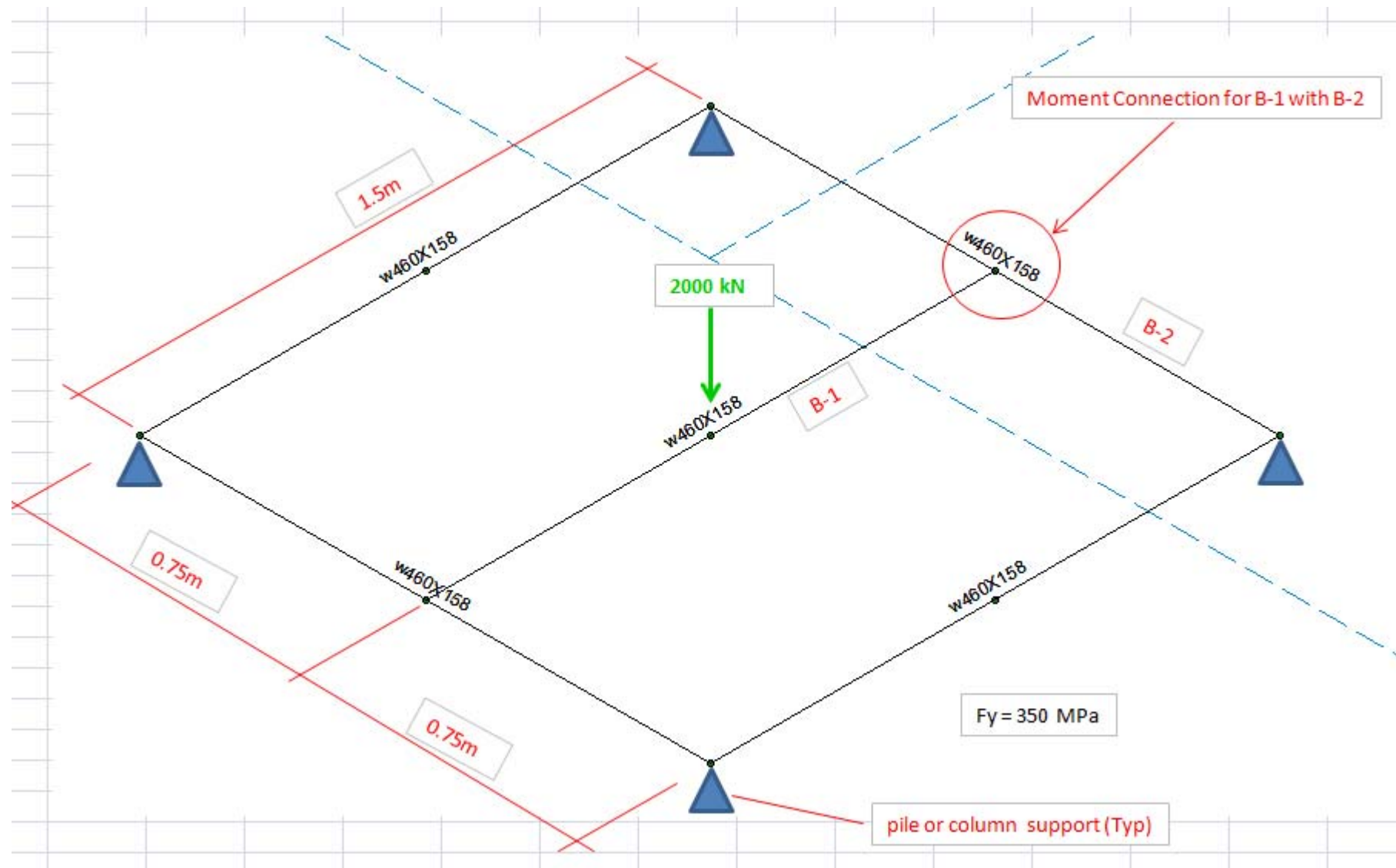


Normally, structural analysis software doesn't provide torsional analysis for members under torque, the following is the method to get torsion for beams with moment connection

1). Structural Layout



2). Get Rotation Stiffness for End Supports of B-1

(Analyse B-2 with www.webcivil.com)

For Beam (B-2)

Torsional Analysis of Open Section Thin-Walled Beams (FEA)

