

## CROSS SECTION: BEULFELD

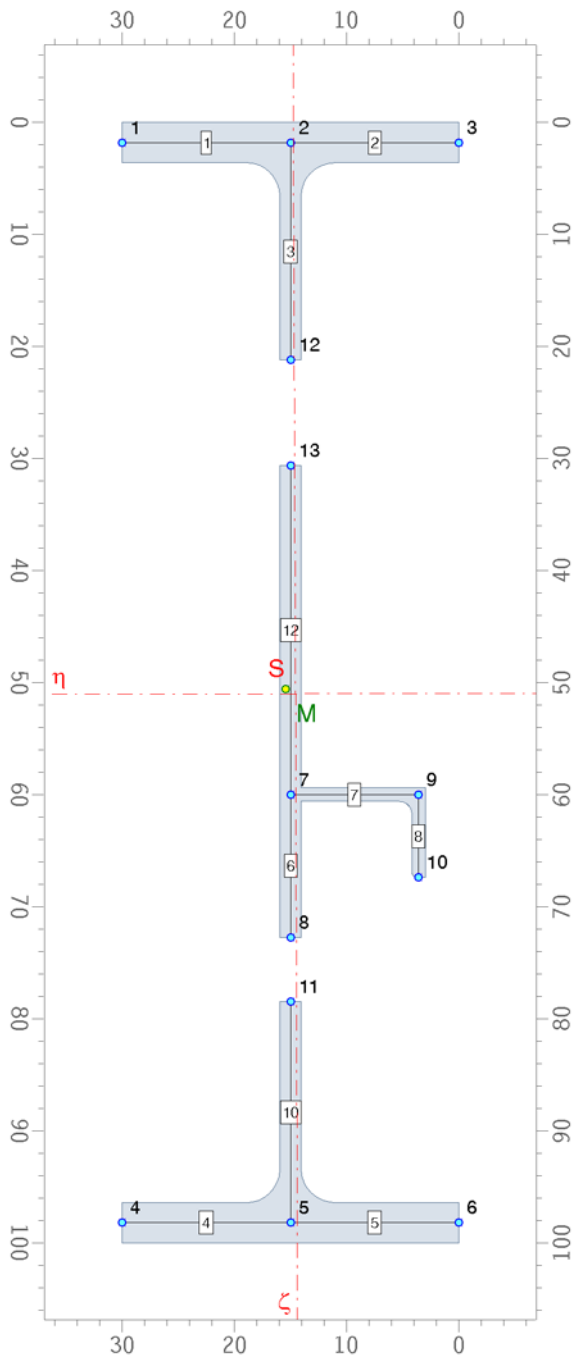
### nodes

nodes	y	z	nodes	y	z	nodes	y	z
-	mm	mm	-	mm	mm	-	mm	mm
1	300.00	18.00	6	0.00	982.00	11	150.00	784.67
2	150.00	18.00	7	150.00	600.00	12	150.00	212.00
3	0.00	18.00	9	36.00	600.00	13	150.00	306.00
4	300.00	982.00	10	36.00	674.00			
5	150.00	982.00	8	150.00	727.33			

### lines

line	from	to	thickn.A	thickn.E	arch rise	r <sub>ar</sub>	r <sub>al</sub>	r <sub>er</sub>	r <sub>el</sub>	Φ <sub>a</sub>	Φ <sub>e</sub>
-	-	-	mm	mm	mm	mm	mm	mm	mm	°	°
1	1	2	36.00	36.00	0.000	0.00	0.00	3.00	0.00	0.00	0.00
2	3	2	36.00	36.00	0.000	0.00	0.00	0.00	3.00	0.00	0.00
3	2	12	19.00	19.00	0.000	3.00	3.00	0.00	0.00	0.00	0.00
4	4	5	36.00	36.00	0.000	0.00	0.00	0.00	3.00	0.00	0.00
5	6	5	36.00	36.00	0.000	0.00	0.00	3.00	0.00	0.00	0.00
6	7	8	19.00	19.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00
7	7	9	12.00	12.00	0.000	0.00	0.00	1.10	0.00	0.00	0.00
8	9	10	12.00	12.00	0.000	1.10	0.00	0.55	0.00	0.00	0.00
10	11	5	19.00	19.00	0.000	0.00	0.00	3.00	3.00	0.00	0.00
12	13	7	19.00	19.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00

plotting



## characteristic values

area, centroid and angle of principal axis

A =	392.91 cm <sup>2</sup>	e <sub>y</sub> =	14.54 cm	e <sub>z</sub> =	51.02 cm	α =	0.19 °
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spread

y <sub>max</sub> =	30.00 cm	y <sub>min</sub> =	0.00 cm	b =	30.00 cm	U =	323.37 cm
Z <sub>max</sub> =	100.00 cm	Z <sub>min</sub> =	0.00 cm	h =	100.00 cm		

