**Calculation Note from RSA 2012**

# STEEL DESIGN

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**CODE:** *Allowable Stress Design - Ninth Edition*
**ANALYSIS TYPE:** Member Verification

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**CODE GROUP:**
**MEMBER:** 649 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

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**LOADS:**
*Governing Load Case:* 8 PP+SCM+VMAX (1+2+3)*1.00

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**MATERIAL:**
STEEL A572-50 Fy = 3515.35 kG/cm2

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**SECTION PARAMETERS: TRABE_1**

d=110.0 cm

| | | | |
|---|---|---|---|
| b=30.0 cm | Ay=132.000 cm2 | Az=286.000 cm2 | Ax=406.560 cm2 |
| tw=1.3 cm | Iy=638684.077 cm4 | Iz=66476.749 cm4 | J=199481.425 cm4 |
| tf=2.2 cm | Wely=11612.438 cm3 | Welz=4431.783 cm3 | |

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**MEMBER PARAMETERS:**

| | | | | |
|---|---|---|---|---|
| Ly = 0.10 m | Ky = 1.00 | KL/ry = 0.25 | Lb = 0.17 m | UNS = Compact |
| Lz = 0.10 m | Kz = 1.00 | KL/rz = 0.78 | Cb = 1.02 | STI = Slender |

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**INTERNAL FORCES:**

| | | |
|---|---|---|
| Fx = 2.58 T | My = 216.48 T*m | Vy = -0.05 T |
| Mx = 6.55 T*m | Mz = -0.03 T*m | Vz = -6.27 T |

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| **CALCULATION STRESSES:** | | **ALLOWABLE STRESSES:** | |
|---|---|---|---|
| fa = 6.34 kG/cm2 | fvy = -0.40 kG/cm2 | Fa = 2105.69 kG/cm2 | Fvy = 1406.14 kG/cm2 |
| fbcy = 1864.17 kG/cm2 | fvz = -21.93 kG/cm2 | Fbcy = 2109.21 kG/cm2 | Fvz = 1406.14 kG/cm2 |
| fbty = -1864.17 kG/cm2 | fvy,mx = -81.38 kG/cm2 | Fbty = 2109.21 kG/cm2 | |
| fbcz = 0.59 kG/cm2 | fvz,mx = -48.09 kG/cm2 | Fbcz = 2109.21 kG/cm2 | |
| fbtz = -0.59 kG/cm2 | | Fbtz = 2109.21 kG/cm2 | |

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**VERIFICATION FORMULAS:**
fa/(0.6*Fy) + fbcy/Fbcy + fbcz/Fbcz = 0.89 < 1.05 ASD (H1-2)
(fvy+fvy,mx)/Fvy = |-0.06| < 1.05 (fvz+fvz,mx)/Fvz = |-0.05| < 1.05 ASD (F4)

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***Section OK !!!***

**Hand calculations**

According to ASD 9th edition Section F4,

h/tw=84.61 ≤ 380/√Fy ; NO

thus, Fv=(Fy/2.89)Cv ≤ 0.4Fy

since there are no transverse stiffeners, kv=5.34

Value of Cv=0.72

This results in Fv=871.97 kg/cm2 instead of 1406.14 kg/cm2 used by RSA 2012.