User Manual

Spans

i = $S_i =$ mm $d_i =$ mm $b_i =$ mm

$t_i =$ mm $w_i =$ mm

i	S_i (mm)	d_i (mm)	b_i (mm)	t_i (mm)	w_i (mm)
1	1500	476	284	23.9	15

Metric Imperial

General Information

E = MPa $X =$ mm

$u =$ Shape

Supports at Ends

Left Right

i	Span	Type	T_q (kN.m or kN.m/m)	X_b (mm)	X_d (mm)
1	1	Point	10	750	-

Loading

i = # of Span

Type $T_q =$ kN.m

$X_b =$ mm

Spans

i =
 S_i = mm d_i = mm b_i = mm
 t_i = mm w_i = mm

i	S _i (mm)	d _i (mm)	b _i (mm)	t _i (mm)	w _i (mm)
1	1500	476	284	23.9	15

[Review Report](#)

Metric Imperial

Twist Angle

Supports at Ends

Left Right

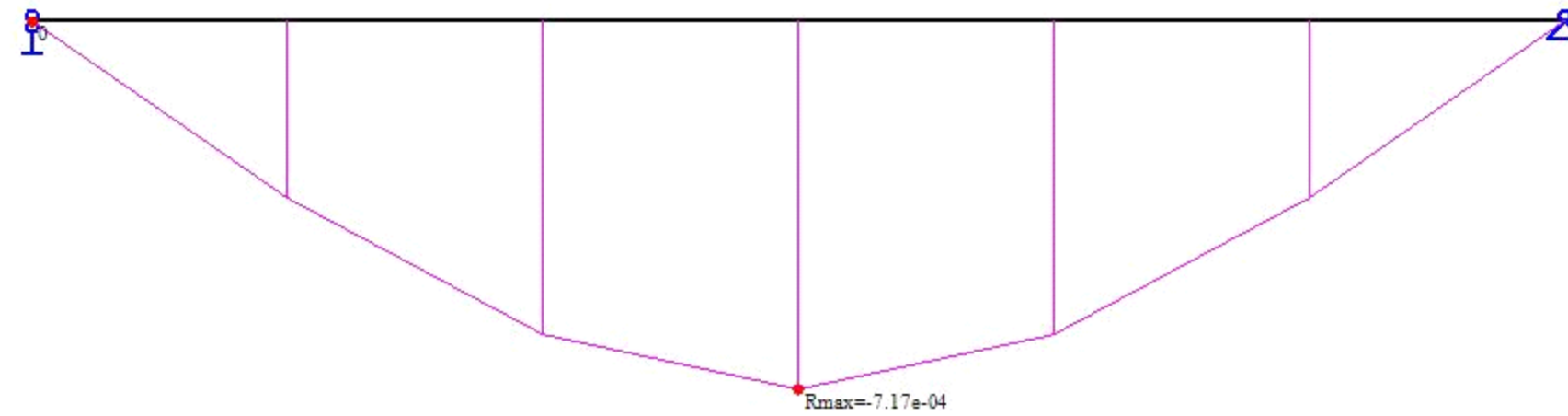
Loading

i = # of Span
 Type T_a = kN.m
 x_o = mm

General Information

E = MPa X = mm
 u = Shape

X = 0.2



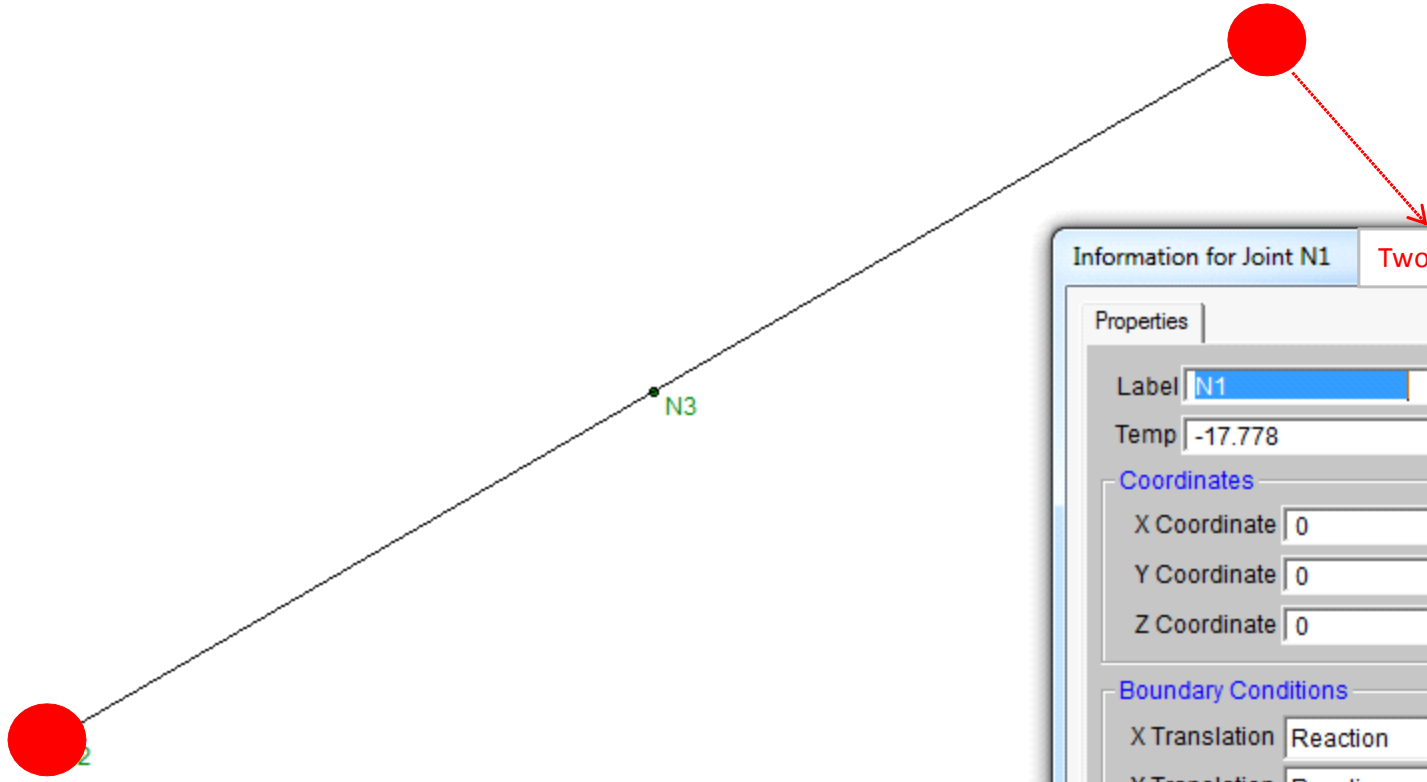
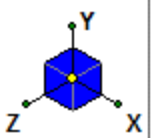
Twist Angle (θ)

Rotation Stiffness: $\frac{10 \text{ kN.m}}{7.17 \times 10^{-4}} = 13947 \text{ kN.m / rad}$

3). Get End Moments for B-1

(Analyse the structure with RISA 3D)

For Beam (B-1) with end rotation spring 13947 kN.m /rad



Information for Joint N1 Two Spring supports

Properties

Label Detach From Diaphragm ?

