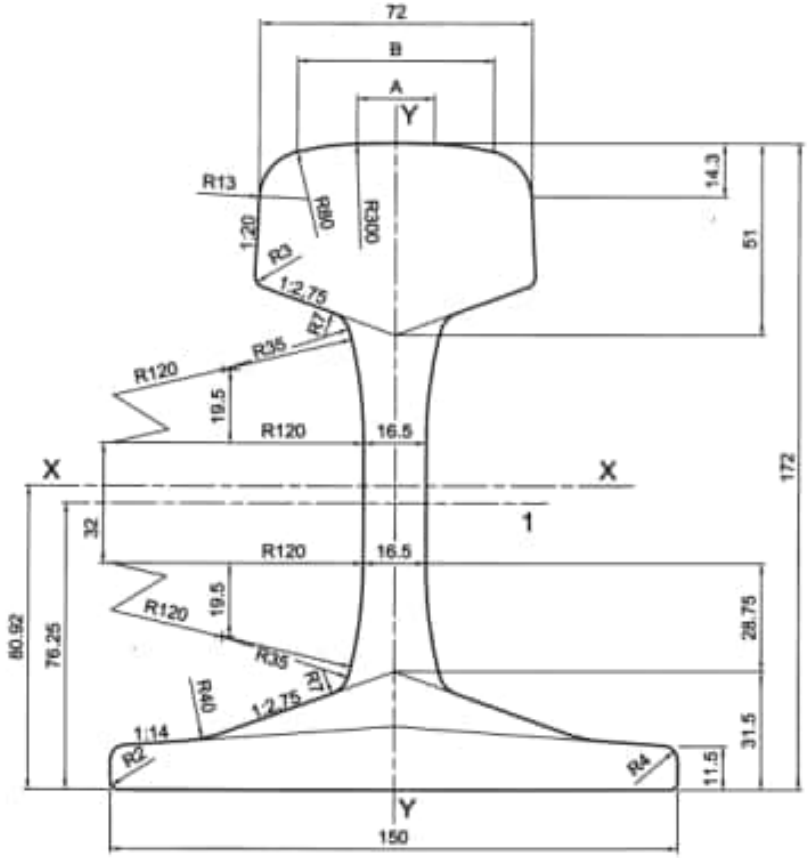
Detailed reduction of braking load: end shield bridge

FÖRORD

Denna bilaga används är en 2D analys av hur bromslasten fördelas mellan bro och spårkonstruktion.

Räl 60 E förutsätts enligt redovisning nedan.



Key

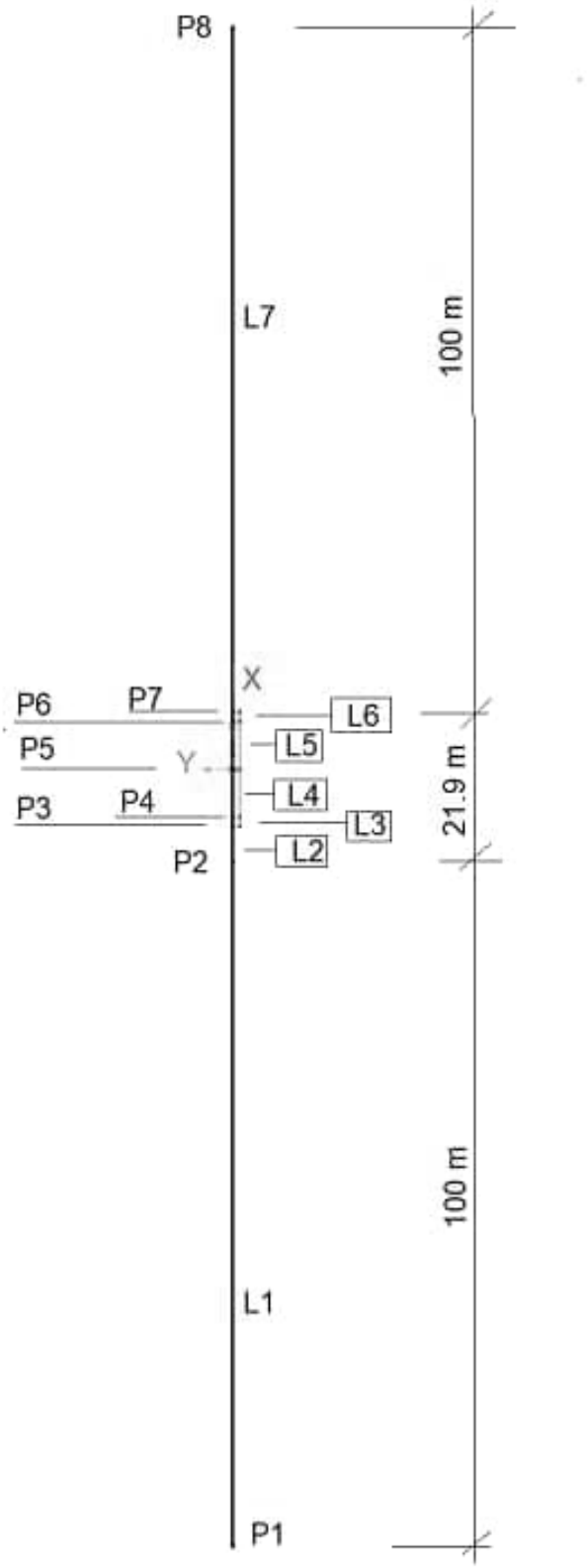
1 centre line of branding

cross-sectional area	:	76,70	cm^2
mass per metre	:	60,21	kg/m
moment of inertia x-x axis	:	3 038,3	cm^4
section modulus - Head	:	333,6	cm^3
section modulus - Base	:	375,5	cm^3
moment of inertia y-y axis	:	512,3	cm^4
section modulus y-y axis	:	68,3	cm^3
indicative dimensions:		A = 20,456 mm	
		B = 52,053 mm	

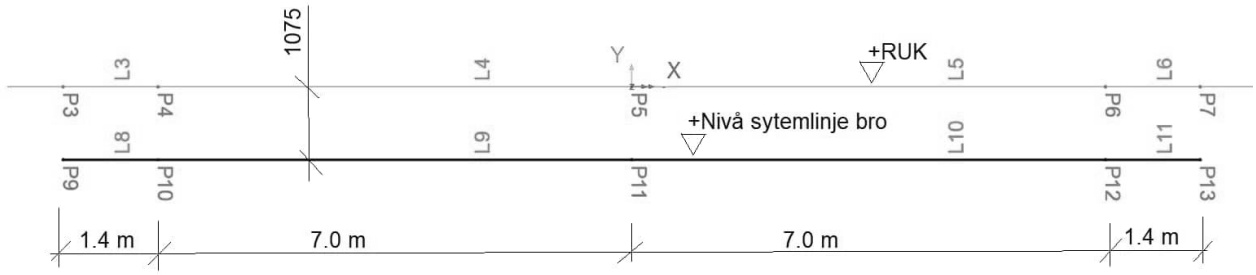
Figure A.23 — Rail profile 60E1

1. SYSTEMSKISS

Systemskiss avser systemlijer räler och brobana.



VY
Defintion räler.



2D Vy

Defintion broana och räler.

