

SCHEME

PAGE No.

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Initials Date

Anwylfa, Cae Glo, Cefn Mawr

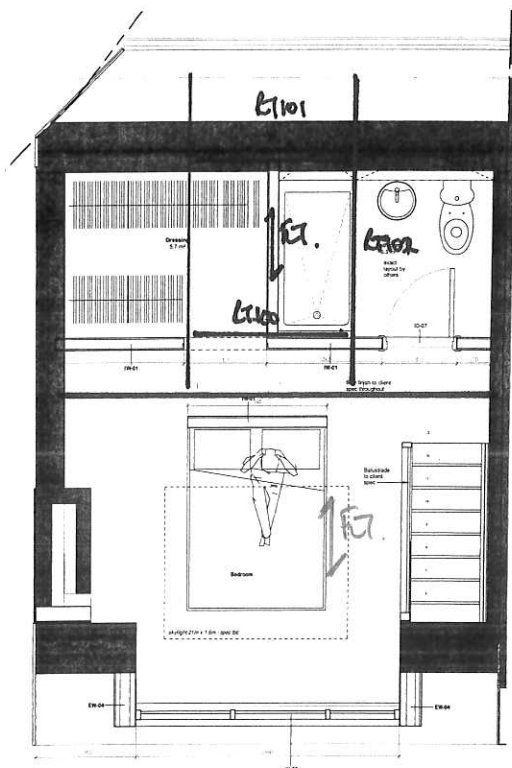
Loft Conversion and Alterations

Prepared by

at 04/24

Checked by

ADDITIONAL DETAILS



Existing joists are 50x175 C24 @ 400mm.

Loft Truss K100 Span = 2100mm.

loads to truss - udl -

$$g_k = 1.17 \times 1.92 + 0.63 \times 1.92 = 1.2 \text{ k/m}$$

$$q_k = 0.75 \times 2.92 = 1.1 \text{ k/m}$$

use 20ft 50x175 C24 joists. III

Loft Truss K101 Span = 2100mm.

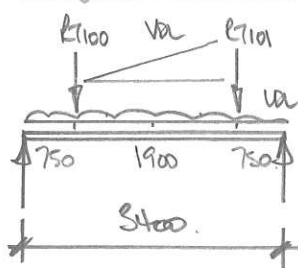
loads to truss - udl -

$$g_k = 1.2 + 1.0 \times 1.3 = 2.5 \text{ k/m}$$

$$q_k = 1.1 \text{ k/m}$$

use 20ft 50x175 C24 joists. III

Loft Truss K102 Span = 3400mm.



$$K100 - G_k = 1.32 \text{ k}$$

$$Q_k = 1.16 \text{ k}$$

$$K101 - G_k = 2.68 \text{ k}$$

$$Q_k = 1.16 \text{ k}$$

$$u - g_k = 1.0 \times 1.3 = 1.3 \text{ k/m max.}$$

$$u - g_k = 1.17 \times 0.42 = 0.2 \text{ k/m}$$

$$q_k = 0.75 \times 0.42 = 0.2 \text{ k/m}$$

