[kN]; 1661.48[kN] \\ 3257.96[kN] \end{matrix} \right] = 508.32[kN]$$

FILA BULLONI 2

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza min

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00[mm] \cdot 39.04[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]]}{2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])} = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05 [mm] \cdot (35.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 39.04 [kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04 [kNm] + 65.00 [mm] \cdot 2 \cdot 254.16 [kN]) / (69.45 [mm] + 65.00 [mm]) = 826.42 [kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16 [kN] = 508.32 [kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27 [kN]; 826.42 [kN]; 508.32 [kN]) = 508.32 [kN]$$

Resistenza riga di bulloni 2

$$F_{t,Rd(2)N} = \min[F_{t,ep,Rd(2)}] = \min[508.32 [kN]] = 508.32 [kN]$$

$$F_{t,Rd(2)M} = \min \left[\begin{array}{l} F_{t,ep,Rd(2)} \\ F_{cfb,Rd} - F_{t,Rd(1)M} \end{array} \right] = \min \left[\begin{array}{l} 508.32 [kN] \\ 3257.96 [kN] - 508.32 [kN] \end{array} \right] = 508.32 [kN]$$

FILA BULLONI 3

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00 [mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00 [mm] - 13.00 [mm] - 0.8 \cdot \sqrt{2} \cdot 8.00 [mm]) = 69.45 [mm]$$

Distanza min

$$e_{min} = 65.00 [mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00 [mm]; 1.25 \cdot 69.45 [mm]) = 65.00 [mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45 [mm] = 436.36 [mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45 [mm] + 1.25 \cdot 65.00 [mm] = 359.05 [mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05 [mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])] = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(3)} = 359.05[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(3)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1657.00[kN]$$

Resistenza riga di bulloni 3

$$F_{t,Rd(3)N} = \min[F_{t,ep,Rd(3)}; F_{t,wb,Rd(3)}] = \min[508.32[kN]; 1657.00[kN]] = 508.32[kN]$$

$$F_{t,Rd(3)M} = \min \left[\begin{array}{c} [F_{t,ep,Rd(3)}; F_{t,wb,Rd(3)}] \\ [508.32[kN]; 1657.00[kN]] \end{array} \right] = \min \left[\begin{array}{c} [508.32[kN]; 1657.00[kN]] \\ [3257.96[kN] - 508.32[kN] - 508.32[kN]] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 4

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza \min

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00[mm] \cdot 39.04[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]]}{2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])} = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16 [kN] = 508.32 [kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27 [kN]; 826.42 [kN]; 508.32 [kN]) = 508.32 [kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(4)} = 359.05 [mm]$$

Componente di resistenza

$$F_{t,wb,Rd(4)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05 [mm] \cdot 13.00 [mm] \cdot 355.00 [MPa]) / 1.00 = 1657.00 [kN]$$

Piastra terminale in flessione

Riga 3+4 considerati come gruppo

Modelli circolari

Fila bulloni 3

$$l_{eff,cp(3,g)} = 2 \cdot p = 2 \cdot 90.00 [mm] = 180.00 [mm]$$

Fila bulloni 4

$$l_{eff,cp(4,g)} = 2 \cdot p = 2 \cdot 90.00 [mm] = 180.00 [mm]$$

$$\Sigma l_{eff(3+4)} = l_{eff,cp(3,g)} + l_{eff,cp(4,g)} = 180.00 [mm] + 180.00 [mm] = 360.00 [mm]$$

Modelli non-circolari

Fila bulloni 3

$$l_{eff,nc(3,g)} = p = 90.00 [mm]$$

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00 [mm]$$

$$\Sigma l_{eff,nc(3+4)} = l_{eff,nc(3,g)} + l_{eff,nc(4,g)} = 90.00 [mm] + 90.00 [mm] = 180.00 [mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(3+4)} = \Sigma l_{eff,cp(3+4)} = 180.00 [mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(3+4)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 360.00 [mm] \cdot (35.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 39.14 [kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 39.14 [kNm] / 69.45 [mm] = 2254.24 [kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m+n)]}{2 \cdot 1 \cdot 1.00 [mm]} = \frac{[(8 \cdot 65.00 [mm] - 2 \cdot 11.00 [mm]) \cdot 39.14 [kNm]] / [2 \cdot 69.45 [mm] \cdot 65.00 [mm] - 11.00 [mm] \cdot (69.45 [mm] + 65.00 [mm])]}{2} = 2581.80 [kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2254.24 [kN]; 2581.80 [kN]) = 2254.24 [kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(3+4)} = \Sigma l_{eff,cp(3+4)} = 180.00 [mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(3+4)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 180.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 39.14[kNm] + 65.00[mm] \cdot 4 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 1073.71[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 4 \cdot 254.16[kN] = 1016.64[kN]$$

Resistenza del gruppo

$$F_{t,ep(3+4)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2254.24[kN]; 1073.71[kN]; 1016.64[kN]) = 1016.64[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(4)} = 360.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(4)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1661.40[kN]$$

Resistenza riga di bulloni 4

$$F_{t,Rd(4)N} = \min[F_{t,ep,Rd(4)}; F_{t,wb,Rd(4)}] = \min[508.32[kN]; 1657.00[kN]] = 508.32[kN]$$

$$F_{t,Rd(4)M} = \min \left[\begin{array}{l} [F_{t,ep,Rd(4)}; F_{t,wb,Rd(4)}] \\ [F_{t,ep,Rd(3+4)} - F_{t,Rd(3)M}; F_{t,wb,Rd(3+4)} - F_{t,Rd(3)M}] \\ [F_{t,ep,Rd(4)}; F_{t,wb,Rd(4)}] \\ [F_{t,ep,Rd(3+4)} - F_{t,Rd(3)M}; F_{t,wb,Rd(3+4)} - F_{t,Rd(3)M}] \end{array} \right] = \min \left[\begin{array}{l} [508.32[kN]; 1657.00[kN]] \\ [1016.64[kN] - 508.32[kN]; 1661.40[kN] - 508.32[kN]] \\ [508.32[kN]; 1657.00[kN]] \\ [3257.96[kN] - 508.32[kN] - 508.32[kN]; 1661.40[kN] - 508.32[kN]] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 5

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza min

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])] = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(5)} = 359.05[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(5)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1657.00[kN]$$

Piastra terminale in flessione

Riga 4+5 considerati come gruppo

Modelli circolari

Fila bulloni 4

$$l_{\text{eff,cp}(4,g)} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff,cp}(5,g)} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

$$\Sigma l_{\text{eff}(4+5)} = l_{\text{eff,cp}(4,g)} + l_{\text{eff,cp}(5,g)} = 180.00 [\text{mm}] + 180.00 [\text{mm}] = 360.00 [\text{mm}]$$

Modelli non-circolari

Fila bulloni 4

$$l_{\text{eff,nc}(4,g)} = p = 90.00 [\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff,nc}(5,g)} = p = 90.00 [\text{mm}]$$

$$\Sigma l_{\text{eff,nc}(4+5)} = l_{\text{eff,nc}(4,g)} + l_{\text{eff,nc}(5,g)} = 90.00 [\text{mm}] + 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{\text{eff},1(4+5)} = \Sigma l_{\text{eff,cp}(4+5)} = 180.00 [\text{mm}]$$

$$M_{\text{pl},1,\text{Rd}} = (0.25 \cdot \Sigma l_{\text{eff},1(4+5)} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{\text{M0}} = (0.25 \cdot 360.00 [\text{mm}] \cdot (35.00 [\text{mm}])^2 \cdot 355.00 [\text{MPa}] / 1.00 = 39.14 [\text{kNm}]$$

Metodo 1

$$F_{\text{T},1,\text{Rd}1} = (4 \cdot M_{\text{pl},1,\text{Rd}}) / m = 4 \cdot 39.14 [\text{kNm}] / 69.45 [\text{mm}] = 2254.24 [\text{kN}]$$

Metodo 2 (metodo alternativo)

$$F_{\text{T},1,\text{Rd}2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{\text{pl},1,\text{Rd}}] / [2 \cdot m \cdot n - e_w \cdot (m+n)] = [(8 \cdot 65.00 [\text{mm}] - 2 \cdot 11.00 [\text{mm}]) \cdot 39.14 [\text{kNm}]] / [2 \cdot 69.45 [\text{mm}] \cdot 65.00 [\text{mm}] - 11.00 [\text{mm}] \cdot (69.45 [\text{mm}] + 65.00 [\text{mm}])] = 2581.80 [\text{kN}]$$

$$F_{\text{T},1,\text{Rd}} = \min(F_{\text{T},1,\text{Rd}1}; F_{\text{T},1,\text{Rd}2}) = (2254.24 [\text{kN}]; 2581.80 [\text{kN}]) = 2254.24 [\text{kN}]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{\text{eff},2(4+5)} = \Sigma l_{\text{eff,cp}(4+5)} = 180.00 [\text{mm}]$$

$$M_{\text{pl},2,\text{Rd}} = (0.25 \cdot \Sigma l_{\text{eff},2(4+5)} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{\text{M0}} = (0.25 \cdot 180.00 [\text{mm}] \cdot (35.00 [\text{mm}])^2 \cdot 355.00 [\text{MPa}] / 1.00 = 39.14 [\text{kNm}]$$

$$F_{\text{T},2,\text{Rd}} = (2 \cdot M_{\text{pl},2,\text{Rd}} + n \cdot \Sigma F_{\text{t},\text{Rd}}) / (m+n) = (2 \cdot 39.14 [\text{kNm}] + 65.00 [\text{mm}] \cdot 4 \cdot 254.16 [\text{kN}]) / (69.45 [\text{mm}] + 65.00 [\text{mm}]) = 1073.71 [\text{kN}]$$

Modello 3: Rottura bullone

$$F_{\text{T},3,\text{Rd}} = \Sigma F_{\text{t},\text{Rd}} = 4 \cdot 254.16 [\text{kN}] = 1016.64 [\text{kN}]$$

Resistenza del gruppo

$$F_{\text{t,ep}(4+5)} = \min(F_{\text{T},1,\text{Rd}}; F_{\text{T},2,\text{Rd}}; F_{\text{T},3,\text{Rd}}) = (2254.24 [\text{kN}]; 1073.71 [\text{kN}]; 1016.64 [\text{kN}]) = 1016.64 [\text{kN}]$$

Riga 3+4+5 considerati come gruppo

Modelli circolari

Fila bulloni 3

$$l_{\text{eff,cp}(3,g)} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Fila bulloni 4

$$l_{\text{eff,cp}(4,g)} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff,cp}(5,g)} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

$$\Sigma l_{\text{eff}(3+4+5)} = l_{\text{eff,cp}(3,g)} + l_{\text{eff,cp}(4,g)} + l_{\text{eff,cp}(5,g)} = 180.00 [\text{mm}] + 180.00 [\text{mm}] + 180.00 [\text{mm}] = 540.00 [\text{mm}]$$

Modelli non-circolari

Fila bulloni 3

$$l_{\text{eff},nc(3,g)} = p = 90.00[\text{mm}]$$

Fila bulloni 4

$$l_{\text{eff},nc(4,g)} = p = 90.00[\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff},nc(5,g)} = p = 90.00[\text{mm}]$$

$$\Sigma l_{\text{eff},nc(3+4+5)} = l_{\text{eff},nc(3,g)} + l_{\text{eff},nc(4,g)} + l_{\text{eff},nc(5,g)} = 90.00[\text{mm}] + 90.00[\text{mm}] + 90.00[\text{mm}] = 270.00[\text{mm}]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{\text{eff},1(3+4+5)} = \Sigma l_{\text{eff},cp(3+4+5)} = 270.00[\text{mm}]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{\text{eff},1(3+4+5)} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{M0} = (0.25 \cdot 540.00[\text{mm}] \cdot (35.00[\text{mm}])^2 \cdot 355.00[\text{MPa}]) / 1.00 = 97.85[\text{kNm}]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 97.85[\text{kNm}] / 69.45[\text{mm}] = 5635.61[\text{kN}]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m + n)]}{2 \cdot 11.00[\text{mm}] \cdot 97.85[\text{kNm}] / [2 \cdot 69.45[\text{mm}] \cdot 65.00[\text{mm}] - 11.00[\text{mm}] \cdot (69.45[\text{mm}] + 65.00[\text{mm}])]} = \frac{[(8 \cdot 65.00[\text{mm}] - 2 \cdot 11.00[\text{mm}]) \cdot 97.85[\text{kNm}]]}{2 \cdot 69.45[\text{mm}] \cdot 65.00[\text{mm}] - 11.00[\text{mm}] \cdot (69.45[\text{mm}] + 65.00[\text{mm}])} = 6454.49[\text{kN}]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (5635.61[\text{kN}]; 6454.49[\text{kN}]) = 5635.61[\text{kN}]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{\text{eff},2(3+4+5)} = \Sigma l_{\text{eff},cp(3+4+5)} = 270.00[\text{mm}]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{\text{eff},2(3+4+5)} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{M0} = (0.25 \cdot 270.00[\text{mm}] \cdot (35.00[\text{mm}])^2 \cdot 355.00[\text{MPa}]) / 1.00 = 97.85[\text{kNm}]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m + n) = (2 \cdot 97.85[\text{kNm}] + 65.00[\text{mm}] \cdot 6 \cdot 254.16[\text{kN}]) / (69.45[\text{mm}] + 65.00[\text{mm}]) = 2192.77[\text{kN}]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 6 \cdot 254.16[\text{kN}] = 1524.96[\text{kN}]$$

Resistenza del gruppo

$$F_{t,ep(3+4+5)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (5635.61[\text{kN}]; 2192.77[\text{kN}]; 1524.96[\text{kN}]) = 1524.96[\text{kN}]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{\text{eff},t,wb} = \Sigma l_{\text{eff}1(5)} = 360.00[\text{mm}]$$

Componente di resistenza

$$F_{t,wb,Rd(5)} = (b_{\text{eff},t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.00[\text{mm}] \cdot 13.00[\text{mm}] \cdot 355.00[\text{MPa}]) / 1.00 = 1661.40[\text{kN}]$$

Larghezza effettiva dell'anima della trave in tensione

$$b_{\text{eff},t,wb} = \Sigma l_{\text{eff}1(5)} = 900.00[\text{mm}]$$

Componente di resistenza

$$F_{t,wb,Rd(5)} = (b_{\text{eff},t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (900.00[\text{mm}] \cdot 13.00[\text{mm}] \cdot 355.00[\text{MPa}]) / 1.00 = 4153.50[\text{kN}]$$

Resistenza riga di bulloni 5

$$F_{t,Rd(5)N} = \min[F_{t,ep,Rd(5)}; F_{t,wb,Rd(5)}] = \min[1524.96[\text{kN}]; 4153.50[\text{kN}]] = 1524.96[\text{kN}]$$

=

$$F_{t,Rd(5)M} = \min \left[\begin{array}{l} [F_{t,ep,Rd(5)}; F_{t,wb,Rd(5)}] \\ [F_{t,ep,Rd(4+5)} - F_{t,Rd(4)M}; F_{t,wb,Rd(4+5)} - F_{t,Rd(4)M}] \\ [F_{t,ep,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}; F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \end{array} \right] = \min \left[\begin{array}{l} [508.32[kN]; 1657.00[kN]] \\ [1016.64[kN] - 508.32[kN]; 1661.40[kN] - 508.32[kN]] \\ [1524.96[kN] - 508.32[kN] - 508.32[kN]; 4153.50[kN] - 508.32[kN] - 508.32[kN]] \\ [4153.50[kN] - 508.32[kN] - 508.32[kN]] \\ [3257.96[kN] - 508.32[kN] - 508.32[kN] - 508.32[kN]] \\ [508.32[kN] - 508.32[kN]] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 6

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza min

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30 [mm] = 11.00 [mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}]/[2 \cdot m_{ep} \cdot n \cdot e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00 [mm] \cdot 39.04 [kNm]/[2 \cdot 69.45 [mm] \cdot 65.00 [mm] - 11.00 [mm] \cdot (69.45 [mm] + 65.00 [mm])]} = \frac{[(8 \cdot 65.00 [mm] - 2 \cdot 11.00 [mm]) \cdot 39.04 [kNm]]}{2 \cdot 69.45 [mm] \cdot 65.00 [mm] - 11.00 [mm] \cdot (69.45 [mm] + 65.00 [mm])} = 2574.95 [kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27 [kN]; 2574.95 [kN]) = 2248.27 [kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot I_{eff,2} \cdot t_p^2 \cdot f_{yp})/\gamma_{M0} = (0.25 \cdot 359.05 [mm]^4 \cdot (35.00 [mm])^2 \cdot 355.00 [MPa])/1.00 = 39.04 [kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd})/(m_{ep} + n) = (2 \cdot 39.04 [kNm] + 65.00 [mm] \cdot 2 \cdot 254.16 [kN])/(69.45 [mm] + 65.00 [mm]) = 826.42 [kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16 [kN] = 508.32 [kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27 [kN]; 826.42 [kN]; 508.32 [kN]) = 508.32 [kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = I_{eff1(6)} = 359.05 [mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb})/\gamma_{M0} = (359.05 [mm] \cdot 13.00 [mm] \cdot 355.00 [MPa])/1.00 = 1657.00 [kN]$$

Piastra terminale in flessione

Riga 5+6 considerati come gruppo

Modelli circolari

Fila bulloni 5

$$I_{eff,cp(5,g)} = 2 \cdot p = 2 \cdot 90.00 [mm] = 180.00 [mm]$$

Fila bulloni 6

$$I_{eff,cp(6,g)} = 2 \cdot p = 2 \cdot 90.00 [mm] = 180.00 [mm]$$

$$\Sigma I_{eff(5+6)} = I_{eff,cp(5,g)} + I_{eff,cp(6,g)} = 180.00 [mm] + 180.00 [mm] = 360.00 [mm]$$

Modelli non-circolari

Fila bulloni 5

$$I_{eff,nc(5,g)} = p = 90.00 [mm]$$

Fila bulloni 6

$$I_{eff,nc(6,g)} = p = 90.00 [mm]$$

$$\Sigma I_{eff,nc(5+6)} = I_{eff,nc(5,g)} + I_{eff,nc(6,g)} = 90.00 [mm] + 90.00 [mm] = 180.00 [mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(5+6)} = \Sigma l_{eff,cp(5+6)} = 180.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 360.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 39.14[kNm] / 69.45[mm] = 2254.24[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m+n)]}{2 \cdot 11.00[mm] \cdot 39.14[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.14[kNm]]}{2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])} = 2581.80[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2254.24[kN]; 2581.80[kN]) = 2254.24[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(5+6)} = \Sigma l_{eff,cp(5+6)} = 180.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 180.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 39.14[kNm] + 65.00[mm] \cdot 4 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 1073.71[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 4 \cdot 254.16[kN] = 1016.64[kN]$$

Resistenza del gruppo

$$F_{t,ep(5+6)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2254.24[kN]; 1073.71[kN]; 1016.64[kN]) = 1016.64[kN]$$

Riga 4+5+6 considerati come gruppo

Modelli circolari

Fila bulloni 4

$$l_{eff,cp(4,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 5

$$l_{eff,cp(5,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 6

$$l_{eff,cp(6,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

$$\Sigma l_{eff(4+5+6)} = l_{eff,cp(4,g)} + l_{eff,cp(5,g)} + l_{eff,cp(6,g)} = 180.00[mm] + 180.00[mm] + 180.00[mm] = 540.00[mm]$$

Modelli non-circolari

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00[mm]$$

Fila bulloni 5

$$l_{eff,nc(5,g)} = p = 90.00[mm]$$

Fila bulloni 6

$$l_{eff,nc(6,g)} = p = 90.00[mm]$$

$$\Sigma l_{eff,nc(4+5+6)} = l_{eff,nc(4,g)} + l_{eff,nc(5,g)} + l_{eff,nc(6,g)} = 90.00[mm] + 90.00[mm] + 90.00[mm] = 270.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(4+5+6)} = \Sigma l_{eff,cp(4+5+6)} = 270.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(4+5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 540.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 97.85[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd})/m = 4 \cdot 97.85[kNm]/69.45[mm] = 5635.61[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m+n)] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 97.85[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])] = 6454.49[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (5635.61[kN]; 6454.49[kN]) = 5635.61[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(4+5+6)} = \Sigma l_{eff,cp(4+5+6)} = 270.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(4+5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 270.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 97.85[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 97.85[kNm] + 65.00[mm] \cdot 6 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 2192.77[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 6 \cdot 254.16[kN] = 1524.96[kN]$$

Resistenza del gruppo

$$F_{t,ep(4+5+6)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (5635.61[kN]; 2192.77[kN]; 1524.96[kN]) = 1524.96[kN]$$

Riga 3+4+5+6 considerati come gruppo

Modelli circolari

Fila bulloni 3

$$l_{eff,cp(3,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 4

$$l_{eff,cp(4,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 5

$$l_{eff,cp(5,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 6

$$l_{eff,cp(6,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

$$\Sigma l_{eff(3+4+5+6)} = l_{eff,cp(3,g)} + l_{eff,cp(4,g)} + l_{eff,cp(5,g)} + l_{eff,cp(6,g)} = 180.00[mm] + 180.00[mm] + 180.00[mm] + 180.00[mm] = 720.00[mm]$$

Modelli non-circolari

Fila bulloni 3

$$l_{eff,nc(3,g)} = p = 90.00[mm]$$

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00[mm]$$

Fila bulloni 5

$$l_{eff,nc(5,g)} = p = 90.00[mm]$$

Fila bulloni 6

$$l_{eff,nc(6,g)} = p = 90.00[mm]$$

$$\Sigma l_{eff,nc(3+4+5+6)} = l_{eff,nc(3,g)} + l_{eff,nc(4,g)} + l_{eff,nc(5,g)} + l_{eff,nc(6,g)} = 90.00[mm] + 90.00[mm] + 90.00[mm] + 90.00[mm] = 360.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(3+4+5+6)} = \Sigma l_{eff,cp(3+4+5+6)} = 360.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(3+4+5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 720.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 176.12[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 176.12[kNm] / 69.45[mm] = 10144.09[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd} / [2 \cdot m \cdot n - e_w \cdot (m+n)]] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 176.12[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]] = 11618.08[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (10144.09[kN]; 11618.08[kN]) = 10144.09[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(3+4+5+6)} = \Sigma l_{eff,cp(3+4+5+6)} = 360.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(3+4+5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 360.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 176.12[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 176.12[kNm] + 65.00[mm] \cdot 8 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 3602.94[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 8 \cdot 254.16[kN] = 2033.28[kN]$$

Resistenza del gruppo

$$F_{t,ep(3+4+5+6)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (10144.09[kN]; 3602.94[kN]; 2033.28[kN]) = 2033.28[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(6)} = 360.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1661.40[kN]$$

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(6)} = 900.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (900.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 4153.50[kN]$$

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(6)} = 1620.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (1620.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 7476.30[kN]$$

Resistenza riga di bulloni 6

$$F_{t,Rd(6)N} = \min[F_{t,ep,Rd(6)}; F_{t,wb,Rd(6)}] = \min[508.32[kN]; 1657.00[kN]] = 508.32[kN]$$

Resistenza a flessione

Momento flettente reale

$$M_0 = M_{b2,Ed} = -639.00[kNm]$$

Momento resistente di progetto del giunto, senza considerare le forze assiali

$$M_{j,Rd} = F_{t,Rd(1)M} \cdot h_1 + F_{t,Rd(2)M} \cdot h_2 + F_{t,Rd(3)M} \cdot h_3 + F_{t,Rd(4)M} \cdot h_4 + F_{t,Rd(5)M} \cdot h_5 = 508.32[kN] \cdot 507.50[mm] + 508.32[kN] \cdot 417.50[mm] + 508.32[kN] \cdot 327.50[mm] + 508.32[kN] \cdot 237.50[mm] + 508.32[kN] \cdot 147.50[mm] = 861.60[kNm]$$

$ M_0 /M_{j,Rd} \leq 1$	$0.74 < 1.00$	0.74	
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Resistenza a tensione

Forza assiale

$$N_0 = N_{b2,Ed} \cdot \cos(\alpha_1) + V_{b2,Ed} \cdot \sin(\alpha_1) = 53.00[kN] \cdot \cos(0.00[Deg]) + 797.00[kN] \cdot \sin(0.00[Deg]) = 53.00[kN]$$

Resistenza di progetto assiale del giunto, senza considerare il momento applicato

$$N_{j,Rd} = F_{t,Rd(1)N} + F_{t,Rd(2)N} + F_{t,Rd(3)N} + F_{t,Rd(4)N} + F_{t,Rd(5)N} + F_{t,Rd(6)N} = 508.32[kN] + 508.32[kN] + 508.32[kN] + 508.32[kN] + 508.32[kN] + 508.32[kN] = 3049.92[kN]$$

$ N_0 /N_{j,Rd} \leq 1$	$0.02 < 1.00$	0.02	
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Resistenza a trazione e flessione

$N_0/N_{j,Rd} + M_0 /M_{j,Rd} \leq 1$	$0.76 < 1.00$	0.76	
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Resistenza a taglio

Forza di taglio

$$V_0 = -N_{b1,Ed} \cdot \sin(\alpha) + V_{b1,Ed} \cdot \cos(\alpha) = -(53.00[kN]) \cdot \sin(0.00[Deg]) + 797.00[kN] \cdot \cos(0.00[Deg]) = 797.00[kN]$$

