

TIMBER STRUCTURE CALCULATIONS

Code: EN 1995-1:2004/A1:2008

Type: 4424119 - Domeo 5

LOADS

Roof covering 0,04 kN/m²
Roof boards, d=18mm 0,09 kN/m²

WIND AND SNOW LOADS:

Ground snow load $s_k = 1,5 \text{ kN/m}^2$
Reference wind $g_{ref} = 0,32 \text{ kN/m}^2$

Governing Load Case: 4 uls (1+2)*1.20+3*1.50

MATERIAL: C24

$g_M = 1.30$ $f_{m,0,k} = 24.00 \text{ MPa}$ $f_{t,0,k} = 14.00 \text{ MPa}$ $f_{c,0,k} = 21.00 \text{ MPa}$
 $f_{v,k} = 2.50 \text{ MPa}$ $f_{t,90,k} = 0.40 \text{ MPa}$ $f_{c,90,k} = 5.30 \text{ MPa}$ $E_{0,moyen} = 11000.00 \text{ MPa}$
 $E_{0,05} = 7400.00 \text{ MPa}$ $G_{moyen} = 690.00 \text{ MPa}$ Service class: 1 $\beta_c = 0.20$



SECTION PARAMETERS: 70x140

$ht = 14.0 \text{ cm}$ $A_y = 65.33 \text{ cm}^2$ $A_z = 65.33 \text{ cm}^2$ $A_x = 98.00 \text{ cm}^2$
 $bf = 7.0 \text{ cm}$ $I_y = 1600.67 \text{ cm}^4$ $I_z = 400.17 \text{ cm}^4$ $I_x = 1096.5 \text{ cm}^4$
 $tw = 3.5 \text{ cm}$ $W_y = 228.67 \text{ cm}^3$ $W_z = 114.33 \text{ cm}^3$
 $tf = 3.5 \text{ cm}$

STRESSES

$\sigma_{m,y,d} = MY/W_y = 2.84/228.67 = 12.40 \text{ MPa}$
 $\tau_{z,d} = 1.5 * -0.00/98.00 = -0.00 \text{ MPa}$

ALLOWABLE STRESSES

$f_{m,y,d} = 14.97 \text{ MPa}$
 $f_{v,d} = 1.54 \text{ MPa}$

Factors and additional parameters

$k_{h,y} = 1.01$ $k_{mod} = 0.80$ $K_{sys} = 1.00$ $k_{cr} = 0.67$



$le_f = 3.68 \text{ m}$ $\lambda_{rel,m} = 0.66$
 $\sigma_{cr} = 54.96 \text{ MPa}$ $k_{crit} = 1.00$

LATERAL BUCKLING PARAMETERS:

$\sigma_{m,y,d}/f_{m,y,d} = 12.40/14.97 = 0.83 < 1.00$ (6.11)
 $\sigma_{m,y,d}/(k_{crit} * f_{m,y,d}) = 12.40/(1.00 * 14.97) = 0.83 < 1.00$ (6.33)
 $(\tau_{z,d}/k_{cr})/f_{v,d} = (0.00/0.67)/1.54 = 0.00 < 1.00$ (6.13)

VERIFICATION FORMULAS:



$u_{fin,y} = 0.0 \text{ cm} < u_{fin,max,y} = L/200.00 = 2.0 \text{ cm}$
Governing load case: $(1+0.6)*1 + (1+0.6)*2 + (1+0*0.6)*3$
 $u_{fin,z} = 2.0 \text{ cm} < u_{fin,max,z} = L/200.00 = 2.0 \text{ cm}$
Governing load case: $(1+0.6)*1 + (1+0.6)*2 + (1+0*0.6)*3$

Section OK !!!