2. TVÄRSNITTSKONSTANTER

Brobana:

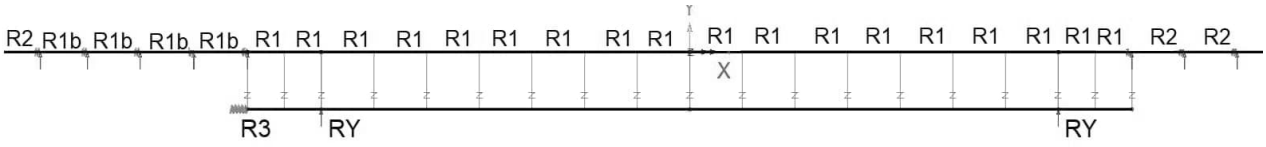
B x H = 5.75 m x 0.95 m

Räler:

$A = 2 \cdot 7670 mm^2 \rightarrow B \times H = 0.124 \times 0.124\ m$

3. RANDVILLKOR

Det förekommer olika randvillkor enligt redivining nedan.

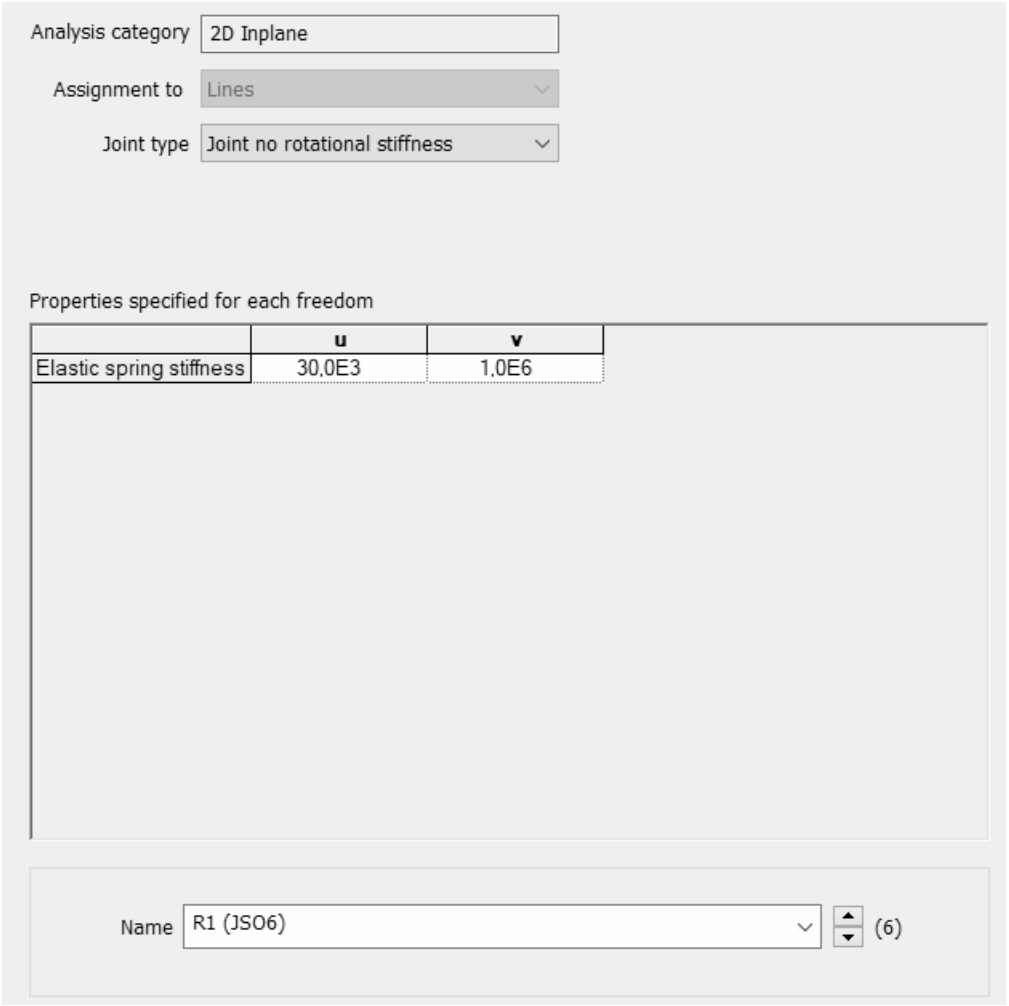


2D Vy
Defintion broana och räler.

R1 (∴ fjäder på bro motsvande belastat spår) :

Fjäder är definerade som linjärelastiskt. Kontroll ser fr att säkeställa att $\delta_x < \Delta_{p.1} = 2$ mm.

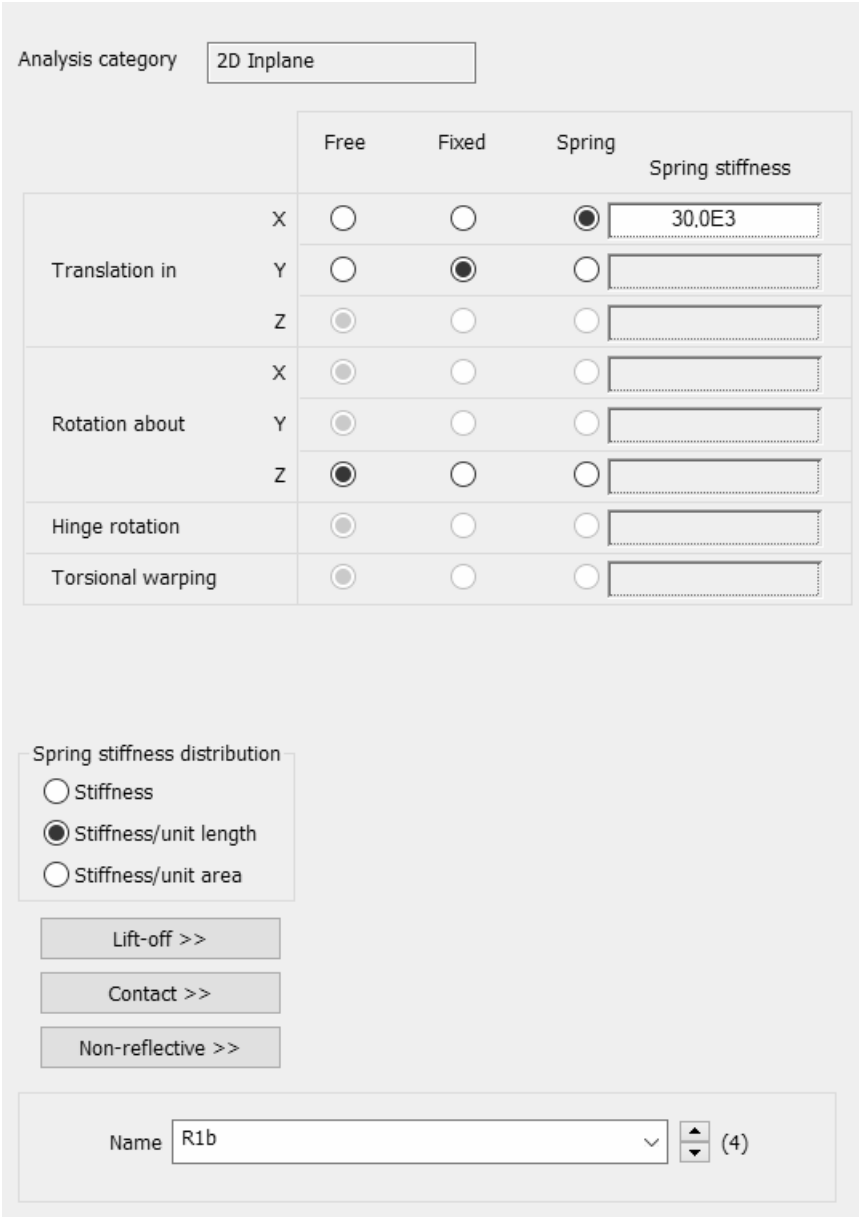
$$k_1 = \frac{p_1}{\Delta_{p.1}} = 60\frac{kN}{m} \cdot \frac{1}{0.002m} = 30 \cdot 10^3 \frac{kN}{m^2}$$



R1b (∴ fjäder utanför bro motsvande belastat spår) :

Fjäder är definerade som linjärelastiskt. Kontroll sker för att säkerställa att $\delta_x < \Delta_{p.1} = 2$ mm.