Temp C

Coordinates

X Coordinate m

Y Coordinate m

Z Coordinate m

Boundary Conditions

X Translation kN/mm

Y Translation kN/mm

Z Translation kN/mm

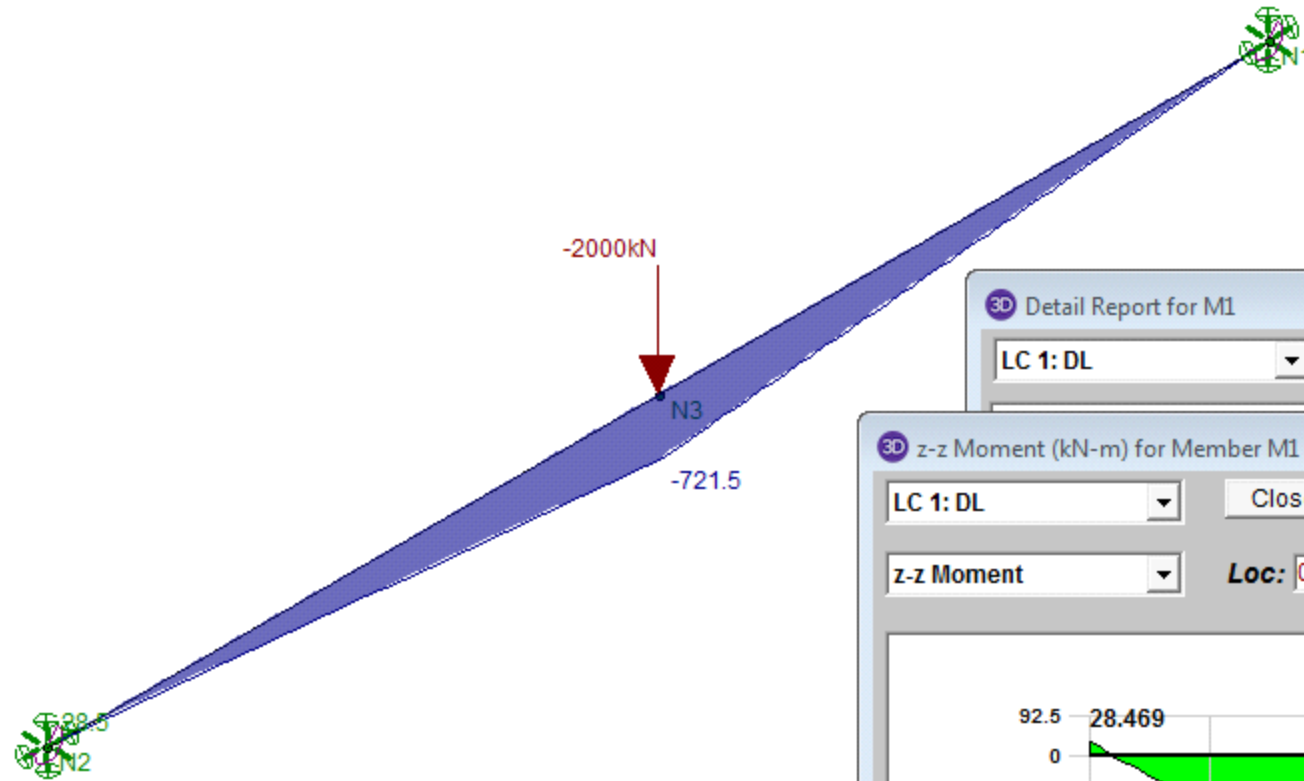
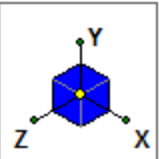
X Rotation kN-m/rad