FILA BULLONI 1

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; e_1/d_0) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/27.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8 \cdot e_2/d_0) = \min(2.5; 2.8 \cdot 65.00[mm]/27.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1 \cdot \alpha_b \cdot f_{up} \cdot d \cdot t_p = 2.50 \cdot 1.00 \cdot 490.00[MPa] \cdot 24.00[mm] \cdot 35.00[mm] = 823.20[kN]$$

Resistenza riga di bulloni 1

$$V_{Rd(1)} = m_1 \cdot \min(F_{b,Rd}; F_{v,Rd}) = 2 \cdot \min(823.20[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 2

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3*d_0)-0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3*27.00[mm])-0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4*p_2/d_0-1.7) = \min(2.5; 1.4*170.00[mm]/27.00[mm]-1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*0.86*490.00[MPa]*24.00[mm]*35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 2

$$V_{Rd(2)} = m_2*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 3

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3*d_0)-0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3*27.00[mm])-0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4*p_2/d_0-1.7) = \min(2.5; 1.4*170.00[mm]/27.00[mm]-1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*0.86*490.00[MPa]*24.00[mm]*35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 3

$$V_{Rd(3)} = m_3*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 4

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3*d_0)-0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3*27.00[mm])-0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4*p_2/d_0-1.7) = \min(2.5; 1.4*170.00[mm]/27.00[mm]-1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*0.86*490.00[MPa]*24.00[mm]*35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 4

$$V_{Rd(4)} = m_4*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 5

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3*d_0)-0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3*27.00[mm])-0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4*p_2/d_0-1.7) = \min(2.5; 1.4*170.00[mm]/27.00[mm]-1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*0.86*490.00[MPa]*24.00[mm]*35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 5

$$V_{Rd(5)} = m_5*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 6

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; e_1/d_0) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/27.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8*e_2/d_0) = \min(2.5; 2.8*65.00[mm]/27.00[mm]) = 2.50$$


Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*1.00*490.00[MPa]*24.00[mm]*35.00[mm] = 823.20[kN]$$

Resistenza riga di bulloni 6

$$V_{Rd(6)} = m_6*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(823.20[kN]; 169.44[kN]) = 338.88[kN]$$

$$V_{j,Rd} = V_{Rd(1)} + V_{Rd(2)} + V_{Rd(3)} + V_{Rd(4)} + V_{Rd(5)} + V_{Rd(6)} = 338.88[kN] + 338.88[kN] + 338.88[kN] + 338.88[kN] + 338.88[kN] + 338.88[kN] = 2033.28[kN]$$

$ V_0 /V_{j,Rd} \leq 1$	$ 797.00[kN] < 2033.28[kN]$	0.39	
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Saldature dell'angolare che collegano trave e piastra frontale

Forze nelle saldature

Forza assiale

$$N_0 = N_{b2,Ed}*\cos(\alpha_1) + V_{b2,Ed}*\sin(\alpha_1) = 53.00[kN]*\cos(0.00[Deg]) + 797.00[kN]*\sin(0.00[Deg]) = 53.00[kN]$$

Forza di taglio

$$V_0 = -N_{b2,Ed}*\sin(\alpha_1) + V_{b2,Ed}*\cos(\alpha_1) = -(53.00[kN])* \sin(0.00[Deg]) + 797.00[kN]*\cos(0.00[Deg]) = 797.00[kN]$$

Momento flettente reale

$$M_0 = M_{b2,Ed} = -639.00[kNm]$$

Proprietà geometriche delle saldature

Trave

Area saldature orizzontali sulla flangia superiore

$$A_{wfu} = [b_{fb} + (b_{fb} - t_{wb} - 2*r_b)]*a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2*27.00[mm])]*13.00[mm] = 69.29[cm^2]$$

Area saldature orizzontali sulla flangia inferiore

$$A_{wfl} = [b_{fb} + (b_{fb} - t_{wb} - 2*r_b)]*a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2*27.00[mm])]*13.00[mm] = 69.29[cm^2]$$

Area delle saldature verticali

$$A_{ww} = 2 * [(h_b - 2 * (t_{fb} - r_b)) / \cos(\alpha)] * a_w = 2 * [(590.00[mm] - 2 * (25.00[mm] - 27.00[mm])) / \cos(0.00[Deg])] * 8.00[mm] = 77.76[cm^2]$$

Area di tutte le saldature

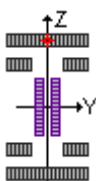
$$A_w = A_{wfu} + A_{wfl} + A_{ww} = 69.29[cm^2] + 69.29[cm^2] + 77.76[cm^2] = 216.34[cm^2]$$

Distanza tra baricentro saldature e baricentro trave

$$e_{0w} = 0.00[mm]$$

Momento d'inerzia saldature

$$I_w = 128290.83[cm^4]$$

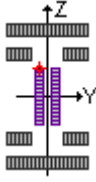
Punto in cui le sollecitazioni vengono controllate	$z_i = 301.50[mm]$
Modulo elastico delle saldature	
$W_w = 4255.09[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 53.00[kN]/216.34[cm^2] = 2.45[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 * z_i)/I_w = (-639.00[kNm] * 301.50[mm])/128290.83[cm^4] = -150.17[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45[MPa] + (-150.17[MPa]) = -147.72[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -147.72[MPa]/\sqrt{2} = -104.46[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -147.72[MPa]/\sqrt{2} = -104.46[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 * f_u / \gamma_{M2}$	$-104.46[MPa] < 352.80[MPa]$	0.21	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 * (\tau_{\perp}^2)]} \leq f_u / (\beta_w * \gamma_{M2})$	$208.91[MPa] < 435.56[MPa]$	0.48	✓
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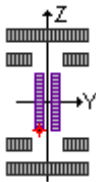
Punto in cui le sollecitazioni vengono controllate	$z_i = 243.00[mm]$
Modulo elastico delle saldature	
$W_w = 5279.46[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 53.00[kN]/216.34[cm^2] = 2.45[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 * z_i)/I_w = (-639.00[kNm] * 243.00[mm])/128290.83[cm^4] = -121.04[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45[MPa] + (-121.04[MPa]) = -118.59[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -118.59[MPa]/\sqrt{2} = -83.85[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -118.59[MPa]/\sqrt{2} = -83.85[MPa]$	
Sforzo tangente parallelo	
$\tau_{ } = V_0/A_{ww} = 797.00[kN]/77.76[cm^2] = 102.49[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$$|\sigma_{\perp}| \leq 0.9 \cdot f_u / \gamma_{M2} \quad |-83.85[MPa]| < 352.80[MPa] \quad 0.17 \quad \checkmark$$

$$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2}) \quad 244.21[MPa] < 435.56[MPa] \quad 0.56 \quad \checkmark$$

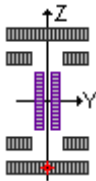
Punto in cui le sollecitazioni vengono controllate	$z_i = -243.00[mm]$
Modulo elastico delle saldature	
$W_w = 5279.46[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 53.00[kN] / 216.34[cm^2] = 2.45[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (-639.00[kNm] \cdot (-243.00[mm])) / 128290.83[cm^4] = 121.04[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45[MPa] + 121.04[MPa] = 123.48[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = 123.48[MPa] / \sqrt{2} = 87.32[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = 123.48[MPa] / \sqrt{2} = 87.32[MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0 / A_{ww} = 797.00[kN] / 77.76[cm^2] = 102.49[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$



$$|\sigma_{\perp}| \leq 0.9 \cdot f_u / \gamma_{M2} \quad |87.32[MPa]| < 352.80[MPa] \quad 0.18 \quad \checkmark$$

$$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2}) \quad 249.02[MPa] < 435.56[MPa] \quad 0.57 \quad \checkmark$$

Punto in cui le sollecitazioni vengono controllate	$z_i = -301.50[mm]$
Modulo elastico delle saldature	
$W_w = 4255.09[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 53.00[kN] / 216.34[cm^2] = 2.45[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (-639.00[kNm] \cdot (-301.50[mm])) / 128290.83[cm^4] = 150.17[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45[MPa] + 150.17[MPa] = 152.62[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = 152.62[MPa] / \sqrt{2} = 107.92[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = 152.62[MPa] / \sqrt{2} = 107.92[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ 107.92[MPa] < 352.80[MPa]$	0.22	
$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$215.84[MPa] < 435.56[MPa]$	0.50	

Rigidezza di rotazione del giunto

Lunghezza di allungamento del bullone

$$L_b = t_p + 0.5 \cdot (m + k) + t_{wa} = 35.00[mm] + 0.5 \cdot (22.30[mm] + 15.00[mm]) + 4.00[mm] = 96.65[mm]$$

$$k_{10} = (3.2 \cdot A_s) / L_b = (3.2 \cdot 3.53[cm^2]) / 96.65[mm] = 5.84[mm]$$

Fila bulloni 1

Piastra terminale in flessione

$$k_{4,1} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 360.02[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,1} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.47[mm] + 1/5.84[mm]) = 7.35[mm]$$

Fila bulloni 2

Piastra terminale in flessione

$$k_{4,2} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,2} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Fila bulloni 3

Piastra terminale in flessione

$$k_{4,3} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,3} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Fila bulloni 4

Piastra terminale in flessione

$$k_{4,4} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,4} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Fila bulloni 5

Piastra terminale in flessione

$$k_{4,5} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,5} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Fila bulloni 6

Piastra terminale in flessione

$$k_{4,6} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,6} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Braccio di leva delle forze interne

$$Z_{eq} = \frac{[k_{eff,1} \cdot h_1^2 + k_{eff,2} \cdot h_2^2 + k_{eff,3} \cdot h_3^2 + k_{eff,4} \cdot h_4^2 + k_{eff,5} \cdot h_5^2 + k_{eff,6} \cdot h_6^2]}{[k_{eff,1} \cdot h_1 + k_{eff,2} \cdot h_2 + k_{eff,3} \cdot h_3 + k_{eff,4} \cdot h_4 + k_{eff,5} \cdot h_5 + k_{eff,6} \cdot h_6]} = \frac{[7.35[mm] \cdot 507.50[mm]^2 + 7.34[mm] \cdot 417.50[mm]^2 + 7.34[mm] \cdot 327.50[mm]^2 + 7.34[mm] \cdot 237.50[mm]^2 + 7.34[mm] \cdot 237.50[mm]^2 + 7.34[mm] \cdot 237.50[mm]^2]}{[7.35[mm] \cdot 507.50[mm] + 7.34[mm] \cdot 417.50[mm] + 7.34[mm] \cdot 327.50[mm] + 7.34[mm] \cdot 237.50[mm] + 7.34[mm] \cdot 237.50[mm] + 7.34[mm] \cdot 237.50[mm]]} =$$

$$147.50[mm]^2 + 7.34[mm] * 57.50[mm]^2 / [7.35[mm] * 507.50[mm] + 7.34[mm] * 417.50[mm] + 7.34[mm] * 327.50[mm] + 7.34[mm] * 237.50[mm] + 7.34[mm] * 147.50[mm] + 7.34[mm] * 57.50[mm]] = 366.14[mm]$$

Coefficiente di rigidità equivalente

$$k_{eq} = \frac{[k_{eff,1} * h_1 + k_{eff,2} * h_2 + k_{eff,3} * h_3 + k_{eff,4} * h_4 + k_{eff,5} * h_5 + k_{eff,6} * h_6]}{Z_{eq}} = \frac{[7.35[mm] * 507.50[mm] + 7.34[mm] * 417.50[mm] + 7.34[mm] * 327.50[mm] + 7.34[mm] * 237.50[mm] + 7.34[mm] * 147.50[mm] + 7.34[mm] * 57.50[mm]]}{366.14[mm]} = 23.71[mm]$$

Rigidità di rotazione iniziale del giunto

$$S_{j,ini} = E * Z_{eq}^2 / (1/k_{eq}) = (210000.00[MPa] * (366.14[mm])^2) / (1/23.71[mm]) = 667392.73[kNm]$$

Rigidità di rotazione del giunto chiodato

$$S_{j,pin} = (0.5 * E * I_{yb}) / L_b = (0.5 * 210000.00[MPa] * 141208.11[cm^4]) / 4000.00[mm] = 37067.13[kNm]$$

Rigidità di rotazione del giunto rigido

$$S_{j,rig} = (k_b * E * I_{yb}) / L_b = (25.00 * 210000.00[MPa] * 141208.11[cm^4]) / 4000.00[mm] = 1853356.46[kNm]$$

Classificazione dei giunti

Semi-rigido

Lato destro

Bulloni di collegamento piastre frontali

Resistenza a trazione di un bullone

$$F_{t,Rd} = (k_2 * f_{ub} * A_s) / \gamma_{M2} = (0.90 * 1000.00[MPa] * 3.53[cm^2]) / 1.25 = 254.16[kN]$$

Area della sezione di taglio del bullone

$$A = A_s = 3.53[cm^2]$$

Resistenza al taglio del bullone in una superficie

$$F_{v,Rd} = (\alpha_v * m * f_{ub} * A) / \gamma_{M2} = (0.60 * 1 * 1000.00[MPa] * 3.53[cm^2]) / 1.25 = 169.44[kN]$$

Resistenza a punzonatura per taglio di un bullone

$$B_{p,Rd} = (0.6 * \pi * d_m * t_p * f_{up}) / \gamma_{M2} = (0.6 * \pi * 37.99[mm] * 35.00[mm] * 490.00[MPa]) / 1.25 = 982.48[kN]$$

Flangia e anima della trave in compressione

Modulo di resistenza di plastica

$$W_{pl} = 5185.20[cm^3]$$

La resistenza di progetto per la piegatura della sezione

$$M_{c,Rd} = (W_{pl} * f_{yb}) / \gamma_{M0} = (5185.20[cm^3] * 355.00[MPa]) / 1.00 = 1840.75[kNm]$$

Distanza tra le flange della trave

$$h_f = 565.00[mm]$$

Resistenza di progetto della flangia colonna soggetta a compressione trasversale

$$F_{c,fb,Rd} = M_{c,Rd} / h_f = 1840.75[kNm] / 565.00[mm] = 3257.96[kN]$$

Zona tesa

FILA BULLONI 1

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza m_{min}

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

parametro di calcolo

$$m_2 = p_1 + e_1 - e_{p1} - t_{fb} - 0.8 \cdot a_f \cdot \sqrt{2} = 90.00[mm] + 90.00[mm] - 20.00[mm] - 25.00[mm] - 0.8 \cdot 13.00[mm] \cdot \sqrt{2} = 492.79[mm]$$

$$\lambda_1 = m_{ep} / (m_{ep} + e_{ep}) = 69.45[mm] / (69.45[mm] + 65.00[mm]) = 0.52$$

$$\lambda_2 = m_2 / (m_{ep} + e_{ep}) = 492.79[mm] / (69.45[mm] + 65.00[mm]) = 3.67$$

$$\alpha = 5.18$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = \alpha \cdot m_{ep} = 5.18 \cdot 69.45[mm] = 360.02[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 360.02[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 360.02[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 360.02[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.14[kNm] / 69.45[mm] = 2254.36[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00[mm] \cdot 39.14[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.14[kNm]]}{2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])} = 2581.92[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2254.36[kN]; 2581.92[kN]) = 2254.36[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot I_{eff,z} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 360.02[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.14[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 827.99[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2254.36[kN]; 827.99[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = I_{eff1}(1) = 360.02[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(1)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.02[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1661.48[kN]$$

Resistenza riga di bulloni 1

$$F_{t,Rd(1)N} = \min[F_{t,ep,Rd(1)}; F_{t,wb,Rd(1)}] = \min[508.32[kN]; 1661.48[kN]] = 508.32[kN]$$

$$F_{t,Rd(1)M} = \min \left[\begin{array}{l} F_{t,ep,Rd(1)}; F_{t,wb,Rd(1)} \\ F_{cfb,Rd} \end{array} \right] = \min \left[\begin{array}{l} 508.32[kN]; 1661.48[kN] \\ 3257.96[kN] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 2

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza min

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])] = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Resistenza riga di bulloni 2

$$F_{t,Rd(2)N} = \min[F_{t,ep,Rd(2)}] = \min[508.32[kN]] = 508.32[kN]$$

$$F_{t,Rd(2)M} = \min \left[\begin{array}{l} F_{t,ep,Rd(2)} \\ F_{cfb,Rd} - F_{t,Rd(1)M} \end{array} \right] = \min \left[\begin{array}{l} 508.32[kN] \\ 3257.96[kN] - 508.32[kN] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 3

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza e_{min}

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00[mm] \cdot 39.04[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]]}{2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])} = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(3)} = 359.05[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(3)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1657.00[kN]$$

Resistenza riga di bulloni 3

$$F_{t,Rd(3)N} = \min[F_{t,ep,Rd(3)}; F_{t,wb,Rd(3)}] = \min[508.32[kN]; 1657.00[kN]] = 508.32[kN]$$

$$F_{t,Rd(3)M} = \min \left[\begin{array}{l} F_{t,ep,Rd(3)}; F_{t,wb,Rd(3)} \\ F_{cfb,Rd} - F_{t,Rd(1)M} - F_{t,Rd(2)M} \end{array} \right] = \min \left[\begin{array}{l} 508.32[kN]; 1657.00[kN] \\ 3257.96[kN] - 508.32[kN] - 508.32[kN] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 4

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza e_{min}

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])] = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(4)} = 359.05[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(4)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1657.00[kN]$$

Piastra terminale in flessione

Riga 3+4 considerati come gruppo

Modelli circolari

Fila bulloni 3

$$l_{eff,cp(3,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 4

$$l_{eff,cp(4,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

$$\Sigma l_{eff(3+4)} = l_{eff,cp(3,g)} + l_{eff,cp(4,g)} = 180.00[mm] + 180.00[mm] = 360.00[mm]$$

Modelli non-circolari

Fila bulloni 3

$$l_{eff,nc(3,g)} = p = 90.00[mm]$$

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00[mm]$$

$$\Sigma l_{eff,nc(3+4)} = l_{eff,nc(3,g)} + l_{eff,nc(4,g)} = 90.00[mm] + 90.00[mm] = 180.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(3+4)} = \Sigma l_{eff,cp(3+4)} = 180.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(3+4)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 360.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 39.14[kNm] / 69.45[mm] = 2254.24[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m + n)] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.14[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])] = 2581.80[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2254.24[kN]; 2581.80[kN]) = 2254.24[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(3+4)} = \Sigma l_{eff,cp(3+4)} = 180.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(3+4)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 180.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m + n) = (2 \cdot 39.14[kNm] + 65.00[mm] \cdot 4 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 1073.71[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 4 \cdot 254.16[kN] = 1016.64[kN]$$

Resistenza del gruppo

$$F_{t,ep(3+4)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2254.24[kN]; 1073.71[kN]; 1016.64[kN]) = 1016.64[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(4)} = 360.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(4)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1661.40[kN]$$

Resistenza riga di bulloni 4

$$F_{t,Rd(4)N} = \min[F_{t,ep,Rd(4)}; F_{t,wb,Rd(4)}] = \min[508.32[kN]; 1661.40[kN]] = 508.32[kN]$$

$$F_{t,Rd(4)M} = \min \left[\begin{array}{l} [F_{t,ep,Rd(4)}; F_{t,wb,Rd(4)}] \\ [F_{t,ep,Rd(3+4)} - F_{t,Rd(3)M}; F_{t,wb,Rd(3+4)} - F_{t,Rd(3)M}] \end{array} \right] = \min \left[\begin{array}{l} [508.32[kN]; 1661.40[kN]] \\ [1016.64[kN] - 508.32[kN]; 1661.40[kN] - 508.32[kN]] \end{array} \right] = 508.32[kN]$$

$$F_{t,Rd(4)M} = \min \left[\begin{array}{l} [F_{t,ep,Rd(4)} - F_{t,Rd(1)M} - F_{t,Rd(2)M} - F_{t,Rd(3)M}] \\ [F_{t,ep,Rd(3+4)} - F_{t,Rd(1)M} - F_{t,Rd(2)M} - F_{t,Rd(3)M}] \end{array} \right] = \min \left[\begin{array}{l} [508.32[kN]; 1661.40[kN]] \\ [3257.96[kN] - 508.32[kN] - 508.32[kN] - 508.32[kN]; 1661.40[kN] - 508.32[kN] - 508.32[kN] - 508.32[kN]] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 5

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza m_{min}

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00[mm] \cdot 39.04[kNm]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]}{2 \cdot 11.00[mm] \cdot 39.04[kNm]} = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) =$$

826.42[kN]

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(5)} = 359.05[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(5)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1657.00[kN]$$

Piastra terminale in flessione

Riga 4+5 considerati come gruppo

Modelli circolari

Fila bulloni 4

$$l_{eff,cp(4,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 5

$$l_{eff,cp(5,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

$$\Sigma l_{eff(4+5)} = l_{eff,cp(4,g)} + l_{eff,cp(5,g)} = 180.00[mm] + 180.00[mm] = 360.00[mm]$$

Modelli non-circolari

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00[mm]$$

Fila bulloni 5

$$l_{eff,nc(5,g)} = p = 90.00[mm]$$

$$\Sigma l_{eff,nc(4+5)} = l_{eff,nc(4,g)} + l_{eff,nc(5,g)} = 90.00[mm] + 90.00[mm] = 180.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(4+5)} = \Sigma l_{eff,cp(4+5)} = 180.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(4+5)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 360.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 39.14[kNm] / 69.45[mm] = 2254.24[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m+n)]}{2 \cdot 11.00[mm]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.14[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]}{2} = 2581.80[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2254.24[kN]; 2581.80[kN]) = 2254.24[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(4+5)} = \Sigma l_{eff,cp(4+5)} = 180.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(4+5)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 180.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.14[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 39.14[kNm] + 65.00[mm] \cdot 4 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 1073.71[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 4 \cdot 254.16[kN] = 1016.64[kN]$$

Resistenza del gruppo

$$F_{t,ep(4+5)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2254.24[kN]; 1073.71[kN]; 1016.64[kN]) = 1016.64[kN]$$

Riga 3+4+5 considerati come gruppo

Modelli circolari

Fila bulloni 3

$$l_{eff,cp(3,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 4

$$l_{eff,cp(4,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

Fila bulloni 5

$$l_{eff,cp(5,g)} = 2 \cdot p = 2 \cdot 90.00[mm] = 180.00[mm]$$

$$\Sigma l_{eff(3+4+5)} = l_{eff,cp(3,g)} + l_{eff,cp(4,g)} + l_{eff,cp(5,g)} = 180.00[mm] + 180.00[mm] + 180.00[mm] = 540.00[mm]$$

Modelli non-circolari

Fila bulloni 3

$$l_{eff,nc(3,g)} = p = 90.00[mm]$$

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00[mm]$$

Fila bulloni 5

$$l_{eff,nc(5,g)} = p = 90.00[mm]$$

$$\Sigma l_{eff,nc(3+4+5)} = l_{eff,nc(3,g)} + l_{eff,nc(4,g)} + l_{eff,nc(5,g)} = 90.00[mm] + 90.00[mm] + 90.00[mm] = 270.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(3+4+5)} = \Sigma l_{eff,cp(3+4+5)} = 270.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(3+4+5)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 270.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 97.85[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 97.85[kNm] / 69.45[mm] = 5635.61[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m \cdot n - e_w \cdot (m+n)]}{2 \cdot 11.00[mm]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 97.85[kNm]] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]}{2} = 6454.49[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (5635.61[kN]; 6454.49[kN]) = 5635.61[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(3+4+5)} = \Sigma l_{eff,cp(3+4+5)} = 270.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(3+4+5)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 270.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 97.85[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 97.85[kNm] + 65.00[mm] \cdot 6 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 2192.77[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 6 \cdot 254.16[kN] = 1524.96[kN]$$

Resistenza del gruppo

$$F_{t,ep(3+4+5)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (5635.61[kN]; 2192.77[kN]; 1524.96[kN]) = 1524.96[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(5)} = 360.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(5)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1661.40[kN]$$

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(5)} = 900.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(5)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (900.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 4153.50[kN]$$

Resistenza riga di bulloni 5

$$F_{t,Rd(5)N} = \min[F_{t,ep,Rd(5)}; F_{t,wb,Rd(5)}] = \min[508.32[kN]; 1657.00[kN]] = 508.32[kN]$$

$$F_{t,Rd(5)M} = \min \left[\begin{array}{l} [F_{t,ep,Rd(5)}; F_{t,wb,Rd(5)}] \\ [F_{t,ep,Rd(4+5)} - F_{t,Rd(4)M}; F_{t,wb,Rd(4+5)} - F_{t,Rd(4)M}] \\ [F_{t,ep,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}; F_{t,wb,Rd(3+4+5)} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \\ [F_{cfb,Rd} - F_{t,Rd(1)M} - F_{t,Rd(2)M} - F_{t,Rd(3)M} - F_{t,Rd(4)M}] \end{array} \right] = \min \left[\begin{array}{l} [508.32[kN]; 1657.00[kN]] \\ [1016.64[kN] - 508.32[kN]; 1661.40[kN] - 508.32[kN]] \\ [1524.96[kN] - 508.32[kN] - 508.32[kN]; 4153.50[kN] - 508.32[kN] - 508.32[kN]] \\ [3257.96[kN] - 508.32[kN] - 508.32[kN] - 508.32[kN]] \end{array} \right] = 508.32[kN]$$