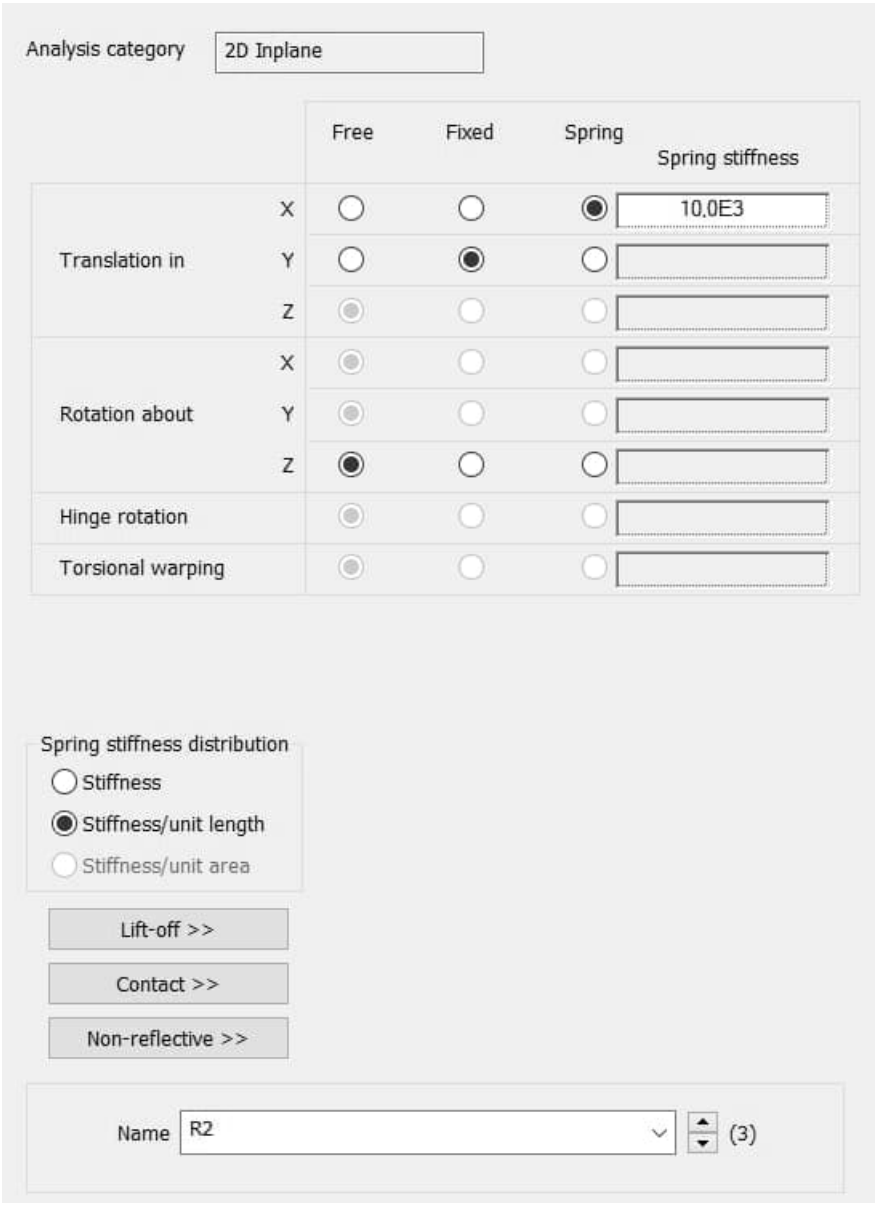
$$k_1 = \frac{p_1}{\Delta_{p.1}} = 60\frac{kN}{m} \cdot \frac{1}{0.002m} = 30 \cdot 10^3 \frac{kN}{m^2}$$



R2 (∴ fjäder utanför bro motsvande belastat spår) :

Fjäder är definerade som linjärelastiskt. Kontroll ser för att säkerställa att $\delta_x < \Delta_{p.2} = 2$ mm.

$$k_2 = \frac{p_2}{\Delta_{p.2}} = 20\frac{kN}{m} \cdot \frac{1}{0.002m} = 10 \cdot 10^3 \frac{kN}{m^2}$$