Y Rotation kN-m/rad

Z Rotation kN-m/rad

Assign Footing

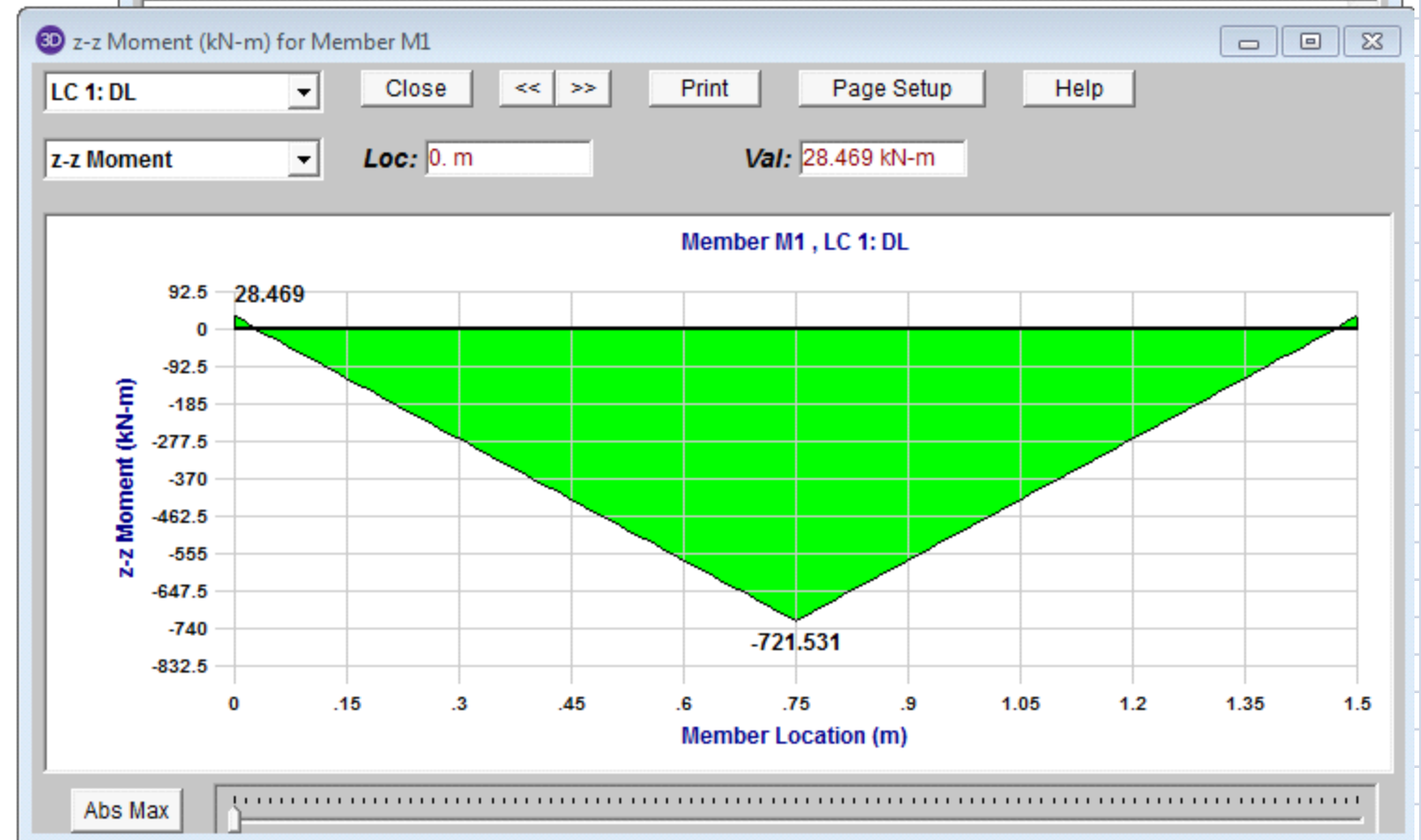
OK Cancel Apply Help



3D Detail Report for M1

LC 1: DL

Options Print Page Setup Help



Loads: BLC 1, Dead
Results for LC 1, DL
Member z Bending Moments (kN-m)

Moment at end of beam (B-1) is 28.5 kN.m

4). Check Maximum Warping Normal Stress on B-2

(Analyse B-2 with www.webcivil.com)

Spans

i = S_i = mm d_i = mm b_i = mm

t = mm w_i = mm

i	S _i (mm)	d _i (mm)	b _i (mm)	t _i (mm)	w _i (mm)
1	1500	476	284	23.9	15

[Review Report](#)

Metric

Imperial

Supports at Ends

Left

Right

Loading

i =

of Span

Type

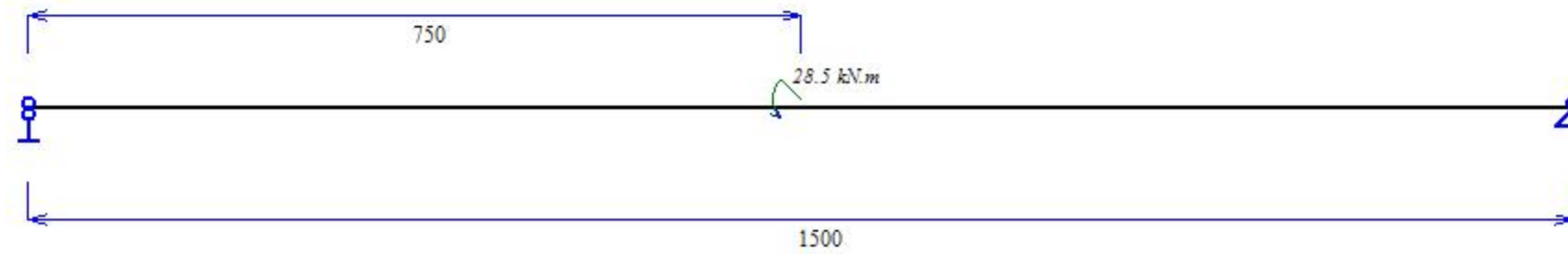
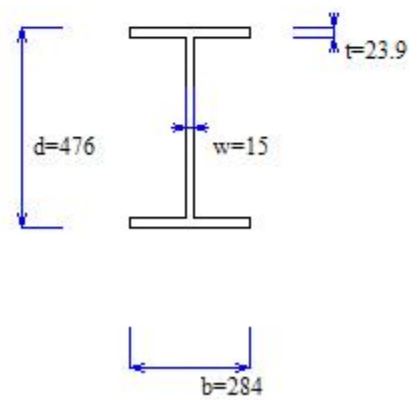
T_a = kN.m

