

# BEAM COLUMN DESIGN AS PER IS-800:2007

## Design Parameters

Section = 450x5+175x8 Sample - (250x5+150x8)

$F_u = 490$  N/mm<sup>2</sup>

$F_y = 350$  N/mm<sup>2</sup>

$KL_z = 13392$  mm

$KL_y = 1500$  mm

$KL_x = 1800$  mm

Moment =  kN m

Shear Force =  kN

Axial Force =  kN

Compression



## Section Classification

$b/t_f = 10.938$

Semi-Compact

$d/t_w = 90$

Semi-Compact

Section

Class.

Semi-Compact

## Sectional Properties

$D = 466$  mm

Total Depth

$NA D = 233$  mm

Neutral Axis Depth

$A = 5050$  mm<sup>2</sup>

Area of Cross Section

$I_{zz} = 184818483$  mm<sup>4</sup>

Moment of Inertia about major axis

$I_{yy} = 7150520.8$  mm<sup>4</sup>

Moment of Inertia about minor axis

$Z_{ez} = 793212.38$  mm<sup>3</sup>

Elastic Section Modulus about major axis

$Z_{ey} = 81720.238$  mm<sup>3</sup>

Elastic Section Modulus about minor axis

$Z_{pz} = 894325$  mm<sup>3</sup>

Plastic Section Modulus about major axis

$Z_{py} = 125312.5$  mm<sup>3</sup>

Plastic Section Modulus about minor axis

$r_z = 191.305$  mm

Radius of Gyration about major axis

$r_y = 37.629$  mm

Radius of Gyration about minor axis

$I_t = 78483.333$  mm<sup>4</sup>

Torsional Constant

$I_w = 3.747E+11$  mm<sup>6</sup>

Warping Constant

$G = 76923.077$  N/mm<sup>2</sup>

Modulus of Rigidity

## Bending Capacity of the Section - Major Axis

$\beta_b$  Value = 0.887

$h_f = 458$  mm

Distance between Flange Centers

$M_{cr} = 1.01E+09$  N mm

$\lambda_{LT} = 0.52$

Non dimensional Slenderness ratio

$\alpha_{LT} = 0.49$

Imperfection Factor

$\phi_{LT} = 0.714$

$\chi_{LT} = 0.831$

Bending Stress reduction factor to acc. LTB

$f_{bd} = 264.409$  N/mm<sup>2</sup>

Design Bending Compressive Stress

$M_{dz} = 209.747$  kN m