FILA BULLONI 6

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 65.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (170.00[mm] - 13.00[mm] - 0.8 \cdot \sqrt{2} \cdot 8.00[mm]) = 69.45[mm]$$

Distanza min

$$e_{min} = 65.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{ep}) = \min(65.00[mm]; 1.25 \cdot 69.45[mm]) = 65.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{ep} = 2 \cdot \pi \cdot 69.45[mm] = 436.36[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = 4 \cdot m + 1.25 \cdot e = 4 \cdot 69.45[mm] + 1.25 \cdot 65.00[mm] = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 359.05[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 359.05[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{ep} = 4 \cdot 39.04[kNm] / 69.45[mm] = 2248.27[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 33.30[mm] = 11.00[mm]$$

$$F_{T,1,Rd2} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{ep} \cdot n - e_w \cdot (m_{ep} + n)]}{2 \cdot 11.00[mm] \cdot 39.04[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]} = \frac{[(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 39.04[kNm]]}{2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])} = 2574.95[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (2248.27[kN]; 2574.95[kN]) = 2248.27[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 359.05[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 39.04[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{ep} + n) = (2 \cdot 39.04[kNm] + 65.00[mm] \cdot 2 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 826.42[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 254.16[kN] = 508.32[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (2248.27[kN]; 826.42[kN]; 508.32[kN]) = 508.32[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = l_{eff1(6)} = 359.05[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (359.05[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1657.00[kN]$$

Piastra terminale in flessione

Riga 5+6 considerati come gruppo

Modelli circolari

Fila bulloni 5

$$l_{\text{eff,cp(5,g)}} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Fila bulloni 6

$$l_{\text{eff,cp(6,g)}} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

$$\Sigma l_{\text{eff(5+6)}} = l_{\text{eff,cp(5,g)}} + l_{\text{eff,cp(6,g)}} = 180.00 [\text{mm}] + 180.00 [\text{mm}] = 360.00 [\text{mm}]$$

Modelli non-circolari

Fila bulloni 5

$$l_{\text{eff,nc(5,g)}} = p = 90.00 [\text{mm}]$$

Fila bulloni 6

$$l_{\text{eff,nc(6,g)}} = p = 90.00 [\text{mm}]$$

$$\Sigma l_{\text{eff,nc(5+6)}} = l_{\text{eff,nc(5,g)}} + l_{\text{eff,nc(6,g)}} = 90.00 [\text{mm}] + 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{\text{eff,1(5+6)}} = \Sigma l_{\text{eff,cp(5+6)}} = 180.00 [\text{mm}]$$

$$M_{\text{pl,1,Rd}} = (0.25 \cdot \Sigma l_{\text{eff,1(5+6)}} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{\text{M0}} = (0.25 \cdot 360.00 [\text{mm}] \cdot (35.00 [\text{mm}])^2 \cdot 355.00 [\text{MPa}]) / 1.00 = 39.14 [\text{kNm}]$$

Metodo 1

$$F_{\text{T,1,Rd1}} = (4 \cdot M_{\text{pl,1,Rd}}) / m = 4 \cdot 39.14 [\text{kNm}] / 69.45 [\text{mm}] = 2254.24 [\text{kN}]$$

Metodo 2 (metodo alternativo)

$$F_{\text{T,1,Rd2}} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{\text{pl,1,Rd}}] / [2 \cdot m \cdot n - e_w \cdot (m + n)]}{2 \cdot 11.00 [\text{mm}] \cdot 39.14 [\text{kNm}] / [2 \cdot 69.45 [\text{mm}] \cdot 65.00 [\text{mm}] - 11.00 [\text{mm}] \cdot (69.45 [\text{mm}] + 65.00 [\text{mm}])]} = \frac{[(8 \cdot 65.00 [\text{mm}] - 2 \cdot 11.00 [\text{mm}]) \cdot 39.14 [\text{kNm}]]}{2 \cdot 69.45 [\text{mm}] \cdot 65.00 [\text{mm}] - 11.00 [\text{mm}] \cdot (69.45 [\text{mm}] + 65.00 [\text{mm}])} = 2581.80 [\text{kN}]$$

$$F_{\text{T,1,Rd}} = \min(F_{\text{T,1,Rd1}}; F_{\text{T,1,Rd2}}) = (2254.24 [\text{kN}]; 2581.80 [\text{kN}]) = 2254.24 [\text{kN}]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{\text{eff,2(5+6)}} = \Sigma l_{\text{eff,cp(5+6)}} = 180.00 [\text{mm}]$$

$$M_{\text{pl,2,Rd}} = (0.25 \cdot \Sigma l_{\text{eff,2(5+6)}} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{\text{M0}} = (0.25 \cdot 180.00 [\text{mm}] \cdot (35.00 [\text{mm}])^2 \cdot 355.00 [\text{MPa}]) / 1.00 = 39.14 [\text{kNm}]$$

$$F_{\text{T,2,Rd}} = (2 \cdot M_{\text{pl,2,Rd}} + n \cdot \Sigma F_{\text{T,Rd}}) / (m + n) = (2 \cdot 39.14 [\text{kNm}] + 65.00 [\text{mm}] \cdot 4 \cdot 254.16 [\text{kN}]) / (69.45 [\text{mm}] + 65.00 [\text{mm}]) = 1073.71 [\text{kN}]$$

Modello 3: Rottura bullone

$$F_{\text{T,3,Rd}} = \Sigma F_{\text{T,Rd}} = 4 \cdot 254.16 [\text{kN}] = 1016.64 [\text{kN}]$$

Resistenza del gruppo

$$F_{\text{t,ep(5+6)}} = \min(F_{\text{T,1,Rd}}; F_{\text{T,2,Rd}}; F_{\text{T,3,Rd}}) = (2254.24 [\text{kN}]; 1073.71 [\text{kN}]; 1016.64 [\text{kN}]) = 1016.64 [\text{kN}]$$

Riga 4+5+6 considerati come gruppo

Modelli circolari

Fila bulloni 4

$$l_{\text{eff,cp(4,g)}} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff,cp(5,g)}} = 2 \cdot p = 2 \cdot 90.00 [\text{mm}] = 180.00 [\text{mm}]$$

Fila bulloni 6

$$l_{\text{eff,cp}(6,g)} = 2 \cdot p = 2 \cdot 90.00[\text{mm}] = 180.00[\text{mm}]$$

$$\Sigma l_{\text{eff}(4+5+6)} = l_{\text{eff,cp}(4,g)} + l_{\text{eff,cp}(5,g)} + l_{\text{eff,cp}(6,g)} = 180.00[\text{mm}] + 180.00[\text{mm}] + 180.00[\text{mm}] = 540.00[\text{mm}]$$

Modelli non-circolari

Fila bulloni 4

$$l_{\text{eff,nc}(4,g)} = p = 90.00[\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff,nc}(5,g)} = p = 90.00[\text{mm}]$$

Fila bulloni 6

$$l_{\text{eff,nc}(6,g)} = p = 90.00[\text{mm}]$$

$$\Sigma l_{\text{eff,nc}(4+5+6)} = l_{\text{eff,nc}(4,g)} + l_{\text{eff,nc}(5,g)} + l_{\text{eff,nc}(6,g)} = 90.00[\text{mm}] + 90.00[\text{mm}] + 90.00[\text{mm}] = 270.00[\text{mm}]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{\text{eff},1(4+5+6)} = \Sigma l_{\text{eff,cp}(4+5+6)} = 270.00[\text{mm}]$$

$$M_{\text{pl},1,\text{Rd}} = (0.25 \cdot \Sigma l_{\text{eff},1(4+5+6)} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{\text{M0}} = (0.25 \cdot 540.00[\text{mm}] \cdot (35.00[\text{mm}])^2 \cdot 355.00[\text{MPa}]) / 1.00 = 97.85[\text{kNm}]$$

Metodo 1

$$F_{\text{T},1,\text{Rd1}} = (4 \cdot M_{\text{pl},1,\text{Rd}}) / m = 4 \cdot 97.85[\text{kNm}] / 69.45[\text{mm}] = 5635.61[\text{kN}]$$

Metodo 2 (metodo alternativo)

$$F_{\text{T},1,\text{Rd2}} = \frac{[(8 \cdot n - 2 \cdot e_w) \cdot M_{\text{pl},1,\text{Rd}}] / [2 \cdot m \cdot n - e_w \cdot (m + n)]}{2 \cdot 11.00[\text{mm}] \cdot 97.85[\text{kNm}] / [2 \cdot 69.45[\text{mm}] \cdot 65.00[\text{mm}] - 11.00[\text{mm}] \cdot (69.45[\text{mm}] + 65.00[\text{mm}])]} = \frac{[(8 \cdot 65.00[\text{mm}] - 2 \cdot 11.00[\text{mm}]) \cdot 97.85[\text{kNm}]}{2 \cdot 69.45[\text{mm}] \cdot 65.00[\text{mm}] - 11.00[\text{mm}] \cdot (69.45[\text{mm}] + 65.00[\text{mm}])} = 6454.49[\text{kN}]$$

$$F_{\text{T},1,\text{Rd}} = \min(F_{\text{T},1,\text{Rd1}}; F_{\text{T},1,\text{Rd2}}) = (5635.61[\text{kN}]; 6454.49[\text{kN}]) = 5635.61[\text{kN}]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{\text{eff},2(4+5+6)} = \Sigma l_{\text{eff,cp}(4+5+6)} = 270.00[\text{mm}]$$

$$M_{\text{pl},2,\text{Rd}} = (0.25 \cdot \Sigma l_{\text{eff},2(4+5+6)} \cdot t_{\text{ep}}^2 \cdot f_{\text{ep}}) / \gamma_{\text{M0}} = (0.25 \cdot 270.00[\text{mm}] \cdot (35.00[\text{mm}])^2 \cdot 355.00[\text{MPa}]) / 1.00 = 97.85[\text{kNm}]$$

$$F_{\text{T},2,\text{Rd}} = (2 \cdot M_{\text{pl},2,\text{Rd}} + n \cdot \Sigma F_{\text{t,Rd}}) / (m + n) = (2 \cdot 97.85[\text{kNm}] + 65.00[\text{mm}] \cdot 6 \cdot 254.16[\text{kN}]) / (69.45[\text{mm}] + 65.00[\text{mm}]) = 2192.77[\text{kN}]$$

Modello 3: Rottura bullone

$$F_{\text{T},3,\text{Rd}} = \Sigma F_{\text{t,Rd}} = 6 \cdot 254.16[\text{kN}] = 1524.96[\text{kN}]$$

Resistenza del gruppo

$$F_{\text{t,ep}(4+5+6)} = \min(F_{\text{T},1,\text{Rd}}; F_{\text{T},2,\text{Rd}}; F_{\text{T},3,\text{Rd}}) = (5635.61[\text{kN}]; 2192.77[\text{kN}]; 1524.96[\text{kN}]) = 1524.96[\text{kN}]$$

Riga 3+4+5+6 considerati come gruppo

Modelli circolari

Fila bulloni 3

$$l_{\text{eff,cp}(3,g)} = 2 \cdot p = 2 \cdot 90.00[\text{mm}] = 180.00[\text{mm}]$$

Fila bulloni 4

$$l_{\text{eff,cp}(4,g)} = 2 \cdot p = 2 \cdot 90.00[\text{mm}] = 180.00[\text{mm}]$$

Fila bulloni 5

$$l_{\text{eff,cp}(5,g)} = 2 \cdot p = 2 \cdot 90.00[\text{mm}] = 180.00[\text{mm}]$$

Fila bulloni 6

$$l_{\text{eff,cp}(6,g)} = 2 \cdot p = 2 \cdot 90.00[\text{mm}] = 180.00[\text{mm}]$$

$$\Sigma l_{eff,(3+4+5+6)} = l_{eff,cp(3,g)} + l_{eff,cp(4,g)} + l_{eff,cp(5,g)} + l_{eff,cp(6,g)} = 180.00[mm] + 180.00[mm] + 180.00[mm] + 180.00[mm] = 720.00[mm]$$

Modelli non-circolari

Fila bulloni 3

$$l_{eff,nc(3,g)} = p = 90.00[mm]$$

Fila bulloni 4

$$l_{eff,nc(4,g)} = p = 90.00[mm]$$

Fila bulloni 5

$$l_{eff,nc(5,g)} = p = 90.00[mm]$$

Fila bulloni 6

$$l_{eff,nc(6,g)} = p = 90.00[mm]$$

$$\Sigma l_{eff,nc(3+4+5+6)} = l_{eff,nc(3,g)} + l_{eff,nc(4,g)} + l_{eff,nc(5,g)} + l_{eff,nc(6,g)} = 90.00[mm] + 90.00[mm] + 90.00[mm] + 90.00[mm] = 360.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

Lunghezza effettiva per un bullone modo 1

$$\Sigma l_{eff,1(3+4+5+6)} = \Sigma l_{eff,cp(3+4+5+6)} = 360.00[mm]$$

$$M_{pl,1,Rd} = (0.25 \cdot \Sigma l_{eff,1(3+4+5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 720.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 176.12[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m = 4 \cdot 176.12[kNm] / 69.45[mm] = 10144.09[kN]$$

Metodo 2 (metodo alternativo)

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd} / [2 \cdot m \cdot n - e_w \cdot (m+n)]] = [(8 \cdot 65.00[mm] - 2 \cdot 11.00[mm]) \cdot 176.12[kNm] / [2 \cdot 69.45[mm] \cdot 65.00[mm] - 11.00[mm] \cdot (69.45[mm] + 65.00[mm])]] = 11618.08[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (10144.09[kN]; 11618.08[kN]) = 10144.09[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

Lunghezza effettiva per un bullone modo 2

$$\Sigma l_{eff,2(3+4+5+6)} = \Sigma l_{eff,cp(3+4+5+6)} = 360.00[mm]$$

$$M_{pl,2,Rd} = (0.25 \cdot \Sigma l_{eff,2(3+4+5+6)} \cdot t_{ep}^2 \cdot f_{ep}) / \gamma_{M0} = (0.25 \cdot 360.00[mm] \cdot (35.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 176.12[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m+n) = (2 \cdot 176.12[kNm] + 65.00[mm] \cdot 8 \cdot 254.16[kN]) / (69.45[mm] + 65.00[mm]) = 3602.94[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 8 \cdot 254.16[kN] = 2033.28[kN]$$

Resistenza del gruppo

$$F_{t,ep(3+4+5+6)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (10144.09[kN]; 3602.94[kN]; 2033.28[kN]) = 2033.28[kN]$$

Anima trave in flessione

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(6)} = 360.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (360.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 1661.40[kN]$$

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(6)} = 900.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (900.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 4153.50[kN]$$

Larghezza effettiva dell'anima della trave in tensione

$$b_{eff,t,wb} = \Sigma l_{eff1(6)} = 1620.00[mm]$$

Componente di resistenza

$$F_{t,wb,Rd(6)} = (b_{eff,t,wb} \cdot t_{wb} \cdot f_{yb}) / \gamma_{M0} = (1620.00[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 = 7476.30[kN]$$

Resistenza riga di bulloni 6

$$F_{t,Rd(6)N} = \min[F_{t,ep,Rd(6)}; F_{t,wb,Rd(6)}] = \min[508.32[kN]; 1657.00[kN]] = 508.32[kN]$$

Resistenza a flessione

Momento flettente reale

$$M_0 = M_{b1,Ed} = -639.00[kNm]$$

Momento resistente di progetto del giunto, senza considerare le forze assiali

$$M_{j,Rd} = F_{t,Rd(1)M} \cdot h_1 + F_{t,Rd(2)M} \cdot h_2 + F_{t,Rd(3)M} \cdot h_3 + F_{t,Rd(4)M} \cdot h_4 + F_{t,Rd(5)M} \cdot h_5 = 508.32[kN] \cdot 507.50[mm] + 508.32[kN] \cdot 417.50[mm] + 508.32[kN] \cdot 327.50[mm] + 508.32[kN] \cdot 237.50[mm] + 508.32[kN] \cdot 147.50[mm] = 861.60[kNm]$$

$$|M_0|/M_{j,Rd} \leq 1 \quad 0.74 < 1.00 \quad 0.74 \quad \checkmark$$

Resistenza a tensione

Forza assiale

$$N_0 = N_{b1,Ed} \cdot \cos(\alpha_2) + V_{b1,Ed} \cdot \sin(\alpha_2) = 53.00[kN] \cdot \cos(0.00[Deg]) + 797.00[kN] \cdot \sin(0.00[Deg]) = 53.00[kN]$$

Resistenza di progetto assiale del giunto, senza considerare il momento applicato

$$N_{j,Rd} = F_{t,Rd(1)N} + F_{t,Rd(2)N} + F_{t,Rd(3)N} + F_{t,Rd(4)N} + F_{t,Rd(5)N} + F_{t,Rd(6)N} = 508.32[kN] + 508.32[kN] + 508.32[kN] + 508.32[kN] + 508.32[kN] + 508.32[kN] = 3049.92[kN]$$

$$|N_0|/N_{j,Rd} \leq 1 \quad 0.02 < 1.00 \quad 0.02 \quad \checkmark$$

Resistenza a trazione e flessione

$$N_0/N_{j,Rd} + |M_0|/M_{j,Rd} \leq 1 \quad 0.76 < 1.00 \quad 0.76 \quad \checkmark$$

Resistenza a taglio

Forza di taglio

$$V_0 = -N_{b1,Ed} \cdot \sin(\alpha) + V_{b1,Ed} \cdot \cos(\alpha) = -(53.00[kN]) \cdot \sin(0.00[Deg]) + 797.00[kN] \cdot \cos(0.00[Deg]) = 797.00[kN]$$

FILA BULLONI 1

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; e_1/d_0) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/27.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8 \cdot e_2/d_0) = \min(2.5; 2.8 \cdot 65.00[mm]/27.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1 \cdot \alpha_b \cdot f_{up} \cdot d \cdot t_p = 2.50 \cdot 1.00 \cdot 490.00[MPa] \cdot 24.00[mm] \cdot 35.00[mm] = 823.20[kN]$$

Resistenza riga di bulloni 1

$$V_{Rd(1)} = m_1 \cdot \min(F_{b,Rd}; F_{v,Rd}) = 2 \cdot \min(823.20[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 2

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3 \cdot d_0) - 0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3 \cdot 27.00[mm]) - 0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4 \cdot p_2/d_0 - 1.7) = \min(2.5; 1.4 \cdot 170.00[mm]/27.00[mm] - 1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1 \cdot \alpha_b \cdot f_{up} \cdot d \cdot t_p = 2.50 \cdot 0.86 \cdot 490.00[MPa] \cdot 24.00[mm] \cdot 35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 2

$$V_{Rd(2)} = m_2 \cdot \min(F_{b,Rd}; F_{v,Rd}) = 2 \cdot \min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 3

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3 \cdot d_0) - 0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3 \cdot 27.00[mm]) - 0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4 \cdot p_2/d_0 - 1.7) = \min(2.5; 1.4 \cdot 170.00[mm]/27.00[mm] - 1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1 \cdot \alpha_b \cdot f_{up} \cdot d \cdot t_p = 2.50 \cdot 0.86 \cdot 490.00[MPa] \cdot 24.00[mm] \cdot 35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 3

$$V_{Rd(3)} = m_3 \cdot \min(F_{b,Rd}; F_{v,Rd}) = 2 \cdot \min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 4

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3*d_0)-0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3*27.00[mm])-0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4*p_2/d_0-1.7) = \min(2.5; 1.4*170.00[mm]/27.00[mm]-1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*0.86*490.00[MPa]*24.00[mm]*35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 4

$$V_{Rd(4)} = m_4*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 5

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; p_1/(3*d_0)-0.25) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/(3*27.00[mm])-0.25) = 0.86$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 1.4*p_2/d_0-1.7) = \min(2.5; 1.4*170.00[mm]/27.00[mm]-1.7) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*0.86*490.00[MPa]*24.00[mm]*35.00[mm] = 708.87[kN]$$

Resistenza riga di bulloni 5

$$V_{Rd(5)} = m_5*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(708.87[kN]; 169.44[kN]) = 338.88[kN]$$

FILA BULLONI 6

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; e_1/d_0) = \min(1.0; 1000.00[MPa]/490.00[MPa]; 90.00[mm]/27.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8*e_2/d_0) = \min(2.5; 2.8*65.00[mm]/27.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd} = k_1*\alpha_b*f_{up}*d*t_p = 2.50*1.00*490.00[MPa]*24.00[mm]*35.00[mm] = 823.20[kN]$$

Resistenza riga di bulloni 6

$$V_{Rd(6)} = m_6*\min(F_{b,Rd}; F_{v,Rd}) = 2*\min(823.20[kN]; 169.44[kN]) = 338.88[kN]$$

$$V_{j,Rd} = V_{Rd(1)} + V_{Rd(2)} + V_{Rd(3)} + V_{Rd(4)} + V_{Rd(5)} + V_{Rd(6)} = 338.88[kN] + 338.88[kN] + 338.88[kN] + 338.88[kN] + 338.88[kN] + 338.88[kN] = 2033.28[kN]$$

$$|V_0|/V_{j,Rd} \leq 1$$

$$|797.00[kN]| < 2033.28[kN]$$

$$0.39$$



Saldature dell'angolare che collegano trave e piastra frontale

Forze nelle saldature

Forza assiale

$$N_0 = N_{b1,Ed} \cdot \cos(\alpha_2) + V_{b1,Ed} \cdot \sin(\alpha_2) = 53.00[kN] \cdot \cos(0.00[Deg]) + 797.00[kN] \cdot \sin(0.00[Deg]) = 53.00[kN]$$

Forza di taglio

$$V_0 = -N_{b1,Ed} \cdot \sin(\alpha_2) + V_{b1,Ed} \cdot \cos(\alpha_2) = -(53.00[kN]) \cdot \sin(0.00[Deg]) + 797.00[kN] \cdot \cos(0.00[Deg]) = 797.00[kN]$$

Momento flettente reale

$$M_0 = M_{b1,Ed} = -639.00[kNm]$$

Proprietà geometriche delle saldature

Trave

Area saldature orizzontali sulla flangia superiore

$$A_{wfu} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2 \cdot 27.00[mm])] \cdot 13.00[mm] = 69.29[cm^2]$$

Area saldature orizzontali sulla flangia inferiore

$$A_{wfl} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2 \cdot 27.00[mm])] \cdot 13.00[mm] = 69.29[cm^2]$$

Area delle saldature verticali

$$A_{ww} = 2 \cdot [(h_b - 2 \cdot (t_{fb} - r_b)) / \cos(\alpha)] \cdot a_w = 2 \cdot [(590.00[mm] - 2 \cdot (25.00[mm] - 27.00[mm])) / \cos(0.00[Deg])] \cdot 8.00[mm] = 77.76[cm^2]$$

Area di tutte le saldature

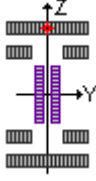
$$A_w = A_{wfu} + A_{wfl} + A_{ww} = 69.29[cm^2] + 69.29[cm^2] + 77.76[cm^2] = 216.34[cm^2]$$

Distanza tra baricentro saldature e baricentro trave

$$e_{0w} = 0.00[mm]$$

Momento d'inerzia saldature

$$I_w = 128290.83[cm^4]$$

Punto in cui le sollecitazioni vengono controllate	$z_i = 301.50[mm]$
Modulo elastico delle saldature	
$W_w = 4255.09[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 53.00[kN]/216.34[cm^2] = 2.45[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (-639.00[kNm] \cdot 301.50[mm])/128290.83[cm^4] = -150.17[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45[MPa] + (-150.17[MPa]) = -147.72[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -147.72[MPa]/\sqrt{2} = -104.46[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -147.72[MPa]/\sqrt{2} = -104.46[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

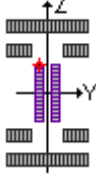
$$|\sigma_{\perp}| \leq 0.9 \cdot f_u / \gamma_{M2}$$

$$|-104.46[MPa]| < 352.80[MPa]$$

$$0.21$$



$$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2}) \quad 208.91 [MPa] < 435.56 [MPa] \quad 0.48 \quad \checkmark$$

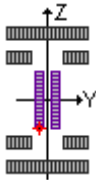
Punto in cui le sollecitazioni vengono controllate	$z_i = 243.00 [mm]$
Modulo elastico delle saldature	
$W_w = 5279.46 [cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 53.00 [kN] / 216.34 [cm^2] = 2.45 [MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (-639.00 [kNm] \cdot 243.00 [mm]) / 128290.83 [cm^4] = -121.04 [MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45 [MPa] + (-121.04 [MPa]) = -118.59 [MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = -118.59 [MPa] / \sqrt{2} = -83.85 [MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = -118.59 [MPa] / \sqrt{2} = -83.85 [MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0 / A_{ww} = 797.00 [kN] / 77.76 [cm^2] = 102.49 [MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$$|\sigma_{\perp}| \leq 0.9 \cdot f_u / \gamma_{M2} \quad |-83.85 [MPa]| < 352.80 [MPa] \quad 0.17 \quad \checkmark$$

$$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2}) \quad 244.21 [MPa] < 435.56 [MPa] \quad 0.56 \quad \checkmark$$

