

STEEL DESIGN

CODE: NF EN 1993-1:2005/NA:2007/AC:2009, Eurocode 3: Design of steel structures.

ANALYSIS TYPE: Member Verification

CODE GROUP:

MEMBER: 234 P.S._234
m

POINT: 4

COORDINATE: x = 0.50 L = 2.00

LOADS:

Governing Load Case: 16 ULS /105/ 1*1.35 + 2*1.35 + 3*1.35 + 4*1.35 + 5*1.35 + 6*1.35 + 7*1.05 + 8*1.05 + 9*1.05 + 14*1.50

MATERIAL:

ACIER $f_y = 235.00$ MPa



SECTION PARAMETERS: IPE 140

h=14.0 cm	gM0=1.00	gM1=1.00	
b=7.3 cm	Ay=11.16 cm ²	Az=7.65 cm ²	Ax=16.43 cm ²
tw=0.5 cm	Iy=541.22 cm ⁴	Iz=44.92 cm ⁴	Ix=2.46 cm ⁴
tf=0.7 cm	Wply=88.34 cm ³	Wplz=19.25 cm ³	

INTERNAL FORCES AND CAPACITIES:

N _{Ed} = -4.01 kN	My _{Ed} = 0.44 kN*m	Mz _{Ed} = -0.64 kN*m
Nt _{Rd} = 386.11 kN	My _{pl,Rd} = 20.76 kN*m	Mz _{pl,Rd} = 4.52 kN*m
	My _{c,Rd} = 20.76 kN*m	Mz _{c,Rd} = 4.52 kN*m
	MN _{y,Rd} = 20.76 kN*m	MN _{z,Rd} = 4.52 kN*m
	Mb _{Rd} = 9.13 kN*m	

Class of section = 1



LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 10.96 kN*m	Curve,LT -	XLT = 0.44
Lcr,upp=4.00 m	Lam_LT = 1.38	fi,LT = 1.56	XLT,mod = 0.44

BUCKLING PARAMETERS:



About y axis:



About z axis:

VERIFICATION FORMULAS:

Section strength check:

$$N_{Ed}/N_{t,Rd} = 0.01 < 1.00 \quad (6.2.3.(1))$$

$$M_{y,Ed}/M_{N,y,Rd} = 0.02 < 1.00 \quad (6.2.9.1.(2))$$

$$M_{z,Ed}/M_{N,z,Rd} = 0.14 < 1.00 \quad (6.2.9.1.(2))$$

$$(M_{y,Ed}/M_{N,y,Rd})^{2.00} + (M_{z,Ed}/M_{N,z,Rd})^{1.00} = 0.14 < 1.00 \quad (6.2.9.1.(6))$$

Global stability check of member:

$$M_{y,Ed}/M_{b,Rd} = 0.05 < 1.00 \quad (6.3.2.1.(1))$$

LIMIT DISPLACEMENTS



Deflections (LOCAL SYSTEM):

$$u_y = 0.8 \text{ cm} < u_{y \text{ max}} = L/200.00 = 2.0 \text{ cm} \quad \text{Verified}$$

$$\text{Governing Load Case: } 19 \text{ SLS } /67/ \quad 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00 + 5*1.00 + 6*1.00 + 7*0.70 + 14*1.00$$

$u_z = 0.0 \text{ cm} < u_z \text{ max} = L/200.00 = 2.0 \text{ cm}$

Verified

Governing Load Case: 19 SLS /55/ $1*1.00 + 2*1.00 + 3*1.00 + 4*1.00 + 5*1.00 + 6*1.00 + 7*0.70 + 8*0.70 + 9*0.70 + 14*1.00$



Displacements (GLOBAL SYSTEM): *Not analyzed*

Section OK !!!