Imn-system: moments of inertia and section moduli, clearances and radii of gyration

I <sub>m</sub> =	629640.51 cm <sup>4</sup>	W <sub>m+</sub> =	12854.60 cm <sup>3</sup>	h <sub>m+</sub> =	15.46 cm	i <sub>m</sub> =	40.03 cm
I <sub>n</sub> =	17957.32 cm <sup>4</sup>	W <sub>m-</sub> =	12341.47 cm <sup>3</sup>	h <sub>m-</sub> =	-14.54 cm	i <sub>n</sub> =	6.76 cm
I <sub>mn</sub> =	-1994.17 cm <sup>4</sup>	W <sub>n+</sub> =	1161.50 cm <sup>3</sup>	h <sub>n+</sub> =	48.98 cm		
		W <sub>n-</sub> =	1235.07 cm <sup>3</sup>	h <sub>n-</sub> =	-51.02 cm		

ξηζ-system: moments of inertia and section moduli, clearances and radii of gyration

I <sub>η</sub> =	629647.01 cm <sup>4</sup>	W <sub>η+</sub> =	12842.37 cm <sup>3</sup>	h <sub>η+</sub> =	15.62 cm	i <sub>η</sub> =	40.03 cm
I <sub>ζ</sub> =	17950.82 cm <sup>4</sup>	W <sub>η-</sub> =	12329.48 cm <sup>3</sup>	h <sub>η-</sub> =	-14.71 cm	i <sub>ζ</sub> =	6.76 cm
I <sub>p</sub> =	647597.83 cm <sup>4</sup>	W <sub>ζ+</sub> =	1149.22 cm <sup>3</sup>	h <sub>ζ+</sub> =	49.03 cm	i <sub>p</sub> =	40.60 cm
		W <sub>ζ-</sub> =	1220.66 cm <sup>3</sup>	h <sub>ζ-</sub> =	-51.07 cm		

shear centre

y <sub>M</sub> =	15.46 cm	y <sub>SM</sub> =	0.92 cm	η <sub>M</sub> =	0.92 cm		
Z <sub>M</sub> =	50.57 cm	Z <sub>SM</sub> =	-0.45 cm	ζ <sub>M</sub> =	-0.45 cm		

shear area coefficient

κ <sub>m</sub> =	3.01 -	A <sub>m</sub> =	130.45 cm <sup>2</sup>	κ <sub>η</sub> =	3.02 -	A <sub>η</sub> =	130.29 cm <sup>2</sup>
κ <sub>n</sub> =	6.62 -	A <sub>n</sub> =	59.35 cm <sup>2</sup>	κ <sub>ζ</sub> =	6.62 -	A <sub>ζ</sub> =	59.38 cm <sup>2</sup>

torsion + warping

I <sub>T</sub> =	1129.75 cm <sup>4</sup>	I <sub>W</sub> =	37716225.41 cm <sup>6</sup>	R <sub>Sy</sub> =	575281.40 cm <sup>5</sup>	R <sub>Sz</sub> =	6655.29 cm <sup>5</sup>
C <sub>s</sub> =	38246695.56 cm <sup>6</sup>	I <sub>pM</sub> =	648010.35 cm <sup>4</sup>	i <sub>ωM</sub> =	7.63 cm		
ω <sub>M+</sub> =	732.68 cm <sup>2</sup>	ω <sub>M-</sub> =	-730.40 cm <sup>2</sup>	W <sub>ω+</sub> =	51477.37 cm <sup>4</sup>	W <sub>ω-</sub> =	51637.61 cm <sup>4</sup>

section lines

i <sub>M</sub> =	40.61 cm	r <sub>η</sub> =	13.05 cm	r <sub>ζ</sub> =	-1.97 cm	r <sub>ω</sub> =	0.00 cm
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plastic characteristic values

W <sub>ply,max</sub> =	14283.80 cm <sup>3</sup>	W <sub>plz,max</sub> =	1881.15 cm <sup>3</sup>	W <sub>plη,max</sub> =	14284.31 cm <sup>3</sup>	W <sub>plζ,max</sub> =	1881.16 cm <sup>3</sup>
W <sub>ply,red</sub> =	14187.47 cm <sup>3</sup>	W <sub>plz,red</sub> =	1880.96 cm <sup>3</sup>	W <sub>plη,red</sub> =	14224.71 cm <sup>3</sup>	W <sub>plζ,red</sub> =	1880.97 cm <sup>3</sup>