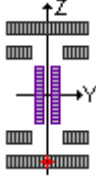
Punto in cui le sollecitazioni vengono controllate	$z_i = -243.00 [mm]$
Modulo elastico delle saldature	
$W_w = 5279.46 [cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 53.00 [kN] / 216.34 [cm^2] = 2.45 [MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (-639.00 [kNm] \cdot (-243.00 [mm])) / 128290.83 [cm^4] = 121.04 [MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45 [MPa] + 121.04 [MPa] = 123.48 [MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = 123.48 [MPa] / \sqrt{2} = 87.32 [MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = 123.48 [MPa] / \sqrt{2} = 87.32 [MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0 / A_{ww} = 797.00 [kN] / 77.76 [cm^2] = 102.49 [MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$$|\sigma_{\perp}| \leq 0.9 \cdot f_u / \gamma_{M2} \quad |87.32 [MPa]| < 352.80 [MPa] \quad 0.18 \quad \checkmark$$

$$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2}) \quad 249.02 [MPa] < 435.56 [MPa] \quad 0.57 \quad \checkmark$$

Punto in cui le sollecitazioni vengono controllate	$z_i = -301.50[mm]$
Modulo elastico delle saldature	
$W_w = 4255.09[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 53.00[kN]/216.34[cm^2] = 2.45[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (-639.00[kNm] \cdot (-301.50[mm]))/128290.83[cm^4] = 150.17[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 2.45[MPa] + 150.17[MPa] = 152.62[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = 152.62[MPa]/\sqrt{2} = 107.92[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = 152.62[MPa]/\sqrt{2} = 107.92[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ 107.92[MPa] < 352.80[MPa]$	0.22	<input checked="" type="checkbox"/>
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$215.84[MPa] < 435.56[MPa]$	0.50	<input checked="" type="checkbox"/>
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Rigidezza di rotazione del giunto

Lunghezza di allungamento del bullone

$$L_b = t_p + 0.5 \cdot (m + k) + t_{wa} = 35.00[mm] + 0.5 \cdot (22.30[mm] + 15.00[mm]) + 4.00[mm] = 96.65[mm]$$

$$k_{10} = (3.2 \cdot A_s) / L_b = (3.2 \cdot 3.53[cm^2]) / 96.65[mm] = 5.84[mm]$$

Fila bulloni 1

Piastra terminale in flessione

$$k_{4,1} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 360.02[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,1} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.47[mm] + 1/5.84[mm]) = 7.35[mm]$$

Fila bulloni 2

Piastra terminale in flessione

$$k_{4,2} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,2} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Fila bulloni 3

Piastra terminale in flessione

$$k_{4,3} = (0.9 \cdot I_{eff} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05[mm] \cdot 35.00[mm]^3) / 0.00[mm]^3 = 0.00[mm]$$

$$k_{eff,3} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00[mm] + 1/41.36[mm] + 1/5.84[mm]) = 7.34[mm]$$

Fila bulloni 4

Piastra terminale in flessione

$$k_{4,4} = (0.9 \cdot I_{\text{eff}} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05 [\text{mm}] \cdot 35.00 [\text{mm}]^3) / 0.00 [\text{mm}]^3 = 0.00 [\text{mm}]$$

$$k_{\text{eff},4} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00 [\text{mm}] + 1/41.36 [\text{mm}] + 1/5.84 [\text{mm}]) = 7.34 [\text{mm}]$$

Fila bulloni 5

Piastra terminale in flessione

$$k_{4,5} = (0.9 \cdot I_{\text{eff}} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05 [\text{mm}] \cdot 35.00 [\text{mm}]^3) / 0.00 [\text{mm}]^3 = 0.00 [\text{mm}]$$

$$k_{\text{eff},5} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00 [\text{mm}] + 1/41.36 [\text{mm}] + 1/5.84 [\text{mm}]) = 7.34 [\text{mm}]$$

Fila bulloni 6

Piastra terminale in flessione

$$k_{4,6} = (0.9 \cdot I_{\text{eff}} \cdot t_p^3) / m_x^3 = (0.9 \cdot 359.05 [\text{mm}] \cdot 35.00 [\text{mm}]^3) / 0.00 [\text{mm}]^3 = 0.00 [\text{mm}]$$

$$k_{\text{eff},6} = 1 / (1/k_4 + 1/k_5 + 1/k_{10}) = 1 / (1/0.00 [\text{mm}] + 1/41.36 [\text{mm}] + 1/5.84 [\text{mm}]) = 7.34 [\text{mm}]$$

Braccio di leva delle forze interne

$$Z_{\text{eq}} = \frac{[k_{\text{eff},1} \cdot h_1^2 + k_{\text{eff},2} \cdot h_2^2 + k_{\text{eff},3} \cdot h_3^2 + k_{\text{eff},4} \cdot h_4^2 + k_{\text{eff},5} \cdot h_5^2 + k_{\text{eff},6} \cdot h_6^2]}{[k_{\text{eff},1} \cdot h_1 + k_{\text{eff},2} \cdot h_2 + k_{\text{eff},3} \cdot h_3 + k_{\text{eff},4} \cdot h_4 + k_{\text{eff},5} \cdot h_5 + k_{\text{eff},6} \cdot h_6]} =$$

$$\frac{[7.35 [\text{mm}] \cdot 507.50 [\text{mm}]^2 + 7.34 [\text{mm}] \cdot 417.50 [\text{mm}]^2 + 7.34 [\text{mm}] \cdot 327.50 [\text{mm}]^2 + 7.34 [\text{mm}] \cdot 237.50 [\text{mm}]^2 + 7.34 [\text{mm}] \cdot 147.50 [\text{mm}]^2 + 7.34 [\text{mm}] \cdot 57.50 [\text{mm}]^2]}{[7.35 [\text{mm}] \cdot 507.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 417.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 327.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 237.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 147.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 57.50 [\text{mm}]} = 366.14 [\text{mm}]$$

Coefficiente di rigidità equivalente

$$k_{\text{eq}} = \frac{[k_{\text{eff},1} \cdot h_1 + k_{\text{eff},2} \cdot h_2 + k_{\text{eff},3} \cdot h_3 + k_{\text{eff},4} \cdot h_4 + k_{\text{eff},5} \cdot h_5 + k_{\text{eff},6} \cdot h_6]}{Z_{\text{eq}}} =$$

$$\frac{[7.35 [\text{mm}] \cdot 507.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 417.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 327.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 237.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 147.50 [\text{mm}] + 7.34 [\text{mm}] \cdot 57.50 [\text{mm}]}{366.14 [\text{mm}]} = 23.71 [\text{mm}]$$

Rigidità di rotazione iniziale del giunto

$$S_{j,\text{ini}} = E \cdot Z_{\text{eq}}^2 / (1/k_{\text{eq}}) = (210000.00 [\text{MPa}] \cdot (366.14 [\text{mm}])^2) / (1/23.71 [\text{mm}]) = 667392.73 [\text{kNm}]$$

Rigidità di rotazione del giunto chiodato

$$S_{j,\text{pin}} = (0.5 \cdot E \cdot I_{yb}) / L_b = (0.5 \cdot 210000.00 [\text{MPa}] \cdot 141208.11 [\text{cm}^4]) / 4000.00 [\text{mm}] = 37067.13 [\text{kNm}]$$

Rigidità di rotazione del giunto rigido

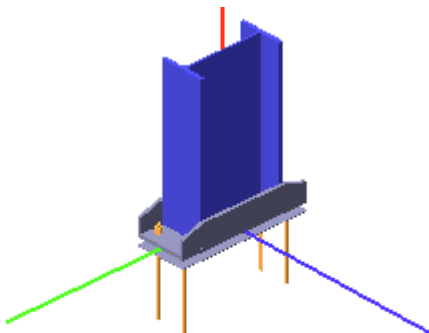
$$S_{j,\text{rig}} = (k_b \cdot E \cdot I_{yb}) / L_b = (25.00 \cdot 210000.00 [\text{MPa}] \cdot 141208.11 [\text{cm}^4]) / 4000.00 [\text{mm}] = 1853356.46 [\text{kNm}]$$

Classificazione dei giunti

Semi-rigido

COLLEGAMENTO HEA600 – TRAVE PREFABBRICATA

Verifica secondo il D.M. 17/01/2018 dei nodi: 33, 50



Coefficienti di sicurezza utilizzati

$$\gamma_{M0} = 1.05$$

$$\gamma_{M1} = 1.10$$

$$\gamma_{M2} = 1.25$$

Colonna

Tipo di profilo: HEA 600

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Classe sezione: 1

Flangia:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\gamma_{ov} = 1.25$

Dimensioni (B x H x Sp): 350.0 x 900.0 x 25.0 mm

Spessore nervature verticali: 25.0 mm

Spessore nervature orizzontali: 25.0 mm

Bullonature:

Viti cl. 8.8 Dadi 8 o 10 ($f_{yb} = 640 \text{ N/mm}^2$, $f_{tb} = 800 \text{ N/mm}^2$)

Diametro gambo $\varnothing = 24 \text{ mm}$ $A_{res} = 352.9 \text{ mm}^2$ (ridotta per filettatura)

Diametro dado/testa $d_m = 36 \text{ mm}$

Diametro foro $\varnothing_0 = 25.5 \text{ mm}$

Saldature:

Materiale: Acciaio S355 $f_y = 355 \text{ N/mm}^2$ $f_t = 510 \text{ N/mm}^2$ $\beta_1 = 0.70$ $\beta_2 = 0.85$

Spessore cordoni d'angolo $s_c = 13 \text{ mm}$

Sollecitazioni:

Nodo.CMB	V2 [N]	V3 [N]	N [N]	M2 [N mm]	M3 [N mm]	T [N mm]
33.1	256000.0	-52.6	-476200.0	0.0	0.0	-33242.0
33.2	281300.0	-55.0	-524700.0	0.0	0.0	-35075.0
33.3	488100.0	-102.7	-898000.0	0.0	0.0	-65436.0
33.4	513400.0	-105.1	-946400.0	0.0	0.0	-67269.0
33.5	196900.0	-40.5	-366300.0	0.0	0.0	-25633.0
33.6	222200.0	-42.9	-414800.0	0.0	0.0	-27466.0
33.7	429000.0	-90.6	-788100.0	0.0	0.0	-57826.0
33.8	454300.0	-92.9	-836500.0	0.0	0.0	-59659.0
33.9	306500.0	-57.4	-573100.0	0.0	0.0	-36909.0
33.10	418500.0	-87.7	-771400.0	0.0	0.0	-55778.0
33.11	469000.0	-92.4	-868300.0	0.0	0.0	-59444.0
33.12	247400.0	-45.3	-463200.0	0.0	0.0	-29299.0
33.13	359400.0	-75.6	-661600.0	0.0	0.0	-48168.0
33.14	409900.0	-80.3	-758400.0	0.0	0.0	-51835.0

33.15	443800.0	-90.0	-819900.0	0.0	0.0	-57611.0
33.16	384700.0	-77.9	-710000.0	0.0	0.0	-50001.0
33.17	244600.0	-51.6	-454400.0	0.0	0.0	-32444.0
33.18	269900.0	-53.9	-502800.0	0.0	0.0	-34276.0
33.19	476700.0	-101.6	-876200.0	0.0	0.0	-64637.0
33.20	502000.0	-104.0	-924600.0	0.0	0.0	-66470.0
33.21	185500.0	-39.5	-344500.0	0.0	0.0	-24834.0
33.22	210800.0	-41.8	-393000.0	0.0	0.0	-26667.0
33.23	417600.0	-89.5	-766300.0	0.0	0.0	-57028.0
33.24	442900.0	-91.9	-814700.0	0.0	0.0	-58860.0
33.25	295100.0	-56.3	-551300.0	0.0	0.0	-36110.0
33.26	407100.0	-86.6	-749600.0	0.0	0.0	-54979.0
33.27	457600.0	-91.4	-846500.0	0.0	0.0	-58645.0
33.28	236000.0	-44.2	-441400.0	0.0	0.0	-28500.0
33.29	348000.0	-74.5	-639800.0	0.0	0.0	-47369.0
33.30	398500.0	-79.2	-736600.0	0.0	0.0	-51035.0
33.31	237000.0	-50.9	-439900.0	0.0	0.0	-31911.0
33.32	262300.0	-53.2	-488300.0	0.0	0.0	-33744.0
33.33	399500.0	-85.9	-735100.0	0.0	0.0	-54446.0
33.34	424700.0	-88.3	-783500.0	0.0	0.0	-56279.0
33.35	177900.0	-38.7	-330000.0	0.0	0.0	-24302.0
33.36	203200.0	-41.1	-378400.0	0.0	0.0	-26134.0
33.37	340400.0	-73.8	-625200.0	0.0	0.0	-46837.0
33.38	365700.0	-76.1	-673700.0	0.0	0.0	-48670.0
33.39	432400.0	-89.0	-798100.0	0.0	0.0	-56812.0
33.40	373300.0	-76.9	-688200.0	0.0	0.0	-49202.0
33.41	260600.0	-53.1	-484900.0	0.0	0.0	-33562.0
33.42	285800.0	-55.4	-533400.0	0.0	0.0	-35395.0
33.43	492700.0	-103.1	-906700.0	0.0	0.0	-65755.0
33.44	517900.0	-105.5	-955100.0	0.0	0.0	-67588.0
33.45	201500.0	-40.9	-375100.0	0.0	0.0	-25953.0
33.46	226700.0	-43.3	-423500.0	0.0	0.0	-27786.0
33.47	433600.0	-91.0	-796800.0	0.0	0.0	-58146.0
33.48	458800.0	-93.4	-845200.0	0.0	0.0	-59979.0
33.49	311100.0	-57.8	-581800.0	0.0	0.0	-37228.0
33.50	423100.0	-88.1	-780200.0	0.0	0.0	-56097.0
33.51	473600.0	-92.8	-877000.0	0.0	0.0	-59764.0
33.52	252000.0	-45.7	-471900.0	0.0	0.0	-29619.0
33.53	364000.0	-76.0	-670300.0	0.0	0.0	-48488.0
33.54	414500.0	-80.7	-767100.0	0.0	0.0	-52154.0
33.55	448300.0	-90.5	-828600.0	0.0	0.0	-57930.0
33.56	389200.0	-78.3	-718700.0	0.0	0.0	-50321.0
33.57	263600.0	-53.4	-490800.0	0.0	0.0	-33775.0
33.58	288900.0	-55.7	-539200.0	0.0	0.0	-35608.0
33.59	426100.0	-88.4	-786000.0	0.0	0.0	-56310.0
33.60	451400.0	-90.8	-834400.0	0.0	0.0	-58143.0
33.61	204500.0	-41.2	-380900.0	0.0	0.0	-26166.0
33.62	229800.0	-43.6	-429300.0	0.0	0.0	-27999.0
33.63	367000.0	-76.3	-676100.0	0.0	0.0	-48701.0
33.64	392300.0	-78.6	-724500.0	0.0	0.0	-50534.0
33.108	205700.0	-846.0	-379900.0	0.0	0.0	-212200.0
33.109	237300.0	-910.7	-437300.0	0.0	0.0	-233289.0
33.110	188100.0	-1018.0	-357700.0	0.0	0.0	-272692.0
33.111	219700.0	-1082.7	-415100.0	0.0	0.0	-293785.0
33.112	359800.0	961.8	-654900.0	0.0	0.0	216784.0
33.113	391500.0	897.1	-712300.0	0.0	0.0	195686.0
33.114	342200.0	789.8	-632500.0	0.0	0.0	156189.0
33.115	373900.0	725.2	-689900.0	0.0	0.0	135093.0
33.116	206000.0	-853.0	-380900.0	0.0	0.0	-216623.0
33.117	237700.0	-917.7	-438300.0	0.0	0.0	-237715.0

33.118	187700.0	-1011.1	-356700.0	0.0	0.0	-268299.0
33.119	219300.0	-1075.7	-414100.0	0.0	0.0	-289391.0
33.120	360200.0	954.8	-655800.0	0.0	0.0	212360.0
33.121	391900.0	890.1	-713200.0	0.0	0.0	191267.0
33.122	341800.0	796.8	-631600.0	0.0	0.0	160605.0
33.123	373500.0	732.2	-689000.0	0.0	0.0	139508.0
33.124	206600.0	-1896.4	-381400.0	0.0	0.0	-760643.0
33.125	238200.0	-1961.1	-438800.0	0.0	0.0	-781731.0
33.126	189000.0	-2068.5	-359100.0	0.0	0.0	-821143.0
33.127	220600.0	-2133.1	-416500.0	0.0	0.0	-842238.0
33.128	358900.0	2012.4	-653300.0	0.0	0.0	765093.0
33.129	390500.0	1947.7	-710700.0	0.0	0.0	743996.0
33.130	341300.0	1840.4	-630900.0	0.0	0.0	704515.0
33.131	372900.0	1775.8	-688300.0	0.0	0.0	683418.0
33.132	207000.0	-1903.4	-382300.0	0.0	0.0	-765059.0
33.133	238600.0	-1968.1	-439700.0	0.0	0.0	-786151.0
33.134	188600.0	-2061.5	-358200.0	0.0	0.0	-816743.0
33.135	220200.0	-2126.1	-415600.0	0.0	0.0	-837834.9
33.136	359300.0	2005.4	-654200.0	0.0	0.0	760669.0
33.137	390900.0	1940.7	-711600.0	0.0	0.0	739578.0
33.138	340900.0	1847.4	-630000.0	0.0	0.0	708924.0
33.139	372500.0	1782.8	-687400.0	0.0	0.0	687828.0
33.140	280200.0	-12.6	-502200.0	0.0	0.0	8579.0
33.141	311800.0	-77.3	-559600.0	0.0	0.0	-12505.0
33.142	221500.0	-585.9	-427800.0	0.0	0.0	-193209.0
33.143	253100.0	-650.6	-485200.0	0.0	0.0	-214308.0
33.144	326400.0	529.7	-584700.0	0.0	0.0	137294.0
33.145	358100.0	465.0	-642100.0	0.0	0.0	116210.0
33.146	267700.0	-43.5	-510300.0	0.0	0.0	-64564.0
33.147	299300.0	-108.2	-567700.0	0.0	0.0	-85662.0
33.148	280400.0	-327.7	-502600.0	0.0	0.0	-155952.0
33.149	312100.0	-392.4	-560000.0	0.0	0.0	-177042.0
33.150	221800.0	-901.1	-428300.0	0.0	0.0	-357707.0
33.151	253400.0	-965.8	-485700.0	0.0	0.0	-378806.0
33.152	326200.0	844.8	-584300.0	0.0	0.0	301823.0
33.153	357800.0	780.2	-641700.0	0.0	0.0	280739.0
33.154	267400.0	271.6	-509800.0	0.0	0.0	99935.0
33.155	299100.0	207.0	-567200.0	0.0	0.0	78837.0
33.156	281500.0	-36.0	-505400.0	0.0	0.0	-6162.0
33.157	313100.0	-100.6	-562800.0	0.0	0.0	-27246.0
33.158	220200.0	-562.7	-424600.0	0.0	0.0	-178529.0
33.159	251800.0	-627.3	-482000.0	0.0	0.0	-199627.0
33.160	327800.0	506.3	-587900.0	0.0	0.0	122555.0
33.161	359400.0	441.7	-645300.0	0.0	0.0	101471.0
33.162	266400.0	-20.3	-507100.0	0.0	0.0	-49884.0
33.163	298000.0	-84.9	-564500.0	0.0	0.0	-70983.0
33.164	281800.0	-351.1	-505800.0	0.0	0.0	-170697.0
33.165	313400.0	-415.7	-563200.0	0.0	0.0	-191786.0
33.166	220500.0	-877.8	-425100.0	0.0	0.0	-343026.0
33.167	252100.0	-942.5	-482500.0	0.0	0.0	-364125.0
33.168	327500.0	821.5	-587400.0	0.0	0.0	287086.0
33.169	359100.0	756.8	-644800.0	0.0	0.0	266002.0
33.170	266100.0	294.9	-506600.0	0.0	0.0	114613.0
33.171	297800.0	230.3	-564000.0	0.0	0.0	93514.0
33.268	222700.0	-137.9	-409200.0	0.0	0.0	-37417.0
33.269	328100.0	-353.4	-600600.0	0.0	0.0	-107717.0
33.270	205100.0	-309.9	-387000.0	0.0	0.0	-97928.0
33.271	310600.0	-525.4	-578300.0	0.0	0.0	-168247.0
33.272	269000.0	404.4	-491700.0	0.0	0.0	91293.0
33.273	374400.0	188.9	-683100.0	0.0	0.0	20987.0

33.274	251400.0	232.5	-469400.0	0.0	0.0	30726.0
33.275	356800.0	17.0	-660700.0	0.0	0.0	-39599.0
33.276	223100.0	-144.9	-410200.0	0.0	0.0	-41840.0
33.277	328500.0	-360.4	-601500.0	0.0	0.0	-112145.0
33.278	204700.0	-302.9	-386000.0	0.0	0.0	-93528.0
33.279	310200.0	-518.4	-577300.0	0.0	0.0	-163844.0
33.280	269400.0	397.4	-492700.0	0.0	0.0	86872.0
33.281	374800.0	181.9	-684000.0	0.0	0.0	16571.0
33.282	251000.0	239.4	-468500.0	0.0	0.0	35130.0
33.283	356400.0	24.0	-659800.0	0.0	0.0	-35189.0
33.284	223000.0	-453.0	-409700.0	0.0	0.0	-201946.0
33.285	328400.0	-668.5	-601000.0	0.0	0.0	-272248.0
33.286	205400.0	-625.1	-387400.0	0.0	0.0	-262461.0
33.287	310800.0	-840.6	-578700.0	0.0	0.0	-332768.0
33.288	268700.0	719.6	-491300.0	0.0	0.0	255804.0
33.289	374100.0	504.1	-682600.0	0.0	0.0	185482.0
33.290	251100.0	547.6	-468900.0	0.0	0.0	195221.0
33.291	356500.0	332.1	-660200.0	0.0	0.0	124899.0
33.292	223400.0	-460.0	-410600.0	0.0	0.0	-206370.0
33.293	328800.0	-675.5	-601900.0	0.0	0.0	-276674.0
33.294	205000.0	-618.1	-386400.0	0.0	0.0	-258061.0
33.295	310400.0	-833.6	-577800.0	0.0	0.0	-328367.0
33.296	269100.0	712.6	-492200.0	0.0	0.0	251381.0
33.297	374500.0	497.1	-683500.0	0.0	0.0	181066.0
33.298	250700.0	554.6	-468000.0	0.0	0.0	199626.0
33.299	356100.0	339.1	-659300.0	0.0	0.0	129307.0
50.1	256300.0	53.7	-476700.0	0.0	0.0	32837.0
50.2	281600.0	56.1	-525200.0	0.0	0.0	34518.0
50.3	488600.0	104.7	-898900.0	0.0	0.0	64155.0
50.4	513900.0	107.1	-947400.0	0.0	0.0	65833.0
50.5	197200.0	41.3	-366700.0	0.0	0.0	25296.0
50.6	222500.0	43.7	-415200.0	0.0	0.0	26978.0
50.7	429500.0	92.3	-788900.0	0.0	0.0	56613.0
50.8	454800.0	94.7	-837400.0	0.0	0.0	58293.0
50.9	306900.0	58.5	-573700.0	0.0	0.0	36203.0
50.10	418900.0	89.4	-772200.0	0.0	0.0	54759.0
50.11	469500.0	94.2	-869200.0	0.0	0.0	58124.0
50.12	247800.0	46.2	-463700.0	0.0	0.0	28663.0
50.13	359800.0	77.0	-662200.0	0.0	0.0	47218.0
50.14	410400.0	81.9	-759200.0	0.0	0.0	50584.0
50.15	444200.0	91.8	-820700.0	0.0	0.0	56440.0
50.16	385100.0	79.4	-710700.0	0.0	0.0	48899.0
50.17	244900.0	52.6	-454900.0	0.0	0.0	32092.0
50.18	270200.0	55.0	-503400.0	0.0	0.0	33771.0
50.19	477200.0	103.6	-877000.0	0.0	0.0	63409.0
50.20	502500.0	106.0	-925500.0	0.0	0.0	65086.0
50.21	185700.0	40.2	-344900.0	0.0	0.0	24551.0
50.22	211000.0	42.7	-393400.0	0.0	0.0	26230.0
50.23	418100.0	91.2	-767000.0	0.0	0.0	55869.0
50.24	443400.0	93.6	-815500.0	0.0	0.0	57545.0
50.25	295500.0	57.4	-551900.0	0.0	0.0	35455.0
50.26	407500.0	88.3	-750400.0	0.0	0.0	54015.0
50.27	458100.0	93.1	-847400.0	0.0	0.0	57376.0
50.28	236300.0	45.1	-441900.0	0.0	0.0	27915.0
50.29	348400.0	75.9	-640400.0	0.0	0.0	46473.0
50.30	399000.0	80.8	-737400.0	0.0	0.0	49835.0
50.31	237300.0	51.9	-440300.0	0.0	0.0	31595.0
50.32	262600.0	54.3	-488800.0	0.0	0.0	33273.0
50.33	399900.0	87.6	-735800.0	0.0	0.0	53517.0
50.34	425200.0	90.0	-784300.0	0.0	0.0	55195.0

