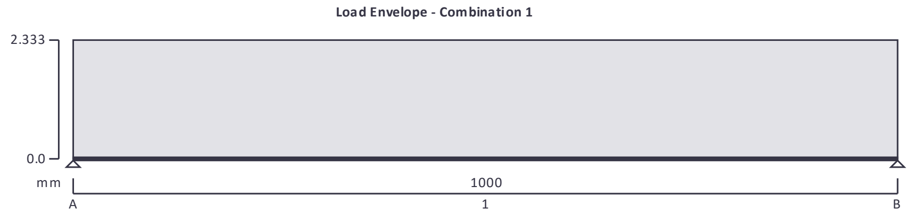
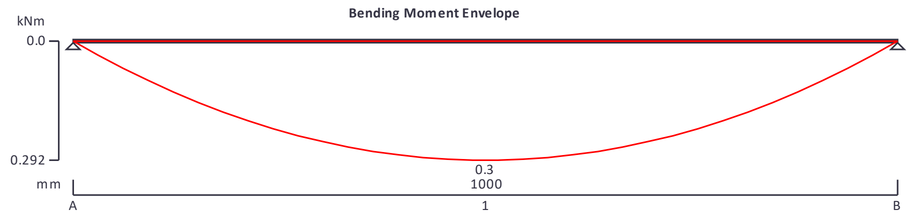
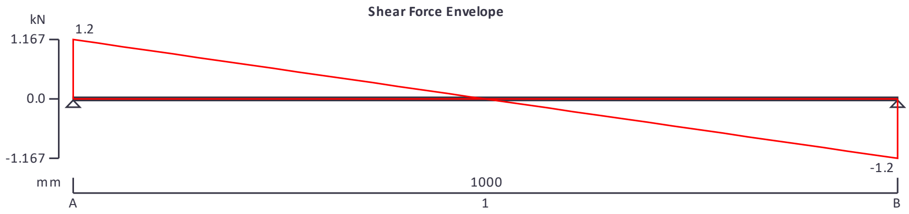
CP Structural Engineering Ltd High Reach, 2 Old Acre Pyrford, Woking Surrey. GU22 8XP	Project Rio House, High Street, Ripley				Job no. 22094	
	Calcs for Timber lintel				Start page no./Revision 1	
	Calcs by CP	Calcs date 12/05/2023	Checked by	Checked date	Approved by	Approved date

TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.01







Applied loading

Beam loads

Dead self weight of beam × 1

Timber stud wall	Dead full UDL 1.500 kN/m
Roof (nom)	Dead full UDL 0.480 kN/m
Roof (nom)	Imposed full UDL 0.300 kN/m

Load combinations

Load combination 1	Support A	Dead × 1.00
Imposed × 1.00		
Span 1	Dead × 1.00	
Imposed × 1.00		
Support B	Dead × 1.00	
Imposed × 1.00		

Analysis results

Maximum moment	M_{max} = **0.292** kNm	M_{min} = **0.000** kNm
Design moment	M = max(abs(M_{max}),abs(M_{min})) = **0.292** kNm	
Maximum shear	F_{max} = **1.167** kN	F_{min} = **-1.167** kN
Design shear	F = max(abs(F_{max}),abs(F_{min})) = **1.167** kN	

Total load on beam W_{tot} = **2.333** kN

Reactions at support A R_{A_max} = **1.167** kN R_{A_min} = **1.167** kN

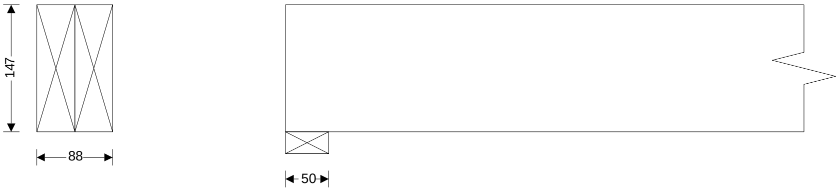
Unfactored dead load reaction at support A R_{A_Dead} = **1.017** kN