x_a = mm

General Information

E = MPa X = mm

u = Shape



Spans

i = 1 S_i = 1500 mm d_i = 476 mm b_i = 284 mm

t_i = 23.9 mm w_i = 15 mm Update Edit

i	S _i (mm)	d _i (mm)	b _i (mm)	t _i (mm)	w _i (mm)
1	1500	476	284	23.9	15

Apply Review Report

Metric Imperial

Bi-Moment Bw UnLock

Supports at Ends

Left Pin Right Pin

Loading

i = 1 # of Span 1

Type Point T_a = 28.5 kN.m

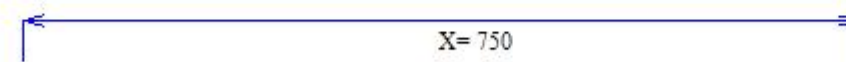
x₀ = 750 mm

Update Edit

General Information

E = 200000 MPa X = 750 mm

u = 0.3 Shape W



at x=750 mm
Max. warping normal stress = 70.6 MPa

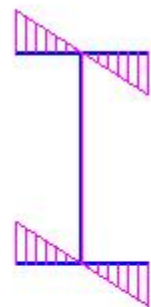
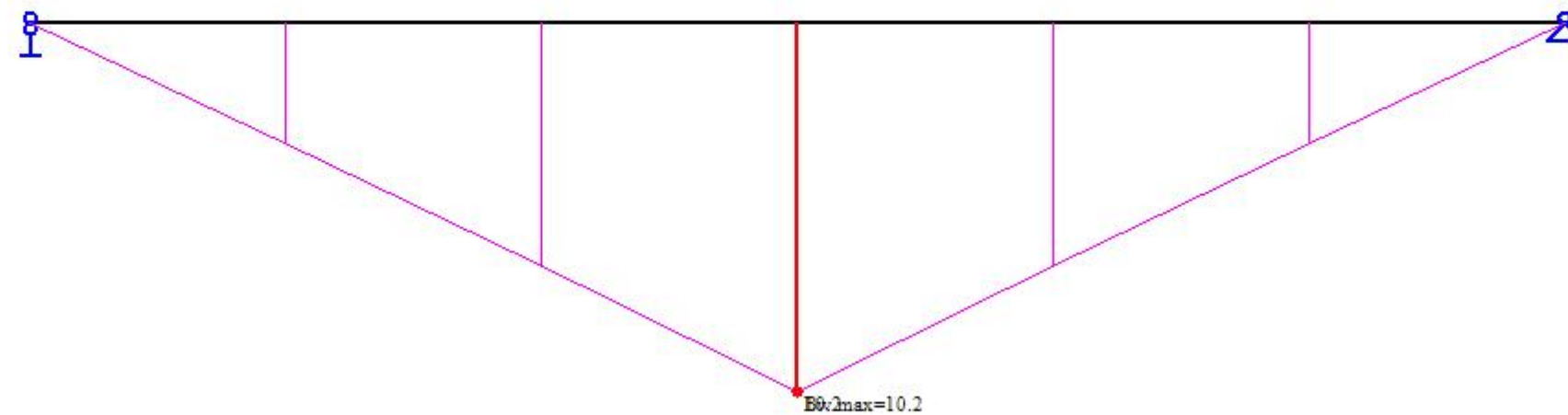


Diagram for Normal Stress by Warping



Bi-Moment Bw (kN.m²)

Utility Ratio = 70.6 MPa / (0.9 x 350 MPa) = 22.4% OK