50.35	178100.0	39.5	-330300.0	0.0	0.0	24055.0
50.36	203400.0	41.9	-378800.0	0.0	0.0	25732.0
50.37	340800.0	75.2	-625800.0	0.0	0.0	45975.0
50.38	366100.0	77.6	-674300.0	0.0	0.0	47654.0
50.39	432800.0	90.7	-798900.0	0.0	0.0	55693.0
50.40	373700.0	78.4	-688900.0	0.0	0.0	48151.0
50.41	260900.0	54.1	-485500.0	0.0	0.0	33135.0
50.42	286200.0	56.6	-534000.0	0.0	0.0	34818.0
50.43	493200.0	105.1	-907600.0	0.0	0.0	64452.0
50.44	518500.0	107.5	-956100.0	0.0	0.0	66132.0
50.45	201700.0	41.8	-375500.0	0.0	0.0	25594.0
50.46	227000.0	44.2	-424000.0	0.0	0.0	27277.0
50.47	434100.0	92.8	-797600.0	0.0	0.0	56911.0
50.48	459400.0	95.2	-846100.0	0.0	0.0	58592.0
50.49	311500.0	59.0	-582500.0	0.0	0.0	36503.0
50.50	423500.0	89.8	-781000.0	0.0	0.0	55057.0
50.51	474100.0	94.7	-878000.0	0.0	0.0	58423.0
50.52	252300.0	46.6	-472500.0	0.0	0.0	28962.0
50.53	364400.0	77.5	-671000.0	0.0	0.0	47516.0
50.54	415000.0	82.3	-768000.0	0.0	0.0	50883.0
50.55	448800.0	92.2	-829500.0	0.0	0.0	56739.0
50.56	389700.0	79.9	-719500.0	0.0	0.0	49198.0
50.57	263900.0	54.4	-491300.0	0.0	0.0	33334.0
50.58	289200.0	56.8	-539800.0	0.0	0.0	35017.0
50.59	426600.0	90.1	-786800.0	0.0	0.0	55256.0
50.60	451900.0	92.5	-835300.0	0.0	0.0	56938.0
50.61	204800.0	42.0	-381300.0	0.0	0.0	25793.0
50.62	230100.0	44.5	-429800.0	0.0	0.0	27477.0
50.63	367400.0	77.7	-676800.0	0.0	0.0	47715.0
50.64	392700.0	80.2	-725300.0	0.0	0.0	49397.0
50.108	360100.0	-762.6	-655600.0	0.0	0.0	-171961.0
50.109	391700.0	-724.9	-712800.0	0.0	0.0	-156720.0
50.110	341800.0	-671.4	-631400.0	0.0	0.0	-137584.0
50.111	373400.0	-633.7	-688700.0	0.0	0.0	-122354.0
50.112	206900.0	757.2	-382500.0	0.0	0.0	198712.0
50.113	238400.0	794.9	-439800.0	0.0	0.0	213970.0
50.114	188600.0	848.6	-358500.0	0.0	0.0	234142.0
50.115	220100.0	886.3	-415700.0	0.0	0.0	249388.0
50.116	359700.0	-767.2	-654600.0	0.0	0.0	-174604.0
50.117	391300.0	-729.5	-711900.0	0.0	0.0	-159365.0
50.118	342200.0	-666.7	-632400.0	0.0	0.0	-134913.0
50.119	373800.0	-629.0	-689700.0	0.0	0.0	-119688.0
50.120	206500.0	752.6	-381500.0	0.0	0.0	196091.0
50.121	238000.0	790.3	-438800.0	0.0	0.0	211348.0
50.122	189000.0	853.2	-359400.0	0.0	0.0	236758.0
50.123	220600.0	890.9	-416700.0	0.0	0.0	252005.0
50.124	359300.0	-1515.4	-654100.0	0.0	0.0	-558564.0
50.125	390800.0	-1477.7	-711400.0	0.0	0.0	-543322.0
50.126	340900.0	-1424.2	-630000.0	0.0	0.0	-524101.0
50.127	372500.0	-1386.5	-687300.0	0.0	0.0	-508870.0
50.128	207800.0	1510.3	-384000.0	0.0	0.0	586790.0
50.129	239400.0	1548.0	-441300.0	0.0	0.0	602043.0
50.130	189500.0	1601.7	-360000.0	0.0	0.0	622191.0
50.131	221100.0	1639.4	-417300.0	0.0	0.0	637439.0
50.132	358900.0	-1520.1	-653200.0	0.0	0.0	-561206.0
50.133	390400.0	-1482.4	-710500.0	0.0	0.0	-545970.0
50.134	341300.0	-1419.6	-631000.0	0.0	0.0	-521450.0
50.135	372900.0	-1381.9	-688300.0	0.0	0.0	-506226.0
50.136	207400.0	1505.7	-383100.0	0.0	0.0	584181.0
50.137	238900.0	1543.4	-440300.0	0.0	0.0	599434.0

50.138	189900.0	1606.3	-361000.0	0.0	0.0	624814.0
50.139	221500.0	1644.0	-418200.0	0.0	0.0	640060.0
50.140	327900.0	-337.1	-588100.0	0.0	0.0	-82878.0
50.141	359400.0	-299.4	-645400.0	0.0	0.0	-67721.0
50.142	266900.0	-32.9	-507800.0	0.0	0.0	33077.0
50.143	298400.0	4.8	-565100.0	0.0	0.0	48388.0
50.144	281900.0	118.8	-506200.0	0.0	0.0	28064.0
50.145	313400.0	156.5	-563400.0	0.0	0.0	43220.0
50.146	220900.0	423.1	-425900.0	0.0	0.0	144878.0
50.147	252500.0	460.8	-483200.0	0.0	0.0	160189.0
50.148	327600.0	-562.9	-587700.0	0.0	0.0	-198830.0
50.149	359200.0	-525.2	-645000.0	0.0	0.0	-183585.0
50.150	266600.0	-258.9	-507300.0	0.0	0.0	-83360.0
50.151	298100.0	-221.2	-564600.0	0.0	0.0	-68045.0
50.152	282100.0	344.7	-506600.0	0.0	0.0	144052.0
50.153	313700.0	382.4	-563900.0	0.0	0.0	159204.0
50.154	221200.0	649.0	-426400.0	0.0	0.0	261297.0
50.155	252700.0	686.7	-483700.0	0.0	0.0	276590.0
50.156	326500.0	-352.6	-584900.0	0.0	0.0	-91695.0
50.157	358000.0	-314.9	-642200.0	0.0	0.0	-76545.0
50.158	268200.0	-17.5	-511000.0	0.0	0.0	41778.0
50.159	299700.0	20.2	-568300.0	0.0	0.0	57094.0
50.160	280500.0	103.3	-502900.0	0.0	0.0	19244.0
50.161	312100.0	140.9	-560200.0	0.0	0.0	34395.0
50.162	222200.0	438.6	-429100.0	0.0	0.0	153566.0
50.163	253800.0	476.3	-486400.0	0.0	0.0	168882.0
50.164	326200.0	-578.5	-584500.0	0.0	0.0	-207613.0
50.165	357800.0	-540.8	-641800.0	0.0	0.0	-192378.0
50.166	267900.0	-243.4	-510500.0	0.0	0.0	-74640.0
50.167	299500.0	-205.7	-567800.0	0.0	0.0	-59323.0
50.168	280800.0	329.1	-503400.0	0.0	0.0	135221.0
50.169	312300.0	366.8	-560600.0	0.0	0.0	150371.0
50.170	222500.0	664.5	-429600.0	0.0	0.0	270003.0
50.171	254100.0	702.2	-486900.0	0.0	0.0	285312.0
50.268	269700.0	-274.7	-493100.0	0.0	0.0	-60323.0
50.269	374800.0	-149.0	-684100.0	0.0	0.0	-9512.0
50.270	251400.0	-183.5	-469000.0	0.0	0.0	-25830.0
50.271	356500.0	-57.8	-660000.0	0.0	0.0	25086.0
50.272	223700.0	181.2	-411200.0	0.0	0.0	50715.0
50.273	328800.0	306.9	-602100.0	0.0	0.0	101386.0
50.274	205400.0	272.5	-387100.0	0.0	0.0	85879.0
50.275	310600.0	398.2	-578100.0	0.0	0.0	136736.0
50.276	269300.0	-279.3	-492200.0	0.0	0.0	-62954.0
50.277	374400.0	-153.7	-683100.0	0.0	0.0	-12161.0
50.278	251800.0	-178.8	-470000.0	0.0	0.0	-23170.0
50.279	356900.0	-53.1	-660900.0	0.0	0.0	27705.0
50.280	223300.0	176.6	-410200.0	0.0	0.0	48066.0
50.281	328400.0	302.2	-601200.0	0.0	0.0	98765.0
50.282	205800.0	277.2	-388100.0	0.0	0.0	88482.0
50.283	311000.0	402.9	-579100.0	0.0	0.0	139361.0
50.284	269400.0	-500.5	-492700.0	0.0	0.0	-176301.0
50.285	374600.0	-374.9	-683700.0	0.0	0.0	-125491.0
50.286	251100.0	-409.3	-468600.0	0.0	0.0	-141824.0
50.287	356300.0	-283.7	-659500.0	0.0	0.0	-91075.0
50.288	224000.0	407.1	-411700.0	0.0	0.0	166951.0
50.289	329100.0	532.8	-602600.0	0.0	0.0	217808.0
50.290	205700.0	498.5	-387600.0	0.0	0.0	202334.0
50.291	310900.0	624.1	-578600.0	0.0	0.0	253145.0
50.292	269000.0	-505.2	-491800.0	0.0	0.0	-178942.0
50.293	374200.0	-379.5	-682700.0	0.0	0.0	-128139.0

50.294	251500.0	-404.7	-469600.0	0.0	0.0	-139168.0
50.295	356700.0	-279.0	-660500.0	0.0	0.0	-88412.0
50.296	223600.0	402.5	-410700.0	0.0	0.0	164329.0
50.297	328700.0	528.2	-601600.0	0.0	0.0	215190.0
50.298	206100.0	503.1	-388600.0	0.0	0.0	204947.0
50.299	311300.0	628.8	-579500.0	0.0	0.0	255762.0

Calcolo resistenze

Resistenza a trazione dei bulloni

$$F_{tb,Rd} = 0.9 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} =$$

203249.5 N

Resistenza a punzonamento flangia

$$B_{pf,Rd} = 0.6 \cdot \pi \cdot d_m \cdot t_f \cdot f_{tk} / \gamma_{M2} =$$

692155.7 N

Bull.	$F_{f,Rd}$ [N]	$F_{t,Rd}$ [N]
1	178820.8	178820.8
2	178820.8	178820.8
3	178820.8	178820.8
4	178820.8	178820.8

Legenda

$F_{f,Rd} = M_{res,m} / (B_m \cdot R_m)$ resistenza a flessione flangia

$F_{t,Rd} = \min [F_{tb,Rd}, B_{pf,Rd}, F_{f,Rd}]$ resistenza a trazione di progetto

Resistenza a taglio dei bulloni

$$F_{vb,Rd} = 0.6 \cdot f_{tb} \cdot A_{res} / \gamma_{M2} =$$

135499.7 N

Bull.	$F_{bf,x,Rd}$ [N]	$F_{v,x,Rd}$ [N]	$F_{bf,y,Rd}$ [N]	$F_{v,y,Rd}$ [N]
1	612000.0	135499.7	612000.0	135499.7
2	612000.0	135499.7	612000.0	135499.7
3	612000.0	135499.7	612000.0	135499.7
4	612000.0	135499.7	612000.0	135499.7

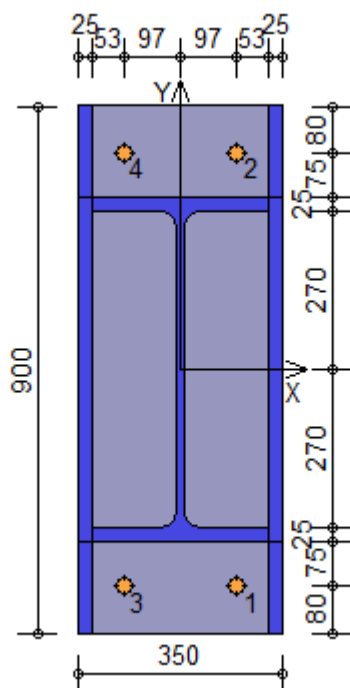
Legenda

$F_{bf,x,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \varnothing \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione x

$F_{v,x,Rd} = \min [F_{vb,Rd}, F_{bf,x,Rd}]$ resistenza a taglio di progetto in direzione x

$F_{bf,y,Rd} = k \cdot \alpha \cdot f_{tk} \cdot \varnothing \cdot t_f / \gamma_{M2}$ resistenza a rifollamento flangia in direzione y

$F_{v,y,Rd} = \min [F_{vb,Rd}, F_{bf,y,Rd}]$ resistenza a taglio di progetto in direzione y



Verifiche sui bulloni

1-Taglio e trazione (Nodo n. 50, CMB n. 44)

Bull.	X [mm]	Y [mm]	$F_{v,Ed}$ [N]	$F_{v,Rd}$ [N]	$F_{t,Ed}$ [N]	$F_{t,Rd}$ [N]	FV ₁	VER
1	97.00	-370.00	129614.1	135499.7	0.0	178820.8	0.956564	Ok
2	97.00	370.00	129614.0	135499.7	0.0	178820.8	0.956564	Ok
3	-97.00	-370.00	129636.0	135499.7	0.0	178820.8	0.956726	Ok

4	-97.00	370.00	129636.0	135499.7	0.0	178820.8	0.956725	Ok
2-Trazione (Elemento non caricato)								
Bull.	X [mm]	Y [mm]	$F_{t,Ed}$ [N]	$F_{t,Rd}$ [N]	FV_2	VER		
1	97.00	-370.00	0.0	178820.8	0.000000	Ok		
2	97.00	370.00	0.0	178820.8	0.000000	Ok		
3	-97.00	-370.00	0.0	178820.8	0.000000	Ok		
4	-97.00	370.00	0.0	178820.8	0.000000	Ok		

Legenda

$F_{v,Ed}$ forza di taglio agente sul bullone
 $F_{v,Rd}$ resistenza a taglio di progetto del bullone
 $F_{t,Ed}$ forza di trazione agente sul bullone
 $F_{t,Rd}$ resistenza a trazione di progetto del bullone
 $FV_1 = F_{v,Ed} / F_{v,Rd} + F_{t,Ed} / (1.4 \cdot F_{t,Rd})$
 $FV_2 = F_{t,Ed} / F_{t,Rd}$
 $VER \rightarrow FV_i \leq 1$

Verifiche sulle saldature profilo-flangia (versione beta)

Si considera la sezione di gola (avente altezza $a = s_c / 2^{0.5} = 9.192$) in posizione ribaltata: vengono considerate positive le tensioni normali di trazione e le tensioni tangenziali agenti verso destra e verso il basso. Tutte le tensioni sono espresse in N/mm².

Verifica formula (4.2.84) (Nodo n. 50, CMB n. 44)

Cordoni	n_{\perp}	t_{\perp}	τ_{\parallel}	FV_1	VER ₁
Nerv. vert. lato destro interno zona inferiore	-28.62	0.00	21.96	36.08	Ok
Nerv. vert. lato sinistro interno zona inferiore	-28.62	0.00	21.96	36.08	Ok
Ala inferiore esterno	-28.62	0.00	0.01	28.62	Ok
Ala inferiore interno lato destro	-28.62	0.00	0.01	28.62	Ok
Ala inferiore interno lato sinistro	-28.62	0.00	0.01	28.62	Ok
Nerv. vert. lato destro interno zona centrale	-28.62	0.00	21.96	36.08	Ok
Anima lato destro	-28.62	0.00	21.96	36.08	Ok
Anima lato sinistro	-28.62	0.00	21.96	36.08	Ok
Nerv. vert. lato sinistro interno zona centrale	-28.62	0.00	21.96	36.08	Ok
Ala superiore interno lato destro	-28.62	0.00	0.01	28.62	Ok
Ala superiore interno lato sinistro	-28.62	0.00	0.01	28.62	Ok
Ala superiore esterno	-28.62	0.00	0.01	28.62	Ok
Nerv. vert. lato destro interno zona superiore	-28.62	0.00	21.96	36.08	Ok
Nerv. vert. lato sinistro interno zona superiore	-28.62	0.00	21.96	36.08	Ok

Verifica formula (4.2.85) (Nodo n. 50, CMB n. 44)

Cordoni	n_{\perp}	t_{\perp}	τ_{\parallel}	FV_2	VER ₂
Nerv. vert. lato destro interno zona inferiore	-28.62	0.00	21.96	28.62	Ok
Nerv. vert. lato sinistro interno zona inferiore	-28.62	0.00	21.96	28.62	Ok
Ala inferiore esterno	-28.62	0.00	0.01	28.62	Ok
Ala inferiore interno lato destro	-28.62	0.00	0.01	28.62	Ok
Ala inferiore interno lato sinistro	-28.62	0.00	0.01	28.62	Ok
Nerv. vert. lato destro interno zona centrale	-28.62	0.00	21.96	28.62	Ok
Anima lato destro	-28.62	0.00	21.96	28.62	Ok
Anima lato sinistro	-28.62	0.00	21.96	28.62	Ok
Nerv. vert. lato sinistro interno zona centrale	-28.62	0.00	21.96	28.62	Ok
Ala superiore interno lato destro	-28.62	0.00	0.01	28.62	Ok
Ala superiore interno lato sinistro	-28.62	0.00	0.01	28.62	Ok
Ala superiore esterno	-28.62	0.00	0.01	28.62	Ok
Nerv. vert. lato destro interno zona superiore	-28.62	0.00	21.96	28.62	Ok
Nerv. vert. lato sinistro interno zona superiore	-28.62	0.00	21.96	28.62	Ok

Legenda

n_{\perp} tensione normale perpendicolare all'asse del cordone
 t_{\perp} tensione tangenziale perpendicolare all'asse del cordone
 τ_{\parallel} tensione tangenziale parallela all'asse del cordone
 $FV_1 = (n_{\perp}^2 + t_{\perp}^2 + \tau_{\parallel}^2)^{0.5}$
 $FV_2 = |n_{\perp}| + |t_{\perp}|$
 $VER_i \rightarrow FV_i \leq \beta_i \cdot f_{yk} \quad (\beta_1 \cdot f_{yk} = 248.50 \text{ N/mm}^2 \quad \beta_2 \cdot f_{yk} = 301.75 \text{ N/mm}^2)$

Verifiche a flessione piastra in zona compressa

Sezione parallela a X a filo della colonna (Nodo n. 50, CMB n. 44)

Pressione media a bordo piastra	$p_{med} = 3.05 \text{ N/mm}^2$
Carico lineare sbalzo	$q_{lin} = 1067.12 \text{ N/mm}$
Lunghezza sbalzo	$L_s = 155.0 \text{ mm}$
Modulo di resistenza minimo	$W_{min} = 372088.3 \text{ mm}^3$
Momento resistente	$M_{p,Rd} = 125801300.0 \text{ N mm}$
Momento massimo	$M_{p,Ed} = 12818720.0 \text{ N mm}$
$M_{p,Ed} / M_{p,Rd} = 0.101897 \text{ Ok}$	

Sezione parallela a Y a filo della nervatura verticale (Nodo n. 50, CMB n. 44)

Pressione media a bordo piastra	$p_{med} = 3.05 \text{ N/mm}^2$
Carico lineare sbalzo	$q_{lin} = 2744.01 \text{ N/mm}$
Lunghezza sbalzo	$L_s = 0.0 \text{ mm}$
Modulo di resistenza minimo	$W_{min} = 414583.3 \text{ mm}^3$
Momento resistente	$M_{p,Rd} = 140168700.0 \text{ N mm}$
Momento massimo	$M_{p,Ed} = 0.0 \text{ N mm}$
$M_{p,Ed} / M_{p,Rd} = 0.000000 \text{ Ok}$	

Ancoraggio

Tirafondi ad aderenza

Lunghezza tirafondi $L_t = 500 \text{ mm}$

Lunghezza minima tirafondi: 40 diametri (960 mm)

Calcestruzzo

Resistenza cubica caratteristica a compressione	$R_{ck} =$	30.00 N/mm ²
Resistenza cilindrica caratteristica a compressione	$f_{ck} = 0.83 \cdot R_{ck} =$	24.90 N/mm ²
Resistenza di calcolo a compressione	$f_{cd} = \alpha_{cc} \cdot f_{ck} / \gamma_C =$	14.11 N/mm ²
Resistenza caratteristica a trazione	$f_{ctk} = 0.7 \cdot 0.30 \cdot f_{ck}^{2/3} =$	1.79 N/mm ²
Resistenza tangenziale di aderenza di calcolo	$f_{bd} = 2.25 \cdot \eta_1 \cdot \eta_2 \cdot f_{ctk} / \gamma_C =$	2.69 N/mm ²

Compressione massima calcestruzzo (Nodo n. 50, CMB n. 44)

$p_{max} = 3.05 \text{ N/mm}^2 < f_{cd} \text{ Ok}$

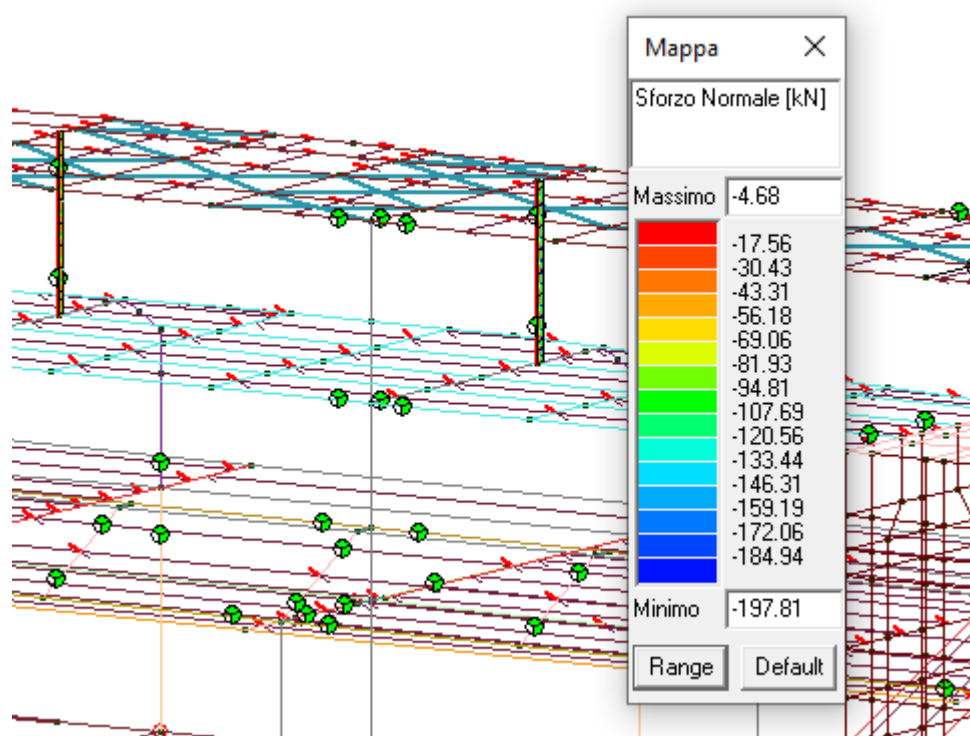
Verifica ancoraggio

Si considera la massima sollecitazione di trazione agente nei tirafondi (Elemento non caricato)

Trazione di progetto dell'ancoraggio $F_{t,an,Ed} = \max [F_{t,Ed}] = 0.0 \text{ N}$

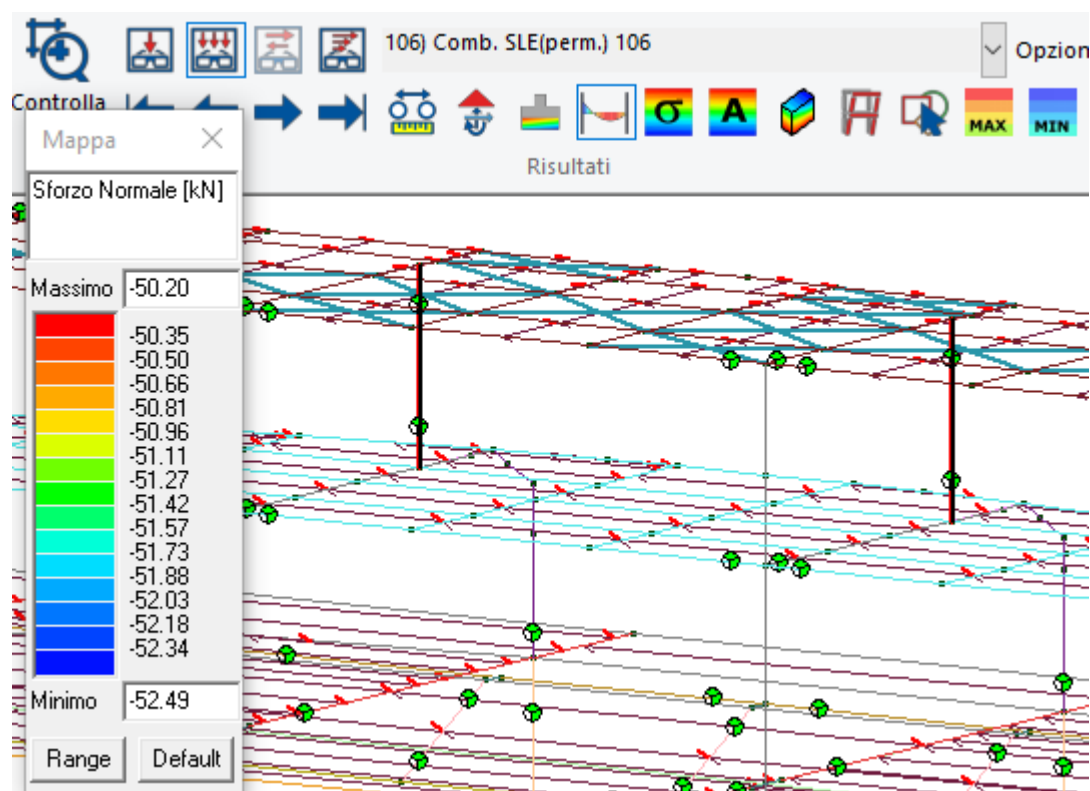
Il sistema di ancoraggio non è sollecitato

COLLEGAMENTO TUBOLARE FI323.9X7.1 - IPE600 E IPE 300




IL PILASTRO, CALCOLATO COME BIELLA, RISULTA SEMPRE COMPRESSO.

