

TIMBER STRUCTURE CALCULATIONS

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

Type: 4423619 - Domeo 1

LOADS

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

WIND AND SNOW LOADS:

Ground snow load $s_k = 2,05 \text{ kN/m}^2$

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: 44x140

ht=14.0 cm			
bf=4.4 cm	$A_y=41.07 \text{ cm}^2$	$A_z=41.07 \text{ cm}^2$	$A_x=61.60 \text{ cm}^2$
tw=2.2 cm	$I_y=1006.13 \text{ cm}^4$	$I_z=99.38 \text{ cm}^4$	$I_x=318.8 \text{ cm}^4$
tf=2.2 cm	$W_y=143.73 \text{ cm}^3$	$W_z=45.17 \text{ cm}^3$	

STRESSES

$\sigma_{m,y,d} = M_y/W_y = 1.90/143.73 = 13.25 \text{ MPa}$
 $\tau_{z,d} = 1.5 * -0.00/61.60 = -0.00 \text{ MPa}$

ALLOWABLE STRESSES

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

Factors and additional parameters

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



$l_{ef} = 2.62 \text{ m}$ $\lambda_{rel,m} = 0.89$
 $\sigma_{cr} = 30.46 \text{ MPa}$ $k_{crit} = 0.89$

LATERAL BUCKLING PARAMETERS:

$\sigma_{m,y,d}/f_{m,y,d} = 13.25/14.97 = 0.88 < 1.00$ (6.11)
 $\sigma_{m,y,d}/(k_{crit} * f_{m,y,d}) = 13.25/(0.89 * 14.97) = 0.99 < 1.00$ (6.33)
 $(\tau_{z,d}/k_{cr})/f_{v,d} = (0.00/0.67)/1.54 = 0.00 < 1.00$ (6.13)

VERIFICATION FORMULAS:



$u_{fin,y} = 0.0 \text{ cm} < u_{fin,max,y} = L/200.00 = 1.5 \text{ cm}$
Governing load case: $(1+0.6)*1 + (1+0.6)*2 + (1+0*0.6)*3$
 $u_{fin,z} = 1.1 \text{ cm} < u_{fin,max,z} = L/200.00 = 1.5 \text{ cm}$
Governing load case: $(1+0.6)*1 + (1+0.6)*2 + (1+0*0.6)*3$

Section OK !!!