Unfactored imposed load reaction at support A $R_{A\_Imposed}$ = **0.150** kN

Reactions at support B R_{B_max} = **1.167** kN R_{B_min} = **1.167** kN

Unfactored dead load reaction at support B R_{B_Dead} = **1.017** kN

Unfactored imposed load reaction at support B $R_{B\_Imposed}$ = **0.150** kN



Timber section details

Breadth of sections b = **44** mm

Depth of sections h = **147** mm

Number of sections in member N = **2**

Overall breadth of member $b_b = N \times b$ = **88** mm

Timber strength class **C24**

Member details

Service class of timber **1**

Load duration **Long term**

Length of span L_{s1} = **1000** mm

Length of bearing L_b = **50** mm

Section properties

Cross sectional area of member $A = N \times b \times h$ = **12936** mm²

Section modulus $Z_x = N \times b \times h^2 / 6$ = **316932** mm³

$Z_y = h \times (N \times b)^2 / 6$ = **189728** mm³

Second moment of area $I_x = N \times b \times h^3 / 12$ = **23294502** mm⁴

$I_y = h \times (N \times b)^3 / 12$ = **8348032** mm⁴

Radius of gyration $i_x = \sqrt{(I_x / A)}$ = **42.4** mm

$i_y = \sqrt{(I_y / A)}$ = **25.4** mm

Modification factors

Duration of loading - Table 17 K_3 = **1.00**

Bearing stress - Table 18 K_4 = **1.00**

Total depth of member - cl.2.10.6 $K_7 = (300 \text{ mm} / h)^{0.11}$ = **1.08**

Load sharing - cl.2.10.11 K_8 = **1.10**

Minimum modulus of elasticity - Table 20 K_9 = **1.14**

Lateral support - cl.2.10.8

No lateral support

Permissible depth-to-breadth ratio - Table 19 **2.00**

Actual depth-to-breadth ratio $h / (N \times b)$ = **1.67**

PASS - Lateral support is adequate

Compression perpendicular to grain

Permissible bearing stress (no wane) $\sigma_{c\_adm} = \sigma_{cp1} \times K_3 \times K_4 \times K_8 =$ **2.640** N/mm²

Applied bearing stress $\sigma_{c\_a} = R_{A\_max} / (N \times b \times L_b) =$ **0.265** N/mm²

$\sigma_{c\_a} / \sigma_{c\_adm} =$ **0.100**

PASS - Applied compressive stress is less than permissible compressive stress at bearing

Bending parallel to grain

Permissible bending stress $\sigma_{m\_adm} = \sigma_m \times K_3 \times K_7 \times K_8 =$ **8.923** N/mm²

Applied bending stress $\sigma_{m\_a} = M / Z_x =$ **0.920** N/mm²

$\sigma_{m\_a} / \sigma_{m\_adm} =$ **0.103**

PASS - Applied bending stress is less than permissible bending stress

Shear parallel to grain

Permissible shear stress $\tau_{adm} = \tau \times K_3 \times K_8 =$ **0.781** N/mm²

Applied shear stress $\tau_a = 3 \times F / (2 \times A) =$ **0.135** N/mm²

$\tau_a / \tau_{adm} =$ **0.173**

PASS - Applied shear stress is less than permissible shear stress

Deflection

Modulus of elasticity for deflection $E = E_{min} \times K_9 =$ **8208** N/mm²

Permissible deflection $\delta_{adm} = \min(0.551 \text{ in}, 0.003 \times L_{s1}) =$ **3.000** mm

Bending deflection $\delta_{b\_s1} =$ **0.159** mm

Shear deflection $\delta_{v\_s1} =$ **0.053** mm

Total deflection $\delta_a = \delta_{b\_s1} + \delta_{v\_s1} =$ **0.212** mm

$\delta_a / \delta_{adm} =$ **0.071**

PASS - Total deflection is less than permissible deflection