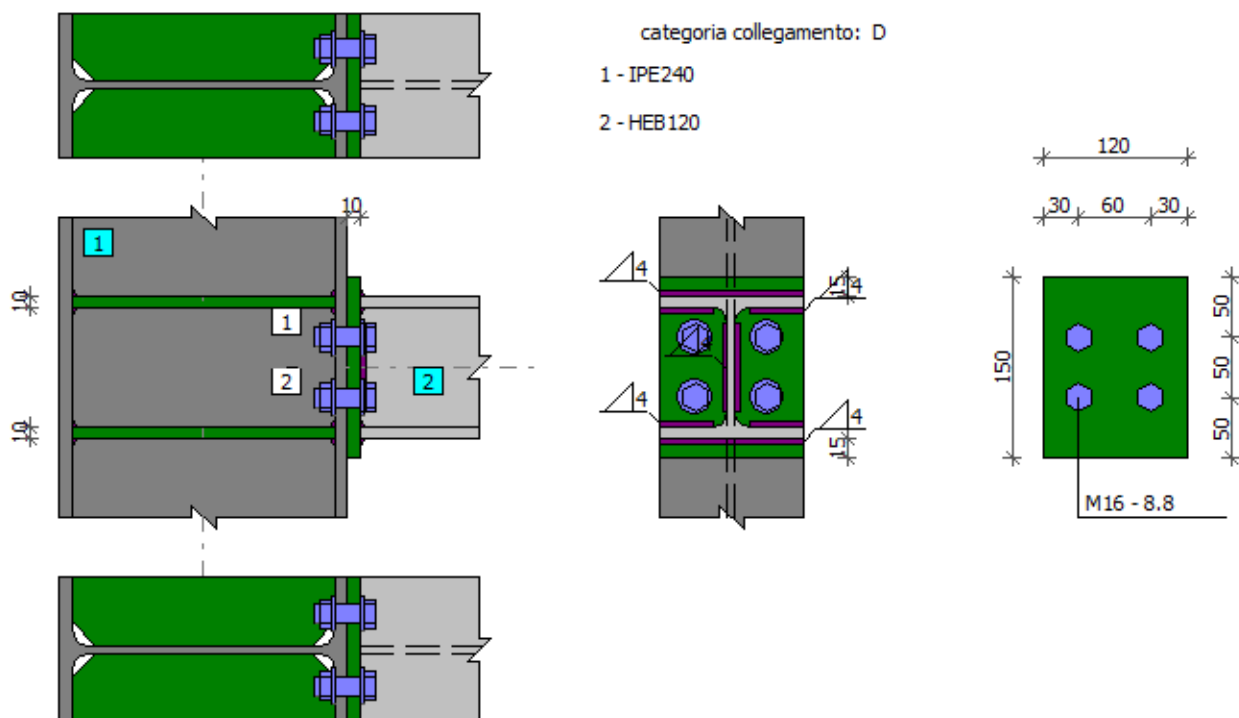
Le azioni sui bulloni si calcolano considerando la massa simica gravante moltiplicata per $S(T)$:



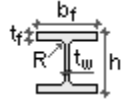
a favore di sicurezza si assume $S(T) = 1$


$V_{eD} = 55 \text{ Kn}$


	Trave - Colonna (piastra frontale)	Rapporto: 0.25	✓
BeamRigidColumn v. 1.0.0.10	EC3 1991-1-8: 2008		



Dati

Colonna HEA600					
	h_c	b_{fc}	t_{fc}	t_{wc}	R_c
	590.00[mm]	300.00[mm]	25.00[mm]	13.00[mm]	27.00[mm]
	A_c	J_{y0c}	J_{z0c}	y_{0c}	Z_{0c}
	226.46[cm ²]	141208.11[cm ⁴]	11271.32[cm ⁴]	150.00[mm]	295.00[mm]
Materiale	Grado	f_y	f_u		
	S 355	355.00[MPa]	490.00[MPa]		

Trave HEA240					
	h_b	b_{fb}	t_{fb}	t_{wb}	R_b
	230.00[mm]	240.00[mm]	12.00[mm]	7.50[mm]	21.00[mm]
	A_b	J_{y0b}	J_{z0b}	y_{0b}	Z_{0b}
	76.84[cm ²]	7763.18[cm ⁴]	2768.81[cm ⁴]	120.00[mm]	115.00[mm]
Materiale	Grado	f_y	f_u		
	S 235	235.00[MPa]	360.00[MPa]		

Piastra frontale				
	l_p	h_p	t_p	

	300.00[mm]	530.00[mm]	20.00[mm]
Materiale	Grado	f_y	f_u
	S 355	355.00[MPa]	490.00[MPa]

Bulloni di collegamento piastra frontale e flangia e colonna

Grado bullone	Grado	8.8
Limite di snervamento	$f_{yb} =$	640.00 [MPa]
Resistenza a tensione	$f_{ub} =$	800.00 [MPa]
Diametro bullone	$d =$	20.00 [mm]
Diametro apertura bullone	$d_0 =$	22.00 [mm]
Area sezione bullone	$A =$	3.14 [cm ²]
Area effettiva sezione bullone	$A_s =$	2.45 [cm ²]
Numero righe	$w =$	2.00
Distanza dal bordo orizzontale	$e_1 =$	50.00 [mm]
Spaziatura orizzontale	$w_1 =$	150.00 [mm]
Numero di bulloni nelle righe $m_1=2$; $m_2=2$		
Spaziatura verticale tra le righe $p_1=430.00$ [mm]		

Saldature

Spessore saldature dell'angolare che collegano flange trave e piastra frontale	$a_f =$	7.00 [mm]
Spessore saldature dell'angolare che collegano anima trave e piastra frontale	$a_w =$	4.00 [mm]

Coefficienti materiali

Coefficiente	$\gamma_{M0} =$	1.00
Coefficiente	$\gamma_{M1} =$	1.00
Coefficiente	$\gamma_{M2} =$	1.25

Forze

Trave destra

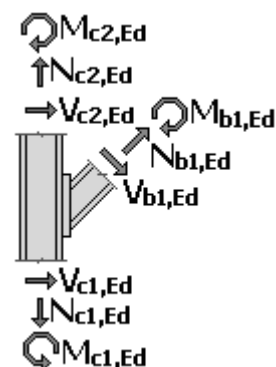
Forza assiale	$N_{b1,Ed} =$	0.00	[kN]
Forza di taglio	$V_{b1,Ed} =$	55.00	[kN]
Momento flettente	$M_{b1,Ed} =$	0.00	[kNm]

Colonna inferiore

Forza assiale	$N_{c1,Ed} =$	0.00	[kN]
Forza di taglio	$V_{c1,Ed} =$	0.00	[kN]
Momento flettente	$M_{c1,Ed} =$	0.00	[kNm]

Colonna superiore

Forza assiale	$N_{c2,Ed} =$	0.00	[kN]
Forza di taglio	$V_{c2,Ed} =$	0.00	[kN]
Momento flettente	$M_{c2,Ed} =$	0.00	[kNm]



Risultati

Pannello d'anima della colonna soggetto a taglio

Area di taglio della colonna

$$A_{vc} = A_c - 2 \cdot b_{fc} \cdot t_{fc} + (t_{wc} + 2 \cdot r_c) \cdot t_{fc} = 226.46 [cm^2] - 2 \cdot 300.00 [mm] \cdot 25.00 [mm] + (13.00 [mm] + 2 \cdot 27.00 [mm]) \cdot 25.00 [mm] = 93.21 [cm^2]$$

Momento resistente plastico della flangia colonna

$$M_{pl,fc,Rd} = (0.25 \cdot b_{fc} \cdot t_{fc}^2 \cdot f_{yc}) / \gamma_{M0} = (0.25 \cdot 300.00 [mm] \cdot (25.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 16.64 [kNm]$$

La distanza tra gli assi centrali dei rinforzi

$$d_s = 218.00 [mm]$$

Resistenza di taglio aggiuntiva dei rinforzi

$$V_{wp,add,Rd} = (4 \cdot M_{pl,fc,Rd}) / d_s = (4 \cdot 16.64 [kNm]) / 218.00 [mm] = 155.00 [kN]$$

Momento resistente plastico del rinforzo

$$M_{pl,st,Rd} = 0.51 [kNm]$$

Resistenza plastica a taglio nel pannello d'anima della colonna

$$V_{wp,Rd} = (0.9 \cdot A_{vc} \cdot f_{ywc}) / (\sqrt{3} \cdot \gamma_{M0}) + V_{wp,add,Rd} = (0.9 \cdot 93.21 [cm^2] \cdot 355.00 [MPa]) / (\sqrt{3} \cdot 1.00) + 155.00 [kN] = 1874.35 [kN]$$

Risultante forza di taglio dell'anima del pannello

$$V_{wp,Ed} = (M_{b1,Ed} - M_{b2,Ed}) / z - 0.5 \cdot (V_{c1,Ed} - V_{c2,Ed}) = (0.00 [kNm] - 0.00 [kNm]) / 324.00 [mm] - 0.5 \cdot (0.00 [kN] - 0.00 [kN]) = 0.00 [kN]$$

$$V_{wp,Ed} \leq V_{wp,Rd}$$

$$0.00 [kN] < 1874.35 [kN]$$

$$0.00$$



Anima colonna in compressione trasversale

parametro di calcolo

$$s_p = \min[t_p + c; 2 \cdot t_p] = \min[20.00 [mm] + 150.00 [mm]; 2 \cdot 20.00 [mm]] = 40.00 [mm]$$

Larghezza effettiva dell'anima colonna in compressione

$$b_{eff,c,wc} = t_{fb} + 2 \cdot \sqrt{2} \cdot a_t + 5 \cdot (t_{fc} + r_c) + s_p = 12.00 [mm] + 2 \cdot \sqrt{2} \cdot 7.00 [mm] + 5 \cdot (25.00 [mm] + 27.00 [mm]) + 40.00 [mm] = 331.80 [mm]$$

Fattore di riduzione

$$\omega = 1 / \sqrt{1 + 1.3 \cdot ((b_{eff,c,wc} \cdot t_{wc}) / A_{vc})^2} = 1 / \sqrt{1 + 1.3 \cdot ((331.80 [mm] \cdot 13.00 [mm]) / 93.21 [cm^2])^2} = 0.88$$

Resistenza di progetto della flangia colonna soggetta a compressione trasversale

$$F_{c,wc,Rd1} = (\omega \cdot k_{wc} \cdot \rho \cdot b_{eff,c,wc} \cdot t_{wc} \cdot f_{y,wc}) / \gamma_{M0} = (0.88 \cdot 1.00 \cdot 331.80 [mm] \cdot 13.00 [mm] \cdot 355.00 [MPa]) / 1.00 = 1354.29 [kN]$$

Profondità anima della colonna

$$d_{wc} = h_c - 2 \cdot (t_{fc} + r_c) = 590.00 [mm] - 2 \cdot (25.00 [mm] + 27.00 [mm]) = 486.00 [mm]$$

Snellezza piastra

$$-\lambda_p = \frac{0.932 \cdot \sqrt{[(b_{eff,c,wc} \cdot d_{wc} \cdot f_{y,wc}) / (E \cdot t_{wc}^2)]}}{0.932 \cdot \sqrt{[(331.80 [mm] \cdot 486.00 [mm] \cdot 355.00 [MPa]) / (210000.00 [MPa] \cdot (13.00 [mm])^2)]]} = 1.18$$

Riduzione del fattore d'instabilità per la piastra

$$\rho = (-\lambda_p - 0.22) / -\lambda_p^2 = (1.18 - 0.22) / (1.18)^2 = 0.70$$

$$F_{c,wc,Rd2} = (\omega \cdot k_{wc} \cdot \rho \cdot b_{eff,c,wc} \cdot t_{wc} \cdot f_{y,wc}) / \gamma_{M1} = (0.88 \cdot 1.00 \cdot 0.70 \cdot 331.80 [mm] \cdot 13.00 [mm] \cdot 355.00 [MPa]) / 1.00 = 950.82 [kN]$$

$$F_{c,wc,Rd,st} = ((b_{fc} - t_{wc}) \cdot t_s \cdot f_{y,s}) / \gamma_{M0} = (300.00 [mm] \cdot 13.00 [mm] \cdot 10.00 [mm] \cdot 355.00 [MPa]) / 1.00 = 1018.85 [kN]$$

Resistenza di progetto della flangia colonna soggetta a compressione trasversale

$$F_{c,wc,Rd} = \min(F_{c,wc,Rd1}; F_{c,wc,Rd2}) + F_{c,wc,Rd,st} = \min(1354.29[kN]; 950.82[kN]) + 1018.85[kN] = 1969.67[kN]$$

Flangia e anima della trave in compressione

Modulo di resistenza di plastica

$$W_{pl} = 707.41 [cm^3]$$

La resistenza di progetto per la piegatura della sezione

$$M_{c,Rd} = (W_{pl} * f_{yb}) / \gamma_{M0} = (707.41 [cm^3] * 235.00 [MPa]) / 1.00 = 166.24 [kNm]$$

Distanza tra le flange della trave

$$h_f = 218.00 [mm]$$

Resistenza di progetto della flangia colonna soggetta a compressione trasversale

$$F_{c,fb,Rd} = M_{c,Rd} / h_f = 166.24 [kNm] / 218.00 [mm] = 762.57 [kN]$$

Bulloni di collegamento piastra frontale e flangia e colonna

Resistenza a trazione di un bullone

$$F_{t,Rd} = (k_2 * f_{ub} * A_s) / \gamma_{M2} = (0.90 * 800.00 [MPa] * 2.45 [cm^2]) / 1.25 = 141.12 [kN]$$

Area della sezione di taglio del bullone

$$A = A_s = 2.45 [cm^2]$$

Resistenza al taglio del bullone in una superficie

$$F_{v,Rd} = (\alpha_v * m * f_{ub} * A) / \gamma_{M2} = (0.60 * 1 * 800.00 [MPa] * 2.45 [cm^2]) / 1.25 = 94.08 [kN]$$

Resistenza a punzonatura per taglio di un bullone

$$B_{p,Rd} = (0.6 * \pi * d_m * t_p * f_{up}) / \gamma_{M2} = (0.6 * \pi * 31.77 [mm] * 20.00 [mm] * 490.00 [MPa]) / 1.25 = 469.42 [kN]$$

Zona tesa

FILA BULLONI 1

Flangia della colonna in flessione

Parametri geometrici

Distanza bullone da anima colonna

$$m_{fc} = 0.5 * (w - t_{wc} - 0.8 * r_c) = 0.5 * (150.00 [mm] - 13.00 [mm] - 0.8 * 27.00 [mm]) = 46.90 [mm]$$

Distanza min

$$e_{min} = 75.00 [mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 * m_{fc}) = \min(75.00 [mm]; 1.25 * 46.90 [mm]) = 58.63 [mm]$$

parametro di calcolo

$$m_2 = p_1 + e_1 - e_{p1} - t_{fb} - 0.8 * a_f * \sqrt{2} = 430.00 [mm] + 50.00 [mm] - 150.00 [mm] - 25.00 [mm] - 0.8 * 7.00 [mm] * \sqrt{2} = 94.34 [mm]$$

$$\lambda_1 = m_{fc} / (m_{fc} + e_{fc}) = 46.90 [mm] / (46.90 [mm] + 75.00 [mm]) = 0.38$$

$$\lambda_2 = m_2 / (m_{fc} + e_{fc}) = 94.34 [mm] / (46.90 [mm] + 75.00 [mm]) = 0.77$$

$$\alpha = 6.15$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{fc} = 2 \cdot \pi \cdot 46.90 [mm] = 294.68 [mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = \alpha \cdot m_{fc} = 6.15 \cdot 46.90 [mm] = 288.49 [mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 288.49 [mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 288.49 [mm]$$

Modello 1: Cedimento completo della flangia colonna

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_{fc}^2 \cdot f_{yc}) / \gamma_{M0} = (0.25 \cdot 288.49 [mm] \cdot (25.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 16.00 [kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{fc} = 4 \cdot 16.00 [kNm] / 46.90 [mm] = 1364.79 [kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 27.70 [mm] = 9.25 [mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{fc} \cdot n - e_w \cdot (m_{fc} + n)] = [(8 \cdot 58.63 [mm] - 2 \cdot 9.25 [mm]) \cdot 16.00 [kNm]] / [2 \cdot 46.90 [mm] \cdot 58.63 [mm] - 9.25 [mm] \cdot (46.90 [mm] + 58.63 [mm])] = 1593.88 [kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (1364.79 [kN]; 1593.88 [kN]) = 1364.79 [kN]$$

Modello 2: Rottura bullone con cedimento della flangia colonna

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_{fc}^2 \cdot f_{yc}) / \gamma_{M0} = (0.25 \cdot 288.49 [mm] \cdot (25.00 [mm])^2 \cdot 355.00 [MPa]) / 1.00 = 16.00 [kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{fc} + n) = (2 \cdot 16.00 [kNm] + 58.63 [mm] \cdot 2 \cdot 141.12 [kN]) / (46.90 [mm] + 58.63 [mm]) = 460.09 [kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 141.12 [kN] = 282.24 [kN]$$

Componente di resistenza

$$F_{t,fc,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (1364.79 [kN]; 460.09 [kN]; 282.24 [kN]) = 282.24 [kN]$$

Anima colonna in tensione trasversale

Area di taglio della colonna

$$A_{wc} = A_c - 2 \cdot b_{fc} \cdot t_{fc} + (t_{wc} + r_c) \cdot t_{fc} = 226.46 [cm^2] - 2 \cdot 300.00 [mm] \cdot 25.00 [mm] + (13.00 [mm] + 27.00 [mm]) \cdot 25.00 [mm] = 93.21 [cm^2]$$

Larghezza effettiva dell'anima colonna in tensione

$$b_{eff,t,wc} = l_{eff,1(1)} = 288.49 [mm]$$

Fattore di riduzione

$$\omega = 1/\sqrt{1+1.3*((b_{eff,t,wc}*t_{wc})/A_{vc})^2} = 1/\sqrt{1+1.3*((288.49*13.00[mm])/93.21[cm^2])^2} = 0.91$$

$$F_{t,wc,Rd,st} = ((b_{fc}-t_{wc})*t_s*f_{y,s})/\gamma_{M0} = (300.00[mm]*13.00[mm]*10.00[mm]*355.00[MPa])/1.00 = 1018.85[kN]$$

Resistenza di progetto dell'anima colonna soggetta a tensione trasversale

$$F_{t,wc,Rd(1)} = (\omega*b_{eff,t,wc}*t_{wc}*f_{y,wc})/\gamma_{M0} + F_{t,wc,Rd,st} = (0.91*288.49[mm]*13.00[mm]*355.00[MPa])/1.00 + 1018.85[kN] = 2228.96[kN]$$

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 75.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5*(w-t_{wb}-0.8*\sqrt{2}*a_w) = 0.5*(150.00[mm]-7.50[mm]-0.8*\sqrt{2}*4.00[mm]) = 66.72[mm]$$

Distanza bullone da flangia trave

$$m_x = e_{p1}-e_1-0.8*a_f*\sqrt{2} = 150.00[mm]-50.00[mm]-0.8*7.00[mm]*\sqrt{2} = 92.08[mm]$$

Distanza bullone dal bordo orizzontale esterno della piastra

$$e_x = e_1 = 50.00[mm]$$

Distanza \min

$$e_{min} = \min(e_x; e_{ep}) = \min(50.00[mm]; 75.00[mm]) = 50.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25*m_{ep}) = \min(50.00[mm]; 1.25*66.72[mm]) = 50.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp,1} = 2*\pi*m_x = 2*\pi*92.08[mm] = 578.56[mm]$$

$$l_{eff,cp,2} = \pi*m_x+w = \pi*92.08[mm]+150.00[mm] = 439.28[mm]$$

$$l_{eff,cp,3} = \pi*m_x+2*e = \pi*92.08[mm]+2*75.00[mm] = 439.28[mm]$$

$$l_{eff,cp} = \min(l_{eff,cp,1}; l_{eff,cp,2}; l_{eff,cp,3}) = \min(578.56[mm]; 439.28[mm]; 439.28[mm]) = 439.28[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc,1} = 4*m_x+1.25*e_x = 4*92.08[mm]+1.25*50.00[mm] = 430.82[mm]$$

$$l_{eff,nc,2} = e+2*m_x+0.625*e_x = 75.00[mm]+2*92.08[mm]+0.625*50.00[mm] = 290.41[mm]$$

$$l_{eff,nc,3} = 0.5*b_p = 0.5*300.00[mm] = 150.00[mm]$$

$$l_{eff,nc,4} = 0.5*w+2*m_x+0.625*e_x = 0.5*150.00[mm]+2*92.08[mm]+0.625*50.00[mm] = 290.41[mm]$$

$$l_{eff,nc} = \min(l_{eff,nc,1}; l_{eff,nc,2}; l_{eff,nc,3}; l_{eff,nc,4}) = \min(430.82[mm]; 290.41[mm]; 150.00[mm]; 290.41[mm]) = 150.00[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 150.00[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 150.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot I_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 150.00[mm] \cdot (20.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 5.32[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_x = 4 \cdot 5.32[kNm] / 92.08[mm] = 231.32[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 27.70[mm] = 9.25[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_x \cdot n - e_w \cdot (m_x + n)] = [(8 \cdot 50.00[mm] - 2 \cdot 9.25[mm]) \cdot 5.32[kNm]] / [2 \cdot 92.08[mm] \cdot 50.00[mm] - 9.25[mm] \cdot (92.08[mm] + 50.00[mm])] = 257.35[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (231.32[kN]; 257.35[kN]) = 231.32[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot I_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 150.00[mm] \cdot (20.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 5.32[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_x + n) = (2 \cdot 5.32[kNm] + 50.00[mm] \cdot 2 \cdot 141.12[kN]) / (92.08[mm] + 50.00[mm]) = 174.28[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 141.12[kN] = 282.24[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (231.32[kN]; 174.28[kN]; 282.24[kN]) = 174.28[kN]$$

Resistenza riga di bulloni 1

FILA BULLONI 2

Flangia della colonna in flessione

Parametri geometrici

Distanza bullone da anima colonna

$$m_{fc} = 0.5 \cdot (w - t_{wc} - 0.8 \cdot r_c) = 0.5 \cdot (150.00[mm] - 13.00[mm] - 0.8 \cdot 27.00[mm]) = 46.90[mm]$$

Distanza min

$$e_{min} = 75.00[mm]$$

parametro di calcolo n

$$n = \min(e_{min}; 1.25 \cdot m_{fc}) = \min(75.00[mm]; 1.25 \cdot 46.90[mm]) = 58.63[mm]$$

parametro di calcolo

$$m_2 = p_1 + e_1 - e_{p1} - t_{fb} - 0.8 \cdot a_f \cdot \sqrt{2} = 430.00[mm] + 50.00[mm] - 150.00[mm] - 25.00[mm] - 0.8 \cdot 7.00[mm] \cdot \sqrt{2} = 324.34[mm]$$

$$\lambda_1 = m_{fc} / (m_{fc} + e_{fc}) = 46.90[mm] / (46.90[mm] + 75.00[mm]) = 0.38$$

$$\lambda_2 = m_2 / (m_{fc} + e_{fc}) = 324.34[mm] / (46.90[mm] + 75.00[mm]) = 2.66$$

$$\alpha = 5.98$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp} = 2 \cdot \pi \cdot m_{fc} = 2 \cdot \pi \cdot 46.90[mm] = 294.68[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc} = \alpha \cdot m_{fc} = 5.98 \cdot 46.90[mm] = 280.32[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 280.32[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 280.32[mm]$$

Modello 1: Cedimento completo della flangia colonna

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_{fc}^2 \cdot f_{yc}) / \gamma_{M0} = (0.25 \cdot 280.32[mm] \cdot (25.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 15.55[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd}) / m_{fc} = 4 \cdot 15.55[kNm] / 46.90[mm] = 1326.12[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 27.70[mm] = 9.25[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_{fc} \cdot n - e_w \cdot (m_{fc} + n)] = [(8 \cdot 58.63[mm] - 2 \cdot 9.25[mm]) \cdot 15.55[kNm]] / [2 \cdot 46.90[mm] \cdot 58.63[mm] - 9.25[mm] \cdot (46.90[mm] + 58.63[mm])] = 1548.72[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (1326.12[kN]; 1548.72[kN]) = 1326.12[kN]$$