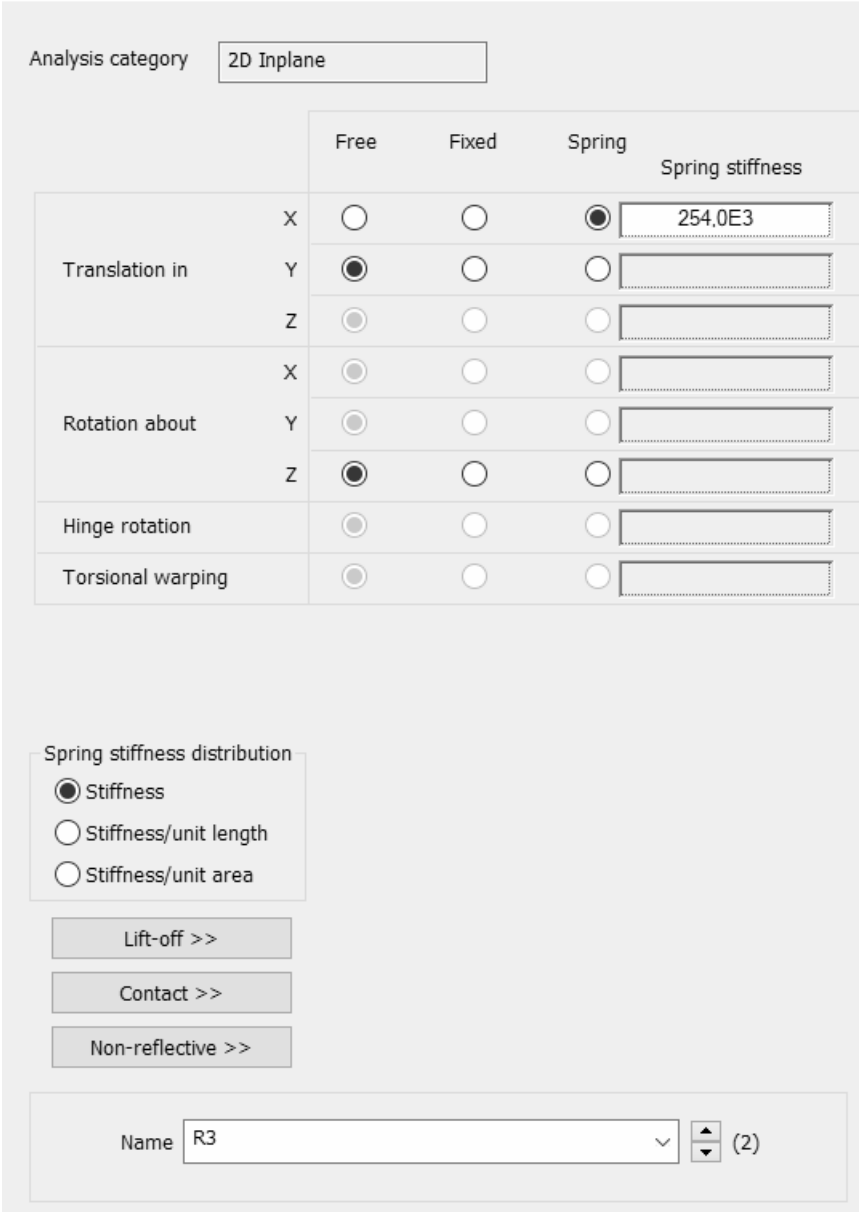

Analysis category
2D Inplane
Free
Fixed
Spring
Spring stiffness
Translation in
X
Y
Z
Rotation about
X
Y
Z
10,0E3
Hinge rotation
Torsional warping
Spring stiffness distribution
Stiffness
Stiffness/unit length
Stiffness/unit area
Lift-off >>
Contact >>
Non-reflective >>
Name
R2
(3)

R3 (∴ fjäder motsvarande ändskärm) :

Fjäder är definerade som linjärelastiskt. Kontroll sker för att säkerställa att $\delta_x < \Delta_{p.3}$ = 14 mm.

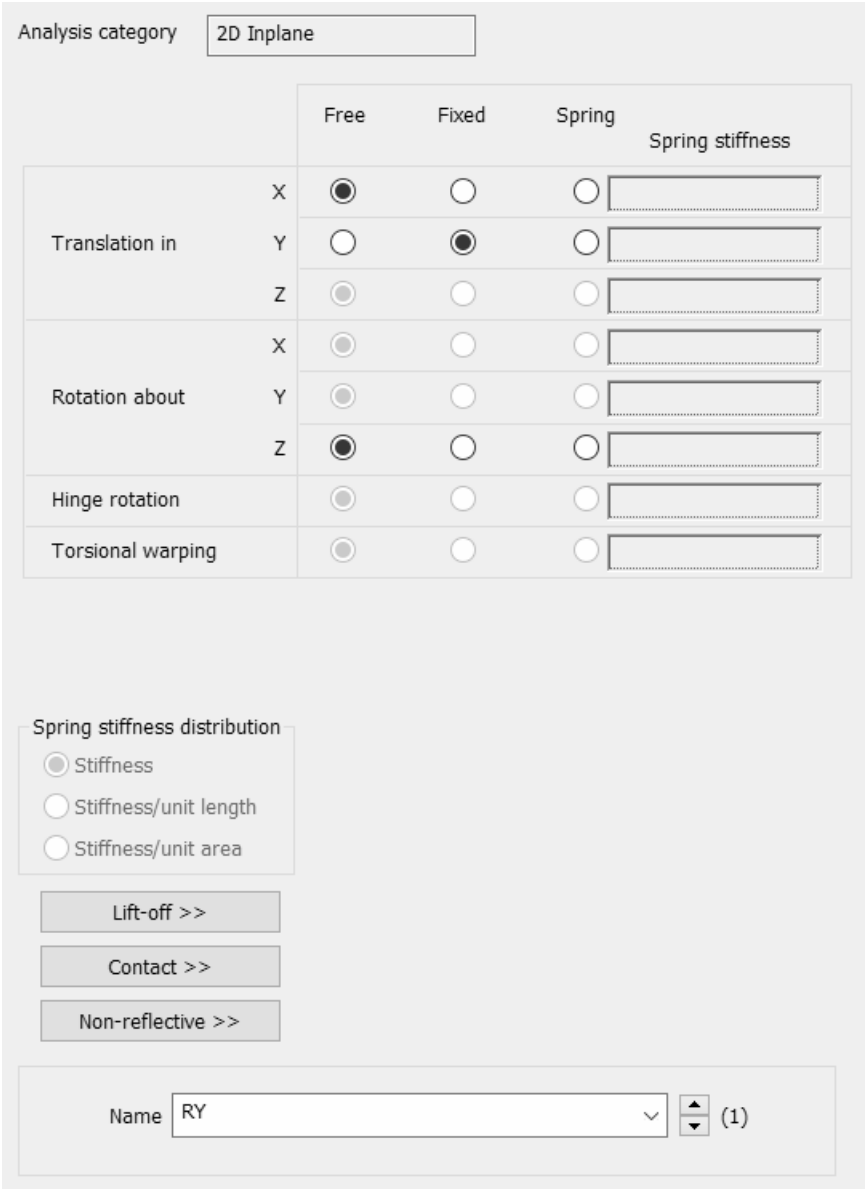
$F_3(\Delta_{p.3})$ = 3561kN

$$K_3 = \frac{F_3(\Delta_{p.3})}{\Delta_{p.3}} = \frac{3561kN}{0.002m} = 254 \cdot 10^3 \frac{kN}{m}$$



RY (.:. brolager) :

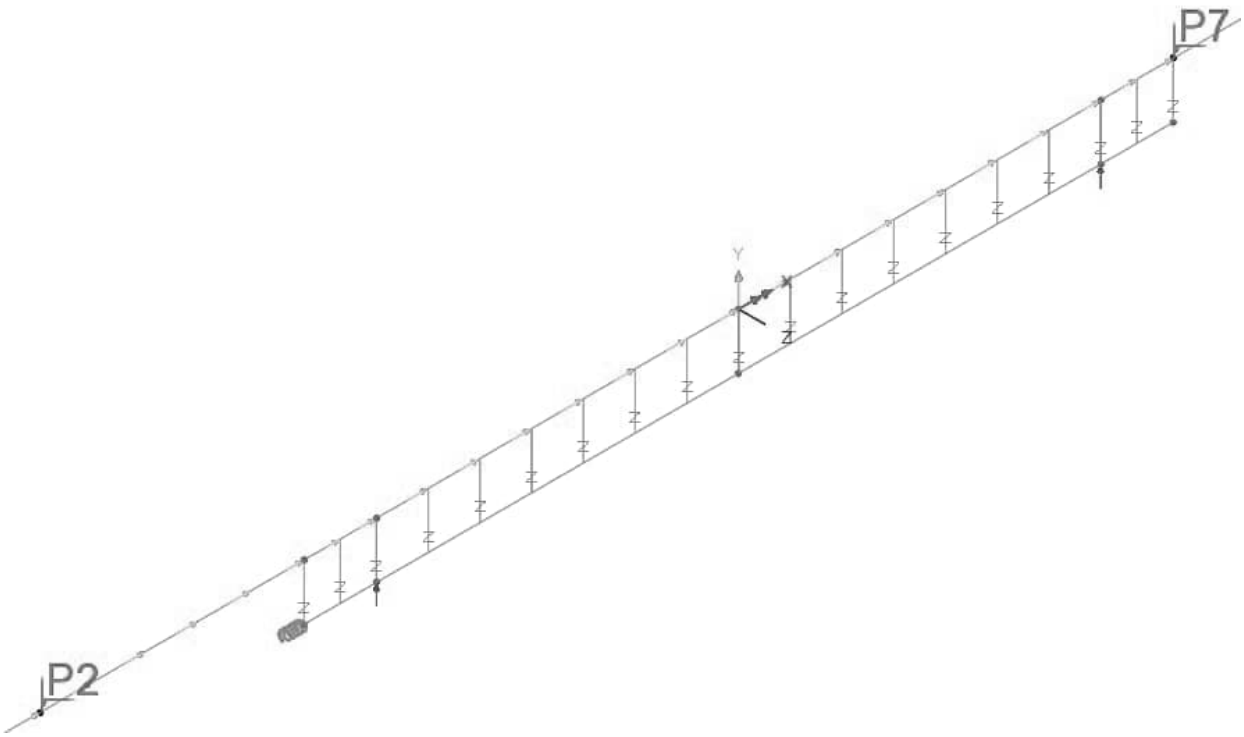
Brolager är modellerade såsom fiktiv fjäder enligt nedan.