Modello 2: Rottura bullone con cedimento della flangia colonna

$$M_{pl,2,Rd} = (0.25 \cdot l_{eff,2} \cdot t_{fc}^2 \cdot f_{yc}) / \gamma_{M0} = (0.25 \cdot 280.32[mm] \cdot (25.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 15.55[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_{fc} + n) = (2 \cdot 15.55[kNm] + 58.63[mm] \cdot 2 \cdot 141.12[kN]) / (46.90[mm] + 58.63[mm]) = 451.49[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 141.12[kN] = 282.24[kN]$$

Componente di resistenza

$$F_{t,fc,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (1326.12[kN]; 451.49[kN]; 282.24[kN]) = 282.24[kN]$$

Anima colonna in tensione trasversale

Area di taglio della colonna

$$A_{vc} = A_c - 2 \cdot b_{fc} \cdot t_{fc} + (t_{wc} + r_c) \cdot t_{fc} = 226.46[cm^2] - 2 \cdot 300.00[mm] \cdot 25.00[mm] + (13.00[mm] + 27.00[mm]) \cdot 25.00[mm] = 93.21[cm^2]$$

Larghezza effettiva dell'anima colonna in tensione

$$b_{eff,t,wc} = l_{eff,1(2)} = 280.32[mm]$$

Fattore di riduzione

$$\omega = 1 / \sqrt{1 + 1.3 \cdot ((b_{eff,t,wc} \cdot t_{wc}) / A_{vc})^2} = 1 / \sqrt{1 + 1.3 \cdot ((280.32 \cdot 13.00[mm]) / 93.21[cm^2])^2} = 0.91$$

$$F_{t,wc,Rd,st} = ((b_{fc} - t_{wc}) \cdot t_s \cdot f_{y,s}) / \gamma_{M0} = (300.00[mm] \cdot 13.00[mm] \cdot 10.00[mm] \cdot 355.00[MPa]) / 1.00 = 1018.85[kN]$$

Resistenza di progetto dell'anima colonna soggetta a tensione trasversale

$$F_{t,wc,Rd(2)} = (\omega \cdot b_{eff,t,wc} \cdot t_{wc} \cdot f_{y,wc}) / \gamma_{M0} + F_{t,wc,Rd,st} = (0.91 \cdot 280.32[mm] \cdot 13.00[mm] \cdot 355.00[MPa]) / 1.00 + 1018.85[kN] = 2200.43[kN]$$

Piastra terminale in flessione

Parametri geometrici

Distanza bullone da bordo esterno

$$e_{ep} = 75.00[mm]$$

Distanza bullone da anima trave

$$m_{ep} = 0.5 \cdot (w - t_{wb} - 0.8 \cdot \sqrt{2} \cdot a_w) = 0.5 \cdot (150.00[mm] - 7.50[mm] - 0.8 \cdot \sqrt{2} \cdot 4.00[mm]) = 66.72[mm]$$

Distanza bullone da flangia trave

$$m_x = e_{p1} - e_1 - 0.8 \cdot a_f \cdot \sqrt{2} = 150.00[mm] - 50.00[mm] - 0.8 \cdot 7.00[mm] \cdot \sqrt{2} = 92.08[mm]$$

Distanza bullone dal bordo orizzontale esterno della piastra

$$e_x = e_1 = 50.00[mm]$$

Distanza \min

$$e_{\min} = \min(e_x; e_{ep}) = \min(50.00[mm]; 75.00[mm]) = 50.00[mm]$$

parametro di calcolo n

$$n = \min(e_{\min}; 1.25 \cdot m_{ep}) = \min(50.00[mm]; 1.25 \cdot 66.72[mm]) = 50.00[mm]$$

Lunghezza effettiva di un bullone a forma circolare

$$l_{eff,cp,1} = 2 \cdot \pi \cdot m_x = 2 \cdot \pi \cdot 92.08[mm] = 578.56[mm]$$

$$l_{eff,cp,2} = \pi \cdot m_x + w = \pi \cdot 92.08[mm] + 150.00[mm] = 439.28[mm]$$

$$l_{eff,cp,3} = \pi \cdot m_x + 2 \cdot e = \pi \cdot 92.08[mm] + 2 \cdot 75.00[mm] = 439.28[mm]$$

$$l_{eff,cp} = \min(l_{eff,cp,1}; l_{eff,cp,2}; l_{eff,cp,3}) = \min(578.56[mm]; 439.28[mm]; 439.28[mm]) = 439.28[mm]$$

Lunghezza effettiva per un bullone a forma non circolare

$$l_{eff,nc,1} = 4 \cdot m_x + 1.25 \cdot e_x = 4 \cdot 92.08[mm] + 1.25 \cdot 50.00[mm] = 430.82[mm]$$

$$l_{eff,nc,2} = e + 2 \cdot m_x + 0.625 \cdot e_x = 75.00[mm] + 2 \cdot 92.08[mm] + 0.625 \cdot 50.00[mm] = 290.41[mm]$$

$$l_{eff,nc,3} = 0.5 \cdot b_p = 0.5 \cdot 300.00[mm] = 150.00[mm]$$

$$l_{eff,nc,4} = 0.5 \cdot w + 2 \cdot m_x + 0.625 \cdot e_x = 0.5 \cdot 150.00[mm] + 2 \cdot 92.08[mm] + 0.625 \cdot 50.00[mm] = 290.41[mm]$$

$$l_{eff,nc} = \min(l_{eff,nc,1}; l_{eff,nc,2}; l_{eff,nc,3}; l_{eff,nc,4}) = \min(430.82[mm]; 290.41[mm]; 150.00[mm]; 290.41[mm]) = 150.00[mm]$$

Lunghezza effettiva per un bullone modo 1

$$l_{eff,1} = \min(l_{eff,cp}; l_{eff,nc}) = 150.00[mm]$$

Lunghezza effettiva per un bullone modo 2

$$l_{eff,2} = l_{eff,nc} = 150.00[mm]$$

Modello 1: Cedimento completo della piastra terminale

$$M_{pl,1,Rd} = (0.25 \cdot l_{eff,1} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 150.00[mm] \cdot (20.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 5.32[kNm]$$

Metodo 1

$$F_{T,1,Rd1} = (4 \cdot M_{pl,1,Rd})/m_x = 4 \cdot 5.32[kNm]/92.08[mm] = 231.32[kN]$$

Metodo 2 (metodo alternativo)

Parametri per la zona d'appoggio

$$e_w = 0.25 \cdot d_w = 0.25 \cdot 27.70[mm] = 9.25[mm]$$

$$F_{T,1,Rd2} = [(8 \cdot n - 2 \cdot e_w) \cdot M_{pl,1,Rd}] / [2 \cdot m_x \cdot n - e_w \cdot (m_x + n)] = [(8 \cdot 50.00[mm] - 2 \cdot 9.25[mm]) \cdot 5.32[kNm]] / [2 \cdot 92.08[mm] \cdot 50.00[mm] - 9.25[mm] \cdot (92.08[mm] + 50.00[mm])] = 257.35[kN]$$

$$F_{T,1,Rd} = \min(F_{T,1,Rd1}; F_{T,1,Rd2}) = (231.32[kN]; 257.35[kN]) = 231.32[kN]$$

Modello 2: Rottura bullone con cedimento della piastra terminale

$$M_{pl,2,Rd} = (0.25 \cdot I_{eff,2} \cdot t_p^2 \cdot f_{yp}) / \gamma_{M0} = (0.25 \cdot 150.00[mm] \cdot (20.00[mm])^2 \cdot 355.00[MPa]) / 1.00 = 5.32[kNm]$$

$$F_{T,2,Rd} = (2 \cdot M_{pl,2,Rd} + n \cdot \Sigma F_{t,Rd}) / (m_x + n) = (2 \cdot 5.32[kNm] + 50.00[mm] \cdot 2 \cdot 141.12[kN]) / (92.08[mm] + 50.00[mm]) = 174.28[kN]$$

Modello 3: Rottura bullone

$$F_{T,3,Rd} = \Sigma F_{t,Rd} = 2 \cdot 141.12[kN] = 282.24[kN]$$

Componente di resistenza

$$F_{t,ep,Rd(1)} = \min(F_{T,1,Rd}; F_{T,2,Rd}; F_{T,3,Rd}) = (231.32[kN]; 174.28[kN]; 282.24[kN]) = 174.28[kN]$$

Resistenza riga di bulloni 2

Resistenza a taglio

Forza di taglio

$$V_0 = -N_{b1,Ed} \cdot \sin(\alpha) + V_{b1,Ed} \cdot \cos(\alpha) = -(0.00[kN]) \cdot \sin(0.00[Deg]) + 55.00[kN] \cdot \cos(0.00[Deg]) = 55.00[kN]$$

FILA BULLONI 1

Bullone di supporto sulla flangia della colonna

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{uc}; e_1/d_0) = \min(1.0; 800.00[MPa]/490.00[MPa]; \infty/22.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8 \cdot e_2/d_0) = \min(2.5; 2.8 \cdot 75.00[mm]/22.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rd1c} = k_1 \cdot \alpha_b \cdot f_{uc} \cdot d \cdot t_{fc} = 2.50 \cdot 1.00 \cdot 490.00[MPa] \cdot 20.00[mm] \cdot 25.00[mm] = 490.00[kN]$$

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; e_1/d_0) = \min(1.0; 800.00[MPa]/355.00[MPa]; 50.00[mm]/22.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8 \cdot e_2/d_0) = \min(2.5; 2.8 \cdot 75.00[mm]/22.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rdep} = k_1 \cdot \alpha_b \cdot f_{up} \cdot d \cdot t_p = 2.50 \cdot 1.00 \cdot 355.00[MPa] \cdot 20.00[mm] \cdot 20.00[mm] = 392.00[kN]$$

Resistenza riga di bulloni 1

$$V_{Rd(1)} = m_1 \cdot \min(F_{b,Rdfc}; F_{b,Rdep}; F_{v,Rd}) = 2 \cdot \min(490.00[kN]; 392.00[kN]; 94.08[kN]) = 188.16[kN]$$

FILA BULLONI 2

Bullone di supporto sulla flangia della colonna

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{uc}; e_1/d_0) = \min(1.0; 800.00[MPa]/490.00[MPa]; \infty/22.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8 \cdot e_2/d_0) = \min(2.5; 2.8 \cdot 75.00[mm]/22.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rdfc} = k_1 \cdot \alpha_b \cdot f_{uc} \cdot d \cdot t_{fc} = 2.50 \cdot 1.00 \cdot 490.00[MPa] \cdot 20.00[mm] \cdot 25.00[mm] = 490.00[kN]$$

Bullone di supporto sulla piastra

Coefficiente determinato dalla spaziatura bulloni

$$\alpha_{ep} = \min(1.0; f_{ub}/f_{up}; e_1/d_0) = \min(1.0; 800.00[MPa]/355.00[MPa]; 50.00[mm]/22.00[mm]) = 1.00$$

Coefficiente determinato dalla spaziatura bulloni

$$k_1 = \min(2.5; 2.8 \cdot e_2/d_0) = \min(2.5; 2.8 \cdot 75.00[mm]/22.00[mm]) = 2.50$$

Resistenza del bullone di supporto

$$F_{b,Rdep} = k_1 \cdot \alpha_b \cdot f_{up} \cdot d \cdot t_p = 2.50 \cdot 1.00 \cdot 355.00[MPa] \cdot 20.00[mm] \cdot 20.00[mm] = 392.00[kN]$$

Resistenza riga di bulloni 2

$$V_{Rd(2)} = m_2 \cdot \min(F_{b,Rdfc}; F_{b,Rdep}; F_{v,Rd}) = 2 \cdot \min(490.00[kN]; 392.00[kN]; 94.08[kN]) = 188.16[kN]$$

$$V_{j,Rd} = V_{Rd(1)} + V_{Rd(2)} = 188.16[kN] + 188.16[kN] = 376.32[kN]$$

$$|V_0|/V_{j,Rd} \leq 1$$

$$|55.00[kN]| < 376.32[kN]$$

$$0.15$$



Saldature dell'angolare che collegano trave e piastra frontale

Forze nelle saldature

Forza assiale

$$N_0 = N_{b1,Ed} \cdot \cos(\alpha) + V_{b1,Ed} \cdot \sin(\alpha) = 0.00[kN] \cdot \cos(0.00[Deg]) + 55.00[kN] \cdot \sin(0.00[Deg]) = 0.00[kN]$$

Forza di taglio

$$V_0 = -N_{b1,Ed} \cdot \sin(\alpha) + V_{b1,Ed} \cdot \cos(\alpha) = -(0.00[kN]) \cdot \sin(0.00[Deg]) + 55.00[kN] \cdot \cos(0.00[Deg]) = 55.00[kN]$$

Momento flettente reale

$$M_0 = M_{b1,Ed} = 0.00[kNm]$$

Proprietà geometriche delle saldature

Trave

Area saldature orizzontali sulla flangia superiore

$$A_{wfu} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [240.00[mm] + (240.00[mm] - 7.50[mm] - 2 \cdot 21.00[mm])] \cdot 7.00[mm] = 30.14[cm^2]$$

Area saldature orizzontali sulla flangia inferiore

$$A_{wfl} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [240.00[mm] + (240.00[mm] - 7.50[mm] - 2 \cdot 21.00[mm])] \cdot 7.00[mm] = 30.14[cm^2]$$

Area delle saldature verticali

$$A_{ww} = 2 \cdot [(h_b - 2 \cdot (t_{fb} - r_b)) / \cos(\alpha)] \cdot a_w = 2 \cdot [(230.00[mm] - 2 \cdot (12.00[mm] - 21.00[mm])) / \cos(0.00[Deg])] \cdot 4.00[mm] = 13.12[cm^2]$$

Area di tutte le saldature

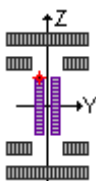
$$A_w = A_{wfu} + A_{wfl} + A_{ww} = 30.14[cm^2] + 30.14[cm^2] + 13.12[cm^2] = 73.39[cm^2]$$

Distanza tra baricentro saldature e baricentro trave

$$e_{0w} = 0.00[mm]$$

Momento d'inerzia saldature

$$I_w = 7655.12[cm^4]$$

Punto in cui le sollecitazioni vengono controllate	$z_i = 82.00[mm]$
Modulo elastico delle saldature	
$W_w = 933.55[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 0.00[kN] / 73.39[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (0.00[kNm] \cdot 82.00[mm]) / 7655.12[cm^4] = 0.00[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + 0.00[MPa] = 0.00[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = 0.00[MPa] / \sqrt{2} = 0.00[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = 0.00[MPa] / \sqrt{2} = 0.00[MPa]$	
Sforzo tangente parallelo	
$\tau_{ } = V_0 / A_{ww} = 55.00[kN] / 13.12[cm^2] = 41.92[MPa]$	

Coefficiente di resistenza saldature

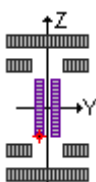
$$\beta_w = 1.00$$

$$\sqrt{3 \cdot (\tau_{||}^2)} \leq f_u / (\beta_w \cdot \gamma_{M2})$$

$$72.61[MPa] < 288.00[MPa]$$

0.25



Punto in cui le sollecitazioni vengono controllate	$z_i = -82.00[mm]$
Modulo elastico delle saldature	
$W_w = 933.55[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 0.00[kN] / 73.39[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (0.00[kNm] \cdot (-82.00[mm])) / 7655.12[cm^4] = 0.00[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + 0.00[MPa] = 0.00[MPa]$	

Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = 0.00[MPa]/\sqrt{2} = 0.00[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = 0.00[MPa]/\sqrt{2} = 0.00[MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0/A_{ww} = 55.00[kN]/13.12[cm^2] = 41.92[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 1.00$$

$$\sqrt{[3*(\tau_{\parallel}^2)]} \leq f_u/(\beta_w*\gamma_{M2})$$

$$72.61[MPa] < 288.00[MPa]$$

0.25



Rigidezza di rotazione del giunto

Pannello d'anima della colonna soggetto a taglio

$$k_1 = (0.385*A_{vc})/(\beta*h) = (0.385*93.21[cm^2])/(1.00*230.00[mm]) = 16.25[mm]$$

Anima colonna in compressione trasversale

$$k_2 = \infty$$

Lunghezza di allungamento del bullone

$$L_b = t_p + t_{fc} + 0.5*(m+k) + t_{wa} = 20.00[mm] + 25.00[mm] + 0.5*(19.00[mm] + 12.50[mm]) + 3.00[mm] = 66.75[mm]$$

Tensione bullone

$$k_{10} = (3.2*A_s)/L_b = (3.2*2.45[cm^2])/66.75[mm] = 5.87[mm]$$

Profondità anima della colonna

$$d_c = h_c - 2*(t_{fc} + r_c) = 590.00[mm] - 2*(25.00[mm] + 27.00[mm]) = 932.78[mm]$$

Righe 1

Anima colonna in tensione trasversale

$$k_{3(1)} = (0.7*b_{eff,wc,t}*t_{wc})/d_c = (0.7*288.49[mm]*13.00[mm])/932.78[mm] = 5.40[mm]$$

Flangia della colonna in flessione

$$k_{4(1)} = (0.9*I_{eff,fc,t}*t_{fc}^3)/m^3 = (0.9*288.49[mm]*25.00[mm]^3)/46.90[mm]^3 = 39.33[mm]$$

Piastra terminale in flessione

$$k_{5(1)} = (0.9*I_{eff}^*t_p^3)/m_x^3 = (0.9*150.00[mm]*20.00[mm]^3)/92.08[mm]^3 = 3.64[mm]$$

$$k_{eff(1)} = 1/(1/k_{3(1)} + 1/k_{4(1)} + 1/k_{5(1)} + 1/k_{10}) = 1/(1/5.40[mm] + 1/39.33[mm] + 1/3.64[mm] + 1/5.87[mm]) = 1.52[mm]$$

Braccio di leva delle forze interne

$$z_{eq} = [k_{eff(1)}*h_1^2]/[k_{eff(1)}*h_1] = [1.52[mm]*324.00[mm]^2]/[1.52[mm]*324.00[mm]] = 324.00[mm]$$

Coefficiente di rigidezza equivalente

$$k_{eq} = [k_{eff(1)}*h_1]/z_{eq} = [1.52[mm]*324.00[mm]]/324.00[mm] = 1.52[mm]$$

Rigidezza di rotazione iniziale del giunto

$$S_{j,ini} = E*z_{eq}^2/(1/k_1 + 1/k_2 + 1/k_{eq}) = (205000.00[MPa]*(324.00[mm]^2)/(1/16.25[mm] + 1/\infty + 1/1.52[mm]) = 29995.40[kNm]$$

Rigidezza di rotazione del giunto chiodato

$$S_{j,\text{pin}} = (0.5 \cdot E \cdot I_{yb}) / L_b = (0.5 \cdot 205000.00 [\text{MPa}] \cdot 7763.18 [\text{cm}^4]) / 4000.00 [\text{mm}] = 1989.32 [\text{kNm}]$$

Rigidezza di rotazione del giunto rigido

$$S_{j,\text{rig}} = (0.5 \cdot E \cdot I_{yb}) / L_b = (0.5 \cdot 205000.00 [\text{MPa}] \cdot 7763.18 [\text{cm}^4]) / 4000.00 [\text{mm}] = 99465.79 [\text{kNm}]$$

Scala di rigidezza

$$\mu = 1.00$$

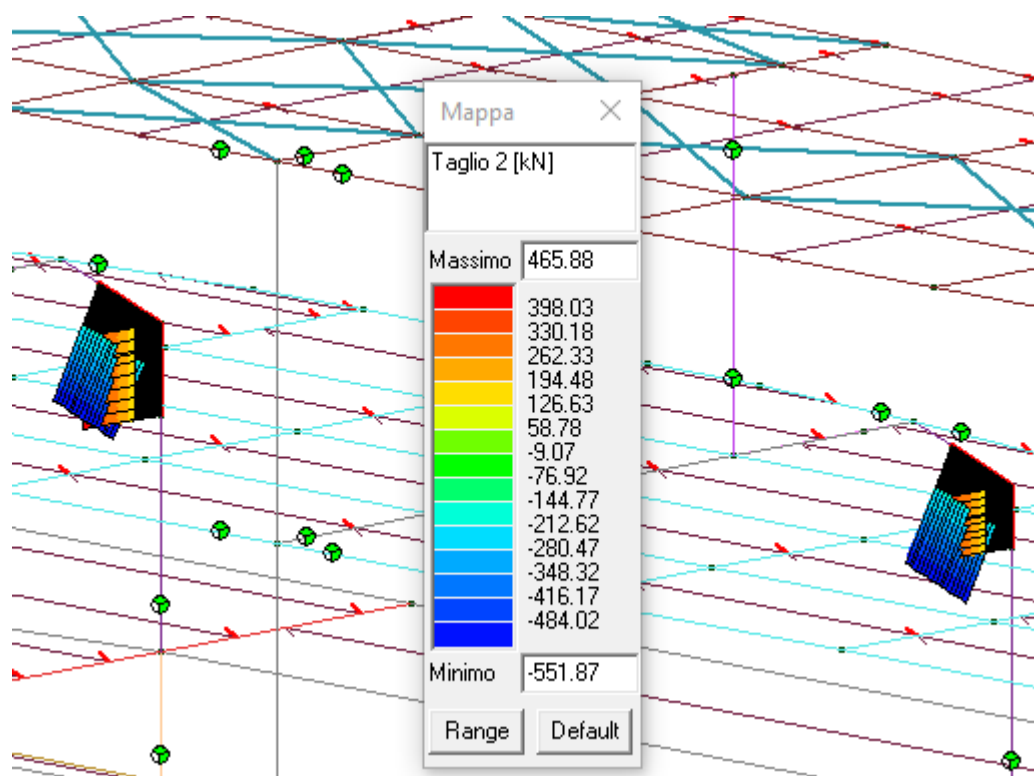
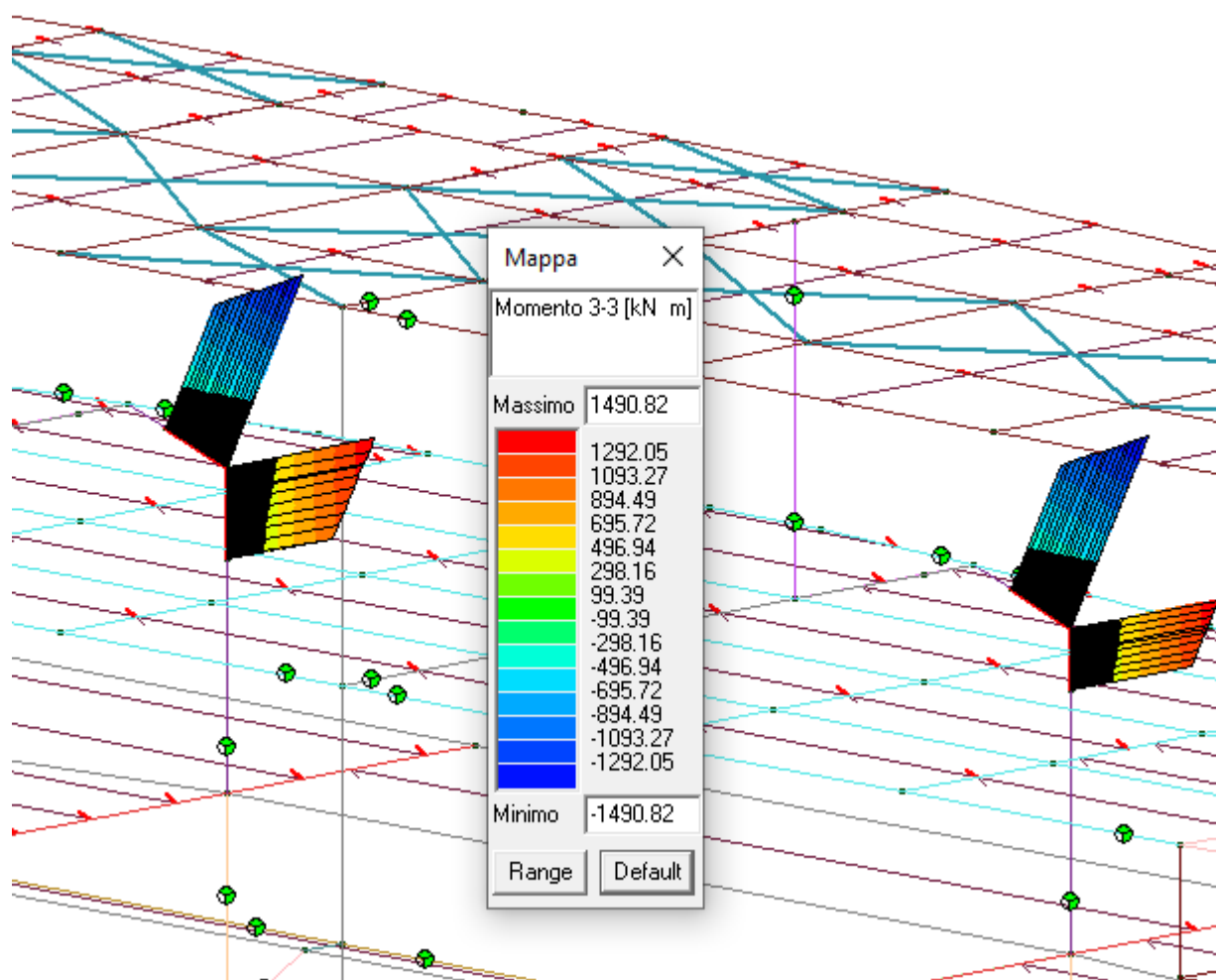
Rigidezza di rotazione del giunto