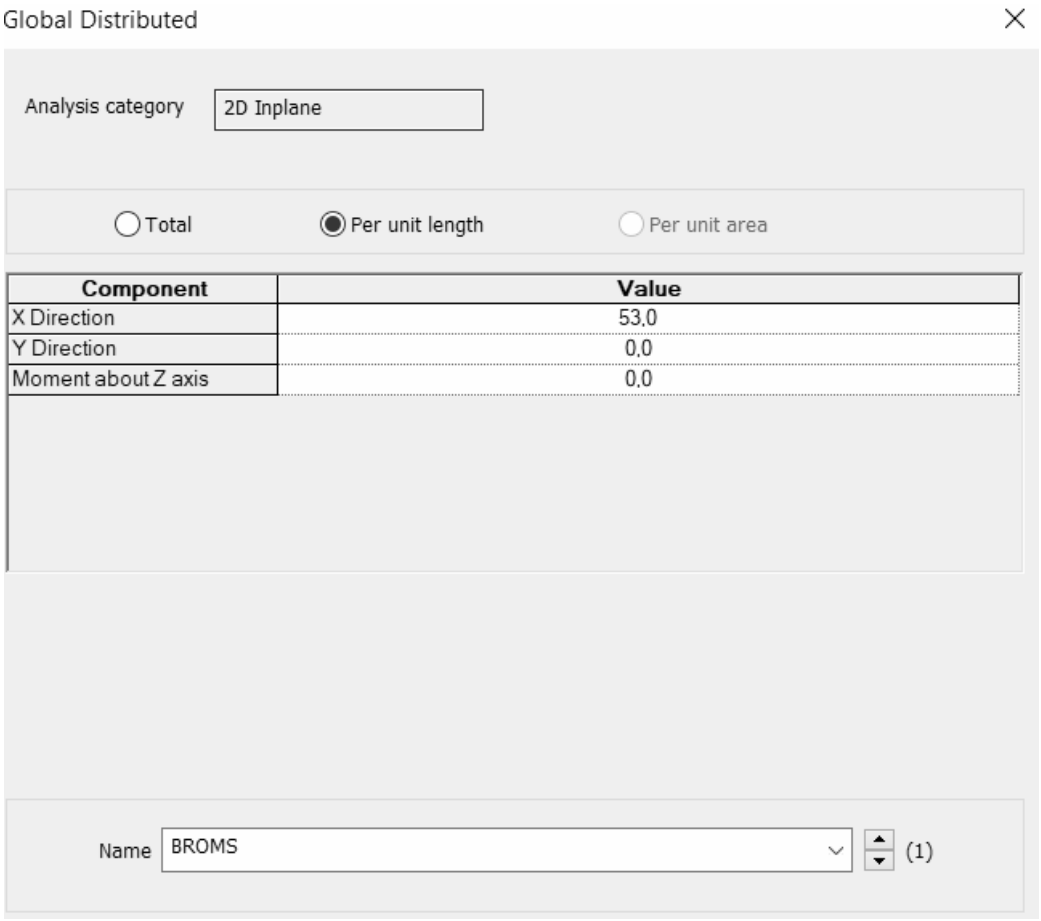
3. LASTER

Endast bromslast är införd i statisk modell. Denna last är införs i nivå med räler från punkt P2 till P7. Totalt belastningslängd (L_{broms}) är 21.9 m

$$p_{broms} = \alpha \cdot 33\frac{kN}{m} = 53kN\frac{kN}{m} \rightarrow P_{broms.tot} = 53\frac{kN}{m} \cdot 21.9m = 1156kN$$



Lastfall BROMS:



4. RESULTAT

Node	X	Y	Z	FX	DX	Kontroll	Anm.
1	8,4	0	0	-8	1,6	< 2,0	R1
2	108,4	0	0	0	0,0	< 2,0	R2
3	9,4	0	0	-15	1,5	< 2,0	-"-
4	10,4	0	0	-14	1,4	< 2,0	-"-
5	11,4	0	0	-13	1,3	< 2,0	-"-
6	12,4	0	0	-13	1,3	< 2,0	-"-
7	13,4	0	0	-12	1,2	< 2,0	-"-
8	14,4	0	0	-11	1,1	< 2,0	-"-
9	15,4	0	0	-11	1,1	< 2,0	-"-
10	16,4	0	0	-10	1,0	< 2,0	-"-
11	17,4	0	0	-10	1,0	< 2,0	-"-
12	18,4	0	0	-9	0,9	< 2,0	-"-
13	19,4	0	0	-9	0,9	< 2,0	-"-
14	20,4	0	0	-8	0,8	< 2,0	-"-
15	21,4	0	0	-8	0,8	< 2,0	-"-
16	22,4	0	0	-7	0,7	< 2,0	-"-
17	23,4	0	0	-7	0,7	< 2,0	-"-
18	24,4	0	0	-7	0,6	< 2,0	-"-
19	25,4	0	0	-6	0,6	< 2,0	-"-
20	26,4	0	0	-6	0,6	< 2,0	-"-
21	27,4	0	0	-6	0,5	< 2,0	-"-
22	28,4	0	0	-5	0,5	< 2,0	-"-
23	29,4	0	0	-5	0,5	< 2,0	-"-
24	30,4	0	0	-5	0,5	< 2,0	-"-
25	31,4	0	0	-4	0,4	< 2,0	-"-
26	32,4	0	0	-4	0,4	< 2,0	-"-
27	33,4	0	0	-4	0,4	< 2,0	-"-
28	34,4	0	0	-4	0,4	< 2,0	-"-
29	35,4	0	0	-4	0,4	< 2,0	-"-
30	36,4	0	0	-3	0,3	< 2,0	-"-
31	37,4	0	0	-3	0,3	< 2,0	-"-
32	38,4	0	0	-3	0,3	< 2,0	-"-
33	39,4	0	0	-3	0,3	< 2,0	-"-
34	40,4	0	0	-3	0,3	< 2,0	-"-
35	41,4	0	0	-3	0,3	< 2,0	-"-
36	42,4	0	0	-2	0,2	< 2,0	-"-
37	43,4	0	0	-2	0,2	< 2,0	-"-
38	44,4	0	0	-2	0,2	< 2,0	-"-
39	45,4	0	0	-2	0,2	< 2,0	-"-
40	46,4	0	0	-2	0,2	< 2,0	-"-
41	47,4	0	0	-2	0,2	< 2,0	-"-
42	48,4	0	0	-2	0,2	< 2,0	-"-
43	49,4	0	0	-2	0,2	< 2,0	-"-
44	50,4	0	0	-2	0,2	< 2,0	-"-
-	m	m	m	kN	mm	mm	-

Node	X	Y	Z	FX	DX	Kontroll	Anm.
45	51,4	0	0	-1	0,1	< 2,0	R2
46	52,4	0	0	-1	0,1	< 2,0	-"-
47	53,4	0	0	-1	0,1	< 2,0	-"-
48	54,4	0	0	-1	0,1	< 2,0	-"-
49	55,4	0	0	-1	0,1	< 2,0	-"-
50	56,4	0	0	-1	0,1	< 2,0	-"-
51	57,4	0	0	-1	0,1	< 2,0	-"-
52	58,4	0	0	-1	0,1	< 2,0	-"-
53	59,4	0	0	-1	0,1	< 2,0	-"-
54	60,4	0	0	-1	0,1	< 2,0	-"-
55	61,4	0	0	-1	0,1	< 2,0	-"-
56	62,4	0	0	-1	0,1	< 2,0	-"-
57	63,4	0	0	-1	0,1	< 2,0	-"-
58	64,4	0	0	-1	0,1	< 2,0	-"-
59	65,4	0	0	-1	0,1	< 2,0	-"-
60	66,4	0	0	-1	0,1	< 2,0	-"-
61	67,4	0	0	-1	0,1	< 2,0	-"-
62	68,4	0	0	-1	0,1	< 2,0	-"-
63	69,4	0	0	-1	0,1	< 2,0	-"-
64	70,4	0	0	-1	0,1	< 2,0	-"-
65	71,4	0	0	-1	0,0	< 2,0	-"-
66	72,4	0	0	-1	0,0	< 2,0	-"-
67	73,4	0	0	0	0,0	< 2,0	-"-
68	74,4	0	0	0	0,0	< 2,0	-"-
69	75,4	0	0	0	0,0	< 2,0	-"-
70	76,4	0	0	0	0,0	< 2,0	-"-
71	77,4	0	0	0	0,0	< 2,0	-"-
72	78,4	0	0	0	0,0	< 2,0	-"-
73	79,4	0	0	0	0,0	< 2,0	-"-
74	80,4	0	0	0	0,0	< 2,0	-"-
75	81,4	0	0	0	0,0	< 2,0	-"-
76	82,4	0	0	0	0,0	< 2,0	-"-
77	83,4	0	0	0	0,0	< 2,0	-"-
78	84,4	0	0	0	0,0	< 2,0	-"-
79	85,4	0	0	0	0,0	< 2,0	-"-
80	86,4	0	0	0	0,0	< 2,0	-"-
81	87,4	0	0	0	0,0	< 2,0	-"-
82	88,4	0	0	0	0,0	< 2,0	-"-
83	89,4	0	0	0	0,0	< 2,0	-"-
84	90,4	0	0	0	0,0	< 2,0	-"-
85	91,4	0	0	0	0,0	< 2,0	-"-
86	92,4	0	0	0	0,0	< 2,0	-"-
87	93,4	0	0	0	0,0	< 2,0	-"-
88	94,4	0	0	0	0,0	< 2,0	-"-
89	95,4	0	0	0	0,0	< 2,0	-"-
-	m	m	m	kN	mm	mm	-

Node	X	Y	Z	FX	DX	Kontroll	Anm.
90	96,4	0	0	0	0,0	< 2,0	-"-
91	97,4	0	0	0	0,0	< 2,0	-"-
92	98,4	0	0	0	0,0	< 2,0	-"-
93	99,4	0	0	0	0,0	< 2,0	-"-
94	100,4	0	0	0	0,0	< 2,0	-"-
95	101,4	0	0	0	0,0	< 2,0	-"-
96	102,4	0	0	0	0,0	< 2,0	-"-
97	103,4	0	0	0	0,0	< 2,0	-"-
98	104,4	0	0	0	0,0	< 2,0	-"-
99	105,4	0	0	0	0,0	< 2,0	-"-
100	106,4	0	0	0	0,0	< 2,0	-"-
101	107,4	0	0	0	0,0	< 2,0	-"-
102	-113,5	0	0	0	0,0	< 2,0	-"-
103	-13,5	0	0	-26	1,3	< 2,0	R1b
104	-112,5	0	0	0	0,0	< 2,0	R2
105	-111,5	0	0	0	0,0	< 2,0	-"-
106	-110,5	0	0	0	0,0	< 2,0	-"-
107	-109,5	0	0	0	0,0	< 2,0	-"-
108	-108,5	0	0	0	0,0	< 2,0	-"-
109	-107,5	0	0	0	0,0	< 2,0	-"-
110	-106,5	0	0	0	0,0	< 2,0	-"-
111	-105,5	0	0	0	0,0	< 2,0	-"-
112	-104,5	0	0	0	0,0	< 2,0	-"-
113	-103,5	0	0	0	0,0	< 2,0	-"-
114	-102,5	0	0	0	0,0	< 2,0	-"-
115	-101,5	0	0	0	0,0	< 2,0	-"-
116	-100,5	0	0	0	0,0	< 2,0	-"-
117	-99,5	0	0	0	0,0	< 2,0	-"-
118	-98,5	0	0	0	0,0	< 2,0	-"-
119	-97,5	0	0	0	0,0	< 2,0	-"-
120	-96,5	0	0	0	0,0	< 2,0	-"-
121	-95,5	0	0	0	0,0	< 2,0	-"-
122	-94,5	0	0	0	0,0	< 2,0	-"-
123	-93,5	0	0	0	0,0	< 2,0	-"-
124	-92,5	0	0	0	0,0	< 2,0	-"-
125	-91,5	0	0	0	0,0	< 2,0	-"-
126	-90,5	0	0	0	0,0	< 2,0	-"-
127	-89,5	0	0	0	0,0	< 2,0	-"-
128	-88,5	0	0	0	0,0	< 2,0	-"-
129	-87,5	0	0	0	0,0	< 2,0	-"-
130	-86,5	0	0	0	0,0	< 2,0	-"-
131	-85,5	0	0	0	0,0	< 2,0	-"-
132	-84,5	0	0	0	0,0	< 2,0	-"-
133	-83,5	0	0	0	0,0	< 2,0	-"-
-	m	m	m	kN	mm	mm	-