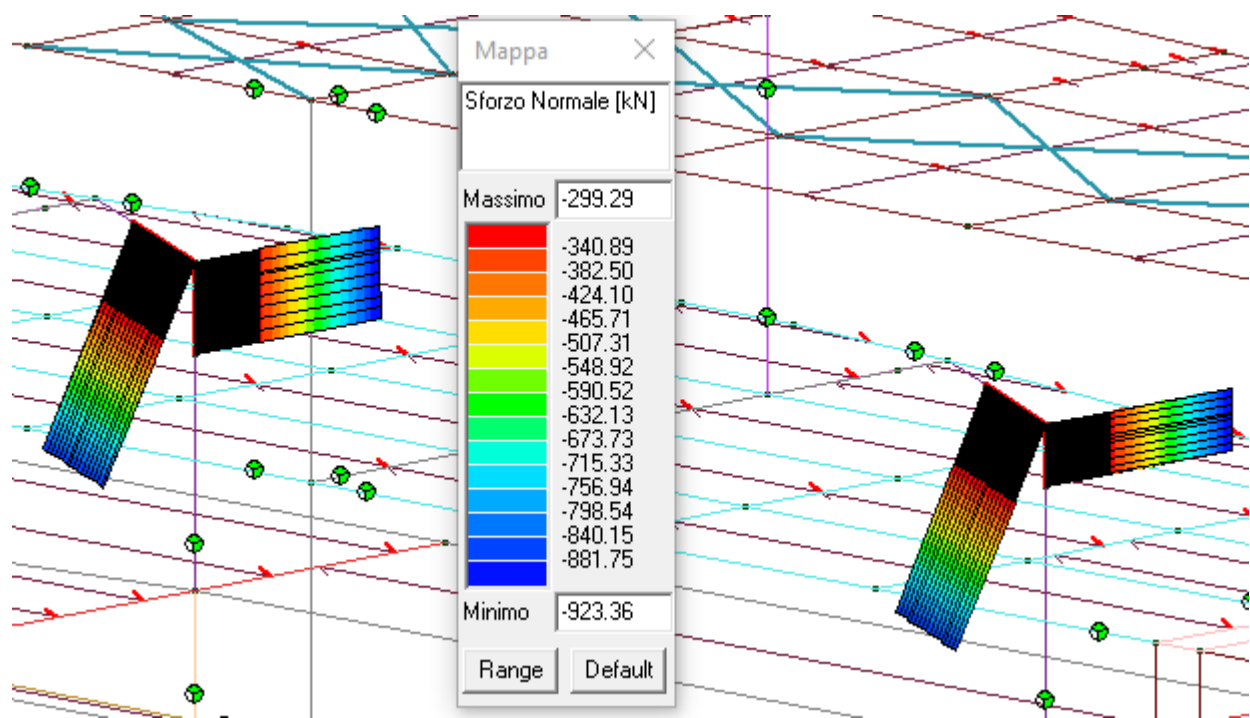
$$S_j = S_{j,\text{ini}} / \mu = 29995.40 [\text{kNm}] / 1.00 = 29995.40 [\text{kNm}]$$



Classificazione dei giunti

Semi-rigido

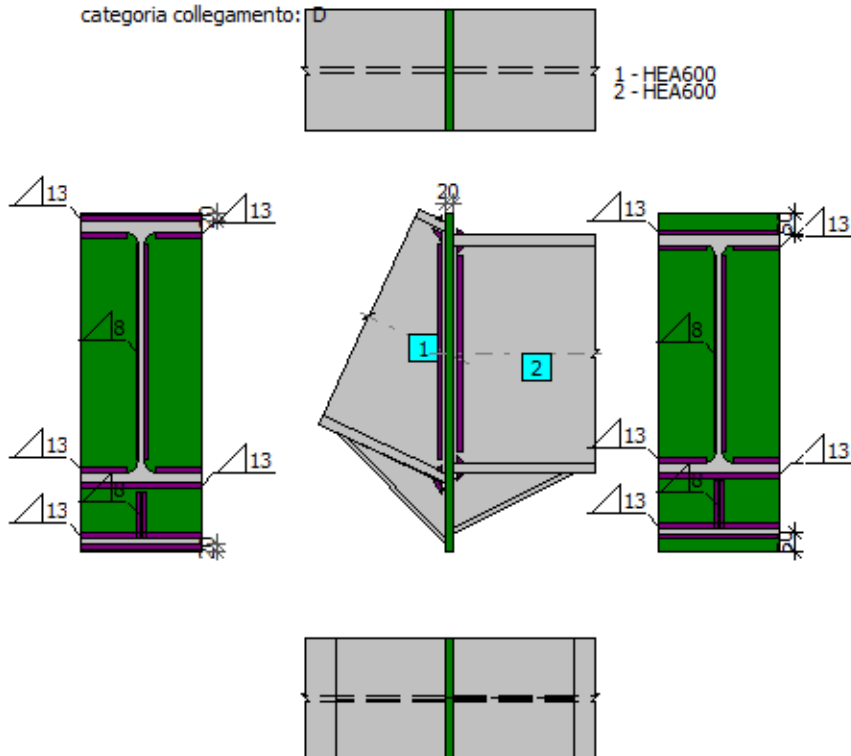
COLLEGAMENTO SALDATO HE A 600 – HEA 600







	Trave - trave (piastra frontale)	Rapporto: 0.84	
BeamsRigid v. 1.0.0.10	EN 1993-1-8:2006		

categoria collegamento: D



Dati

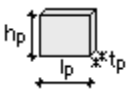
Trave sinistra HEA600					
	h_b	b_{fb}	t_{fb}	t_{wb}	R_b
	590.00[mm]	300.00[mm]	25.00[mm]	13.00[mm]	27.00[mm]
	A_b	J_{y0b}	J_{z0b}	y_{0b}	z_{0b}
	226.46[cm ²]	141208.11[cm ⁴]	11271.32[cm ⁴]	150.00[mm]	295.00[mm]
Materiale	Grado	f_y	f_u		
	S 355	355.00[MPa]	490.00[MPa]		

Trave destra HEA600					
	h_b	b_{fb}	t_{fb}	t_{wb}	R_b
	590.00[mm]	300.00[mm]	25.00[mm]	13.00[mm]	27.00[mm]
	A_b	J_{y0b}	J_{z0b}	y_{0b}	z_{0b}
	226.46[cm ²]	141208.11[cm ⁴]	11271.32[cm ⁴]	150.00[mm]	295.00[mm]
Materiale	Grado	f_y	f_u		
	S 355	355.00[MPa]	490.00[MPa]		

Staffa sinistra inferiore						
	l_{bl}	h_{bl}	t_{wbl}	b_{fbl}	t_{fbl}	tr_{fbl}

	300.00[mm]	150.00[mm]	6.60[mm]	300.00[mm]	10.20[mm]	10.20[mm]
Materiale	Grado	f_y	f_u			
	S 355	355.00[MPa]	490.00[MPa]			

Staffa destra inferiore						
	l_{bi}	h_{bi}	t_{wbi}	b_{fbi}	t_{fbi}	t_{rfbi}
	300.00[mm]	150.00[mm]	6.60[mm]	300.00[mm]	10.20[mm]	10.20[mm]
Materiale	Grado	f_y	f_u			
	S 355	355.00[MPa]	490.00[MPa]			

Piastra frontale			
	l_p	h_p	t_p
	300.00[mm]	780.00[mm]	20.00[mm]
Materiale	Grado	f_y	f_u
	S 355	355.00[MPa]	490.00[MPa]

Saldature

Lato sinistro

Spessore saldature dell'angolare che collegano flange trave e piastra frontale $a_f = 13.00 \text{ [mm]}$

Spessore saldature dell'angolare che collegano anima trave e piastra frontale $a_w = 8.00 \text{ [mm]}$

Spessore saldature dell'angolare che collegano flangia staffa inferiore e piastra frontale $a_{fi} = 13.00 \text{ [mm]}$

Spessore saldature dell'angolare che collegano anima staffa inferiore e piastra frontale $a_{wi} = 8.00 \text{ [mm]}$

Lato destro

Spessore saldature dell'angolare che collegano flange trave e piastra frontale $a_f = 13.00 \text{ [mm]}$

Spessore saldature dell'angolare che collegano anima trave e piastra frontale $a_w = 8.00 \text{ [mm]}$

Spessore saldature dell'angolare che collegano flangia staffa inferiore e piastra frontale $a_{fi} = 13.00 \text{ [mm]}$

Spessore saldature dell'angolare che collegano anima staffa inferiore e piastra frontale $a_{wi} = 8.00 \text{ [mm]}$

Forze

Forza assiale $N_{b1,Ed} = 0.00 \text{ [kN]}$

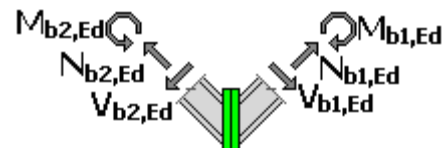
Forza di taglio $V_{b1,Ed} = 552.00 \text{ [kN]}$

Momento flettente $M_{b1,Ed} = 1491.00 \text{ [kNm]}$

Forza assiale $N_{b2,Ed} = 0.00 \text{ [kN]}$

Forza di taglio $V_{b2,Ed} = 552.00 \text{ [kN]}$

Momento flettente $M_{b2,Ed} = 1491.00 \text{ [kNm]}$



Risultati

Lato sinistro

Saldature dell'angolare che collegano trave e piastra frontale

Forze nelle saldature

Forza assiale

$$N_0 = N_{b2,Ed} \cdot \cos(\alpha_1) + V_{b2,Ed} \cdot \sin(\alpha_1) = 0.00[kN] \cdot \cos(0.00[Deg]) + 552.00[kN] \cdot \sin(0.00[Deg]) = 0.00[kN]$$

Forza di taglio

$$V_0 = -N_{b2,Ed} \cdot \sin(\alpha_1) + V_{b2,Ed} \cdot \cos(\alpha_1) = -(0.00[kN]) \cdot \sin(0.00[Deg]) + 552.00[kN] \cdot \cos(0.00[Deg]) = 552.00[kN]$$

Momento flettente reale

$$M_0 = M_{b2,Ed} = 1491.00[kNm]$$

Proprietà geometriche delle saldature

Trave

Area saldature orizzontali sulla flangia superiore

$$A_{wfu} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2 \cdot 27.00[mm])] \cdot 13.00[mm] = 69.29[cm^2]$$

Area saldature orizzontali sulla flangia inferiore

$$A_{wfi} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2 \cdot 27.00[mm])] \cdot 13.00[mm] = 69.29[cm^2]$$

Area delle saldature verticali

$$A_{ww} = 2 \cdot [(h_b - 2 \cdot (t_{fb} - r_b)) / \cos(\alpha)] \cdot a_w = 2 \cdot [(590.00[mm] - 2 \cdot (25.00[mm] - 27.00[mm])) / \cos(0.00[Deg])] \cdot 8.00[mm] = 77.76[cm^2]$$

Fianco inferiore

Area delle saldature orizzontali

$$A_{wfi} = [b_{fi} + (b_{fi} - t_{wb})] \cdot a_f = [300.00[mm] + (300.00[mm] - 6.60[mm])] \cdot 13.00[mm] = 77.14[cm^2]$$

Area delle saldature verticali

$$A_{wwi} = 2 \cdot [h_{bi} - c_{bi} - t_{fb} / \cos(\beta_i)] \cdot a_{wi} = 2 \cdot [150.00[mm] - 20.00[mm] - 10.20[mm] / \cos(26.57[Deg])] \cdot 8.00[mm] = 18.98[cm^2]$$

Area di tutte le saldature

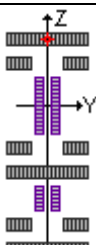
$$A_w = A_{wfu} + A_{wfi} + A_{wfi} + A_{ww} + A_{wwi} = 69.29[cm^2] + 69.29[cm^2] + 77.14[cm^2] + 77.76[cm^2] + 18.98[cm^2] = 312.46[cm^2]$$

Distanza tra baricentro saldature e baricentro trave

$$e_{0w} = -131.22[mm]$$

Momento d'inerzia saldature

$$I_w = 250383.41[cm^4]$$

Punto in cui le sollecitazioni vengono controllate	$z_i = 432.72[mm]$
Modulo elastico delle saldature	
$W_w = 5786.24[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = 0.00[kN] / 312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (1491.00[kNm] \cdot 432.72[mm]) / 250383.41[cm^4] = 257.68[MPa]$	

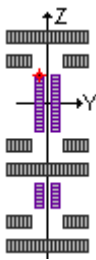
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + 257.68[MPa] = 257.68[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = 257.68[MPa]/\sqrt{2} = 182.21[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = 257.68[MPa]/\sqrt{2} = 182.21[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ 182.21[MPa] < 352.80[MPa]$	0.37	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$364.41[MPa] < 435.56[MPa]$	0.84	✓
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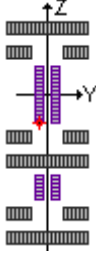
Punto in cui le sollecitazioni vengono controllate	$z_i = 374.22[mm]$
Modulo elastico delle saldature	
$W_w = 6690.77[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 0.00[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot 374.22[mm])/250383.41[cm^4] = 222.84[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + 222.84[MPa] = 222.84[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = 222.84[MPa]/\sqrt{2} = 157.57[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = 222.84[MPa]/\sqrt{2} = 157.57[MPa]$	
Sforzo tangente parallelo	
$\tau_{ } = V_0/A_{ww} = 552.00[kN]/77.76[cm^2] = 70.99[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ 157.57[MPa] < 352.80[MPa]$	0.32	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{ }^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$338.29[MPa] < 435.56[MPa]$	0.78	✓
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Punto in cui le sollecitazioni vengono controllate	$z_i = -111.78[mm]$
Modulo elastico delle saldature	
$W_w = 22400.04[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 0.00[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-111.78[mm]))/250383.41[cm^4] = -66.56[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-66.56[MPa]) = -66.56[MPa]$	
Sforzo normale perpendicolare	

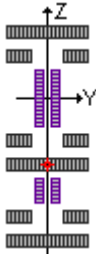
$\sigma_{\perp} = \sigma/\sqrt{2} = -66.56[MPa]/\sqrt{2} = -47.07[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -66.56[MPa]/\sqrt{2} = -47.07[MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0/A_{ww} = 552.00[kN]/77.76[cm^2] = 70.99[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -47.07[MPa] < 352.80[MPa]$	0.10	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$154.85[MPa] < 435.56[MPa]$	0.36	✓
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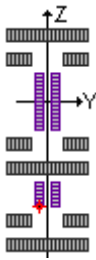
Punto in cui le sollecitazioni vengono controllate	$z_i = -170.28[mm]$
Modulo elastico delle saldature	
$W_w = 14704.38[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 0.00[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-170.28[mm]))/250383.41[cm^4] = -101.40[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-101.40[MPa]) = -101.40[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -101.40[MPa]/\sqrt{2} = -71.70[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -101.40[MPa]/\sqrt{2} = -71.70[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -71.70[MPa] < 352.80[MPa]$	0.15	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$143.40[MPa] < 435.56[MPa]$	0.33	✓
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Punto in cui le sollecitazioni vengono controllate	$z_i = -302.37[mm]$
Modulo elastico delle saldature	
$W_w = 8280.58[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 0.00[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-302.37[mm]))/250383.41[cm^4] = -180.06[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-180.06[MPa]) = -180.06[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -180.06[MPa]/\sqrt{2} = -127.32[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -180.06[MPa]/\sqrt{2} = -127.32[MPa]$	

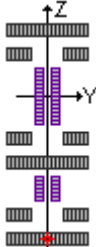
Sforzo tangente parallelo	
$\tau_{II} = V_0/A_{ww} = 552.00[kN]/77.76[cm^2] = 70.99[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -127.32[MPa] < 352.80[MPa]$	0.26	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{II}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$282.77[MPa] < 435.56[MPa]$	0.65	✓
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Punto in cui le sollecitazioni vengono controllate	$z_i = -320.28[mm]$
Modulo elastico delle saldature	
$W_w = 7817.69[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = 0.00[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-320.28[mm]))/250383.41[cm^4] = -190.72[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-190.72[MPa]) = -190.72[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = -190.72[MPa] / \sqrt{2} = -134.86[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = -190.72[MPa] / \sqrt{2} = -134.86[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -134.86[MPa] < 352.80[MPa]$	0.28	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$269.72[MPa] < 435.56[MPa]$	0.62	✓
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Lato destro

Saldature dell'angolare che collegano trave e piastra frontale

Forze nelle saldature

Forza assiale

$$N_0 = N_{b1,Ed} \cdot \cos(\alpha_2) + V_{b1,Ed} \cdot \sin(\alpha_2) = 0.00[kN] \cdot \cos(-65.00[Deg]) + 552.00[kN] \cdot \sin(-65.00[Deg]) = -500.28[kN]$$

Forza di taglio

$$V_0 = -N_{b1,Ed} \cdot \sin(\alpha_2) + V_{b1,Ed} \cdot \cos(\alpha_2) = -(0.00[kN]) \cdot \sin(-65.00[Deg]) + 552.00[kN] \cdot \cos(-65.00[Deg]) = 233.29[kN]$$

Momento flettente reale

$$M_0 = M_{b1,Ed} = 1491.00[kNm]$$

Proprietà geometriche delle saldature

Trave

Area saldature orizzontali sulla flangia superiore

$$A_{wfu} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2 \cdot 27.00[mm])] \cdot 13.00[mm] = 69.29[cm^2]$$

Area saldature orizzontali sulla flangia inferiore

$$A_{wfl} = [b_{fb} + (b_{fb} - t_{wb} - 2 \cdot r_b)] \cdot a_f = [300.00[mm] + (300.00[mm] - 13.00[mm] - 2 \cdot 27.00[mm])] \cdot 13.00[mm] = 69.29[cm^2]$$

Area delle saldature verticali

$$A_{ww} = 2 \cdot [(h_b - 2 \cdot (t_{fb} - r_b)) / \cos(\alpha)] \cdot a_w = 2 \cdot [(590.00[mm] - 2 \cdot (25.00[mm] - 27.00[mm])) / \cos(-65.00[Deg])] \cdot 8.00[mm] = 77.76[cm^2]$$

Fianco inferiore

Area delle saldature orizzontali

$$A_{wflb} = [b_{fbl} + (b_{fbl} - t_{wbl})] \cdot a_{fl} = [300.00[mm] + (300.00[mm] - 6.60[mm])] \cdot 13.00[mm] = 77.14[cm^2]$$

Area delle saldature verticali

$$A_{wwl} = 2 \cdot [h_{bl} - c_{bl} - t_{fb} / \cos(\beta_l)] \cdot a_{wl} = 2 \cdot [150.00[mm] - 20.00[mm] - 10.20[mm] / \cos(-43.87[Deg])] \cdot 8.00[mm] = 18.98[cm^2]$$

Area di tutte le saldature

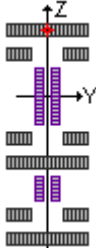
$$A_w = A_{wfu} + A_{wfl} + A_{wflb} + A_{ww} + A_{wwl} = 69.29[cm^2] + 69.29[cm^2] + 77.14[cm^2] + 77.76[cm^2] + 18.98[cm^2] = 312.46[cm^2]$$

Distanza tra baricentro saldature e baricentro trave

$$e_{0w} = -131.22[mm]$$

Momento d'inerzia saldature


$$I_w = 250383.41[cm^4]$$

Punto in cui le sollecitazioni vengono controllate	$z_i = 432.72[mm]$
Modulo elastico delle saldature	
$W_w = 5786.24[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0 / A_w = -500.28[kN] / 312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i) / I_w = (1491.00[kNm] \cdot 432.72[mm]) / 250383.41[cm^4] = 257.68[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + 257.68[MPa] = 257.68[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = 257.68[MPa] / \sqrt{2} = 182.21[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = 257.68[MPa] / \sqrt{2} = 182.21[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ 182.21[MPa] < 352.80[MPa]$	0.37	✓
$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$364.41[MPa] < 435.56[MPa]$	0.84	✓

Punto in cui le sollecitazioni vengono controllate	$z_i = 374.22[mm]$
Modulo elastico delle saldature	

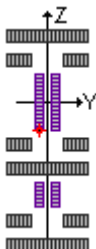
$W_w = 6690.77[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = -500.28[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot 374.22[mm])/250383.41[cm^4] = 222.84[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + 222.84[MPa] = 222.84[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = 222.84[MPa]/\sqrt{2} = 157.57[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = 222.84[MPa]/\sqrt{2} = 157.57[MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0/A_{ww} = 233.29[kN]/77.76[cm^2] = 70.99[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ 157.57[MPa] < 352.80[MPa]$	0.32	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$338.29[MPa] < 435.56[MPa]$	0.78	✓
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
Punto in cui le sollecitazioni vengono controllate	$z_i = -111.78[mm]$
Modulo elastico delle saldature	
$W_w = 22400.04[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = -500.28[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-111.78[mm]))/250383.41[cm^4] = -66.56[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-66.56[MPa]) = -66.56[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -66.56[MPa]/\sqrt{2} = -47.07[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -66.56[MPa]/\sqrt{2} = -47.07[MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0/A_{ww} = 233.29[kN]/77.76[cm^2] = 70.99[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -47.07[MPa] < 352.80[MPa]$	0.10	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$154.85[MPa] < 435.56[MPa]$	0.36	✓
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Punto in cui le sollecitazioni vengono controllate	$z_i = -170.28[mm]$
Modulo elastico delle saldature	
$W_w = 14704.38[cm^3]$	

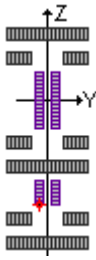
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = -500.28[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-170.28[mm]))/250383.41[cm^4] = -101.40[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-101.40[MPa]) = -101.40[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -101.40[MPa]/\sqrt{2} = -71.70[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -101.40[MPa]/\sqrt{2} = -71.70[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -71.70[MPa] < 352.80[MPa]$	0.15	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$143.40[MPa] < 435.56[MPa]$	0.33	✓
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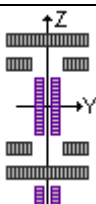
Punto in cui le sollecitazioni vengono controllate	$z_i = -302.37[mm]$
Modulo elastico delle saldature	
$W_w = 8280.58[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = -500.28[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	
$\sigma_M = (M_0 \cdot z_i)/I_w = (1491.00[kNm] \cdot (-302.37[mm]))/250383.41[cm^4] = -180.06[MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00[MPa] + (-180.06[MPa]) = -180.06[MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma/\sqrt{2} = -180.06[MPa]/\sqrt{2} = -127.32[MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma/\sqrt{2} = -180.06[MPa]/\sqrt{2} = -127.32[MPa]$	
Sforzo tangente parallelo	
$\tau_{\parallel} = V_0/A_{ww} = 233.29[kN]/77.76[cm^2] = 70.99[MPa]$	

Coefficiente di resistenza saldature

$$\beta_w = 0.90$$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -127.32[MPa] < 352.80[MPa]$	0.26	✓
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2 + \tau_{\parallel}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$282.77[MPa] < 435.56[MPa]$	0.65	✓
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Punto in cui le sollecitazioni vengono controllate	$z_i = -320.28[mm]$
Modulo elastico delle saldature	
$W_w = 7817.69[cm^3]$	
Sollecitazione da forza assiale	
$\sigma_N = N_0/A_w = -500.28[kN]/312.46[cm^2] = 0.00[MPa]$	
Sollecitazione dovuta alla flessione	

$\sigma_M = (M_0 \cdot z_i) / I_w = (1491.00 [kNm] \cdot (-320.28 [mm])) / 250383.41 [cm^4] = -190.72 [MPa]$	
Sforzo normale massimo	
$\sigma = \sigma_N + \sigma_M = 0.00 [MPa] + (-190.72 [MPa]) = -190.72 [MPa]$	
Sforzo normale perpendicolare	
$\sigma_{\perp} = \sigma / \sqrt{2} = -190.72 [MPa] / \sqrt{2} = -134.86 [MPa]$	
Sforzo tangente perpendicolare	
$\tau_{\perp} = \sigma / \sqrt{2} = -190.72 [MPa] / \sqrt{2} = -134.86 [MPa]$	

Coefficiente di resistenza salature

$\beta_w = 0.90$

$ \sigma_{\perp} \leq 0.9 \cdot f_u / \gamma_{M2}$	$ -134.86 [MPa] < 352.80 [MPa]$	0.28	
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$\sqrt{[\sigma_{\perp}^2 + 3 \cdot (\tau_{\perp}^2)]} \leq f_u / (\beta_w \cdot \gamma_{M2})$	$269.72 [MPa] < 435.56 [MPa]$	0.62	
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