Node	X	Y	Z	FX	DX	Kontroll	Anm.
134	-82,5	0	0	0	0,0	< 2,0	R2
135	-81,5	0	0	0	0,0	< 2,0	-"-
136	-80,5	0	0	0	0,0	< 2,0	-"-
137	-79,5	0	0	0	0,0	< 2,0	-"-
138	-78,5	0	0	0	0,0	< 2,0	-"-
139	-77,5	0	0	0	0,0	< 2,0	-"-
140	-76,5	0	0	0	0,0	< 2,0	-"-
141	-75,5	0	0	0	0,0	< 2,0	-"-
142	-74,5	0	0	0	0,0	< 2,0	-"-
143	-73,5	0	0	-1	0,0	< 2,0	-"-
144	-72,5	0	0	-1	0,0	< 2,0	-"-
145	-71,5	0	0	-1	0,1	< 2,0	-"-
146	-70,5	0	0	-1	0,1	< 2,0	-"-
147	-69,5	0	0	-1	0,1	< 2,0	-"-
148	-68,5	0	0	-1	0,1	< 2,0	-"-
149	-67,5	0	0	-1	0,1	< 2,0	-"-
150	-66,5	0	0	-1	0,1	< 2,0	-"-
151	-65,5	0	0	-1	0,1	< 2,0	-"-
152	-64,5	0	0	-1	0,1	< 2,0	-"-
153	-63,5	0	0	-1	0,1	< 2,0	-"-
154	-62,5	0	0	-1	0,1	< 2,0	-"-
155	-61,5	0	0	-1	0,1	< 2,0	-"-
156	-60,5	0	0	-1	0,1	< 2,0	-"-
157	-59,5	0	0	-1	0,1	< 2,0	-"-
158	-58,5	0	0	-1	0,1	< 2,0	-"-
159	-57,5	0	0	-1	0,1	< 2,0	-"-
160	-56,5	0	0	-1	0,1	< 2,0	-"-
161	-55,5	0	0	-1	0,1	< 2,0	-"-
162	-54,5	0	0	-1	0,1	< 2,0	-"-
163	-53,5	0	0	-1	0,1	< 2,0	-"-
164	-52,5	0	0	-2	0,1	< 2,0	-"-
165	-51,5	0	0	-2	0,2	< 2,0	-"-
166	-50,5	0	0	-2	0,2	< 2,0	-"-
167	-49,5	0	0	-2	0,2	< 2,0	-"-
168	-48,5	0	0	-2	0,2	< 2,0	-"-
169	-47,5	0	0	-2	0,2	< 2,0	-"-
170	-46,5	0	0	-2	0,2	< 2,0	-"-
171	-45,5	0	0	-2	0,2	< 2,0	-"-
172	-44,5	0	0	-2	0,2	< 2,0	-"-
173	-43,5	0	0	-2	0,2	< 2,0	-"-
174	-42,5	0	0	-3	0,3	< 2,0	-"-
175	-41,5	0	0	-3	0,3	< 2,0	-"-
176	-40,5	0	0	-3	0,3	< 2,0	-"-
177	-39,5	0	0	-3	0,3	< 2,0	-"-
-	m	m	m	kN	mm	mm	-

Node	X	Y	Z	FX	DX	Kontroll	Anm.
178	-38,5	0	0	-3	0,3	< 2,0	R2
179	-37,5	0	0	-3	0,3	< 2,0	-"-
180	-36,5	0	0	-4	0,4	< 2,0	-"-
181	-35,5	0	0	-4	0,4	< 2,0	-"-
182	-34,5	0	0	-4	0,4	< 2,0	-"-
183	-33,5	0	0	-4	0,4	< 2,0	-"-
184	-32,5	0	0	-5	0,4	< 2,0	-"-
185	-31,5	0	0	-5	0,5	< 2,0	-"-
186	-30,5	0	0	-5	0,5	< 2,0	-"-
187	-29,5	0	0	-5	0,5	< 2,0	-"-
188	-28,5	0	0	-6	0,6	< 2,0	-"-
189	-27,5	0	0	-6	0,6	< 2,0	-"-
190	-26,5	0	0	-6	0,6	< 2,0	-"-
191	-25,5	0	0	-7	0,7	< 2,0	-"-
192	-24,5	0	0	-7	0,7	< 2,0	-"-
193	-23,5	0	0	-7	0,7	< 2,0	-"-
194	-22,5	0	0	-8	0,8	< 2,0	-"-
195	-21,5	0	0	-8	0,8	< 2,0	-"-
196	-20,5	0	0	-9	0,9	< 2,0	-"-
197	-19,5	0	0	-9	0,9	< 2,0	-"-
198	-18,5	0	0	-10	1,0	< 2,0	-"-
199	-17,5	0	0	-10	1,0	< 2,0	-"-
200	-16,5	0	0	-11	1,1	< 2,0	-"-
201	-15,5	0	0	-12	1,2	< 2,0	-"-
202	-14,5	0	0	-12	1,2	< 2,0	-"-
203	-8,4	0	0	-25	1,6	< 2,0	-"-
204	-12,5	0	0	-42	1,4	< 2,0	R1b
205	-11,5	0	0	-44	1,4	< 2,0	-"-
206	-10,4	0	0	-46	1,5	< 2,0	-"-
207	-9,4	0	0	-48	1,6	< 2,0	-"-
243	-8,4	-1,075	0	-422	1.7	< 14,0	R3
244	-7,0	-1,075	0	N/A	1,7	< 2,0	R1
262	7,0	-1,075	0	N/A	1,7	< 2,0	R1
-	m	m	m	kN	mm	mm	-

Total: -1156 kN

Title: Indatakvitto

Model Units: kN,m,t,s,C
Report Units: kN,m,t,s,C

Model Title: System 003

Table of Contents

1. Points

Point	X coordinate	Y coordinate	Z coordinate
1	-113,5	0,0	0,0
2	-13,5	0,0	0,0
3	-8,4	0,0	0,0
4	-7,0	0,0	0,0
5	0,0	0,0	0,0
6	7,0	0,0	0,0
7	8,4	0,0	0,0
8	108,4	0,0	0,0
9	-8,4	-1,1	0,0
10	-7,0	-1,1	0,0
11	0,0	-1,1	0,0
12	7,0	-1,1	0,0
13	8,4	-1,1	0,0

2. Lines

Line	Points	Line	Points
1	1;2	2	2;3
3	3;4	4	4;5
5	5;6	6	6;7
7	7;8	8	9;10
9	10;11	10	11;12
11	12;13		

3. MESH:Line

Attribute: 1 Title: Element 100

Sub Type = Line Mesh	Element Type = BMI2		
Mesh spacing	**Nr. of elements**	**Start node end releases:**	**End node end releases:**
Uniform	100	None	None

Assignment to Lines:
1;7

Attribute: 2 Title: Element 5

Sub Type = Line Mesh	Element Type = BMI2		
Mesh spacing	**Nr. of elements**	**Start node end releases:**	**End node end releases:**
Uniform	5	None	None

Assignment to Lines:
2

Attribute: 3 Title: Element 7

Sub Type = Line Mesh	Element Type = BMI2		
Mesh spacing	**Nr. of elements**	**Start node end releases:**	**End node end releases:**
Uniform	7	None	None

Assignment to Lines:
4;5;9;10

Attribute: 5 Title: Element 2

Sub Type = Line Mesh	Element Type = BMI2		
Mesh spacing	**Nr. of elements**	**Start node end releases:**	**End node end releases:**
Uniform	2	None	None

Assignment to Lines:
3;6;8;11

4. MESH:Joint

Attribute: 4 Title: Joint JNT3: 2 element
Sub Type = Line Mesh **Element Type = JNT3**

Mesh spacing	Nr. of elements	Start node end releases:	End node end releases:
Uniform	2	None	None

Assignment to Lines: Beta angle = 0,0, Interface secondary Line 3, Mesh from primary to secondary
8;11

Attribute: 9 Title: Joint JNT3: 7 element
Sub Type = Line Mesh **Element Type = JNT3**

Mesh spacing	Nr. of elements	Start node end releases:	End node end releases:
Uniform	7	None	None

Assignment to Lines: Beta angle = 0,0, Interface secondary Line 4, Mesh from primary to secondary
9;10

5. Geometric : Line

Attribute: 1 Title: Brobana (Brobana (RSS D=0,95 B=5,75))
Sub Type = Line Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Cross sectional area	A	5,5
Second moment of area about y axis	Iyy	15,1
Second moment of area about z axis	Izz	0,4
Product moment of area	Iyz	0,0
Torsional constant	J	1,5
Eccentricity in local z direction, relative to specified origin	ez0	0,0
Eccentricity in local y direction, relative to specified origin	ey0	0,0
Eccentricity in local z direction, relative to beam centroid	ez	0,0
Eccentricity in local y direction, relative to beam centroid	ey	0,0
Wagner constant 1st moment of square radius about y (Iyr)	Iyr	0,0
Wagner constant 1st moment of square radius about z (Izr)	Izr	0,0
Wagner constant 4th moment of area about origin (Irr)	Irr	77,0
Wagner constant 2nd moment of warping about origin (Iwr)	Iwr	0,0
Effective shear area in local z direction	Asz	4,6
Effective shear area in local y direction	Asy	4,6
Plastic area	Ap	5,5
Plastic modulus for bending about y	Zpy	7,9
Plastic modulus for bending about z	Zpz	1,3
Plastic neutral axis, distance from centroid along y axis	yp	0,0
Plastic neutral axis, distance from centroid along z axis	zp	0,0
Plastic torsional section modulus	Zpt	3,4
Warping torsional constant about shear centre	Cw	1,0
Shear centre about y axis	yo	0,0
Shear centre about z axis	zo	0,0
Monosymmetry constant about y	betay	0,0
Monosymmetry constant about z	betaz	0,0
Radius of gyration about y axis	ky	1,7
Radius of gyration about z axis	kz	0,3
y axis extreme fibre, top	yt	0,5
y axis extreme fibre, bottom	yb	-0,5
z axis extreme fibre, top	zt	2,9
z axis extreme fibre, bottom	zb	-2,9
Shape code identifier	Type	1
Breadth of this section	B	5,8
Depth of this section	D	0,9
Element type	elementType	"2D Thick Beam"
Reinforcement	reinforcement	None

Assignment to Lines:
8T11

Attribute: 2 Title: RAL
Sub Type = Line Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Cross sectional area	A	0,0154
Second moment of area about y axis	Iyy	0,0
Second moment of area about z axis	Izz	0,0
Product moment of area	Iyz	0,0
Torsional constant	J	0,0
Eccentricity in local z direction, relative to specified origin	ez0	0,0
Eccentricity in local y direction, relative to specified origin	ey0	0,0
Eccentricity in local z direction, relative to beam centroid	ez	0,0
Eccentricity in local y direction, relative to beam centroid	ey	0,0
Wagner constant 1st moment of square radius about y (Iyr)	Iyr	0,0
Wagner constant 1st moment of square radius about z (Izr)	Izr	0,0
Wagner constant 4th moment of area about origin (Irr)	Irr	0,0
Wagner constant 2nd moment of warping about origin (Iwr)	Iwr	0,0
Effective shear area in local z direction	Asz	0,0
Effective shear area in local y direction	Asy	0,0
Plastic area	Ap	0,0
Plastic modulus for bending about y	Zpy	0,0
Plastic modulus for bending about z	Zpz	0,0
Plastic neutral axis, distance from centroid along y axis	yp	0,0
Plastic neutral axis, distance from centroid along z axis	zp	0,0
Plastic torsional section modulus	Zpt	0,0
Warping torsional constant about shear centre	Cw	0,0
Shear centre about y axis	yo	0,0
Shear centre about z axis	zo	0,0
Monosymmetry constant about y	betay	0,0
Monosymmetry constant about z	betaz	0,0
Radius of gyration about y axis	ky	0,0
Radius of gyration about z axis	kz	0,0
y axis extreme fibre, top	yt	0,1
y axis extreme fibre, bottom	yb	-0,1
z axis extreme fibre, top	zt	0,1
z axis extreme fibre, bottom	zb	-0,1
Shape code identifier	Type	1
Breadth of this section	B	0,1
Depth of this section	D	0,1
Element type	elementType	"2D Thick Beam"
Reinforcement	reinforcement	None

Assignment to Lines:
1T7

6. Isotropic material

Attribute: 3 Title: STAL (Ungraded | Steel - Structural | EN1993-1-1:2005)
Sub Type = Isotropic Material
Assigned in: Analysis 1

Property	Symbol	Value
Young's modulus	E	210000000,0
Poisson's ratio	nu	0,3
Density	rho	7,8
Coefficient of thermal expansion	alpha	0,0

Assignment to Lines:
1T7

Attribute: 4 Title: BETONG (C35/45 | Concrete | EN1992-1-1:2004/2014)
Sub Type = Isotropic Material
Assigned in: Analysis 1

Property	Symbol	Value
Young's modulus	E	34000000,0
Poisson's ratio	nu	0,2
Density	rho	2,5
Coefficient of thermal expansion	alpha	0,0
Characteristic compressive cylinder strength of concrete at 28 days	fck	35000,0
Mean value of axial tensile strength of concrete	fctm	3200,0
Ultimate compressive strain limit 3	ecu3	0,0
Design compressive strength 3	fcd3	23333,3
Compressive strain limit 3	ec3	0,0
Modulus of elasticity 3	E3	13333333,3

Assignment to Lines:
8T11

7. Joint materal

Attribute: 6 Title: R1 (JSO6)
Sub Type = Joint Material, Spring Stiffness Only
Assigned in: Analysis 1

	u	**v**
Number of degrees of freedom	nDOF	2
Joint type	JointType	"Plane stress / plane strain / 2D axisymmetric membranes"
Assignment type	Assignment	"Line"
Elastic spring stiffness	K[0]	30000,0
Elastic spring stiffness	K[1]	1000000,0

Assignment to Lines:
8T11

8. Support

Attribute: 1 Title: RY
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"F"
Translation in Y	V	"R"
Rotation about Z	THZ	"F"

Assignment to Points:
10;12

Attribute: 2 Title: R3
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"S"
Translation in Y	V	"F"
Rotation about Z	THZ	"F"
Spring stiffness distribution	springType	"Total"
Stiffness in X	Ustiff	254000,0

Assignment to Points:
9

Attribute: 3 Title: R2
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"S"
Translation in Y	V	"R"
Rotation about Z	THZ	"F"
Spring stiffness distribution	springType	"Length"
Stiffness in X	Ustiff	10000,0

Assignment to Lines:
1;7

Attribute: 4 Title: R1b
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"S"
Translation in Y	V	"R"
Rotation about Z	THZ	"F"
Spring stiffness distribution	springType	"Length"
Stiffness in X	Ustiff	30000,0

Assignment to Lines:
2

9. Global distributed load

Attribute: 1 Title: BROMS
Sub Type = Global Distributed Load

Property	**Symbol**	**Value**
Attribute type	type	"Length"
X Direction	WX	53,0
Y Direction	WY	0,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	0,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 2 Title: BROMS Factor = 1
Assignment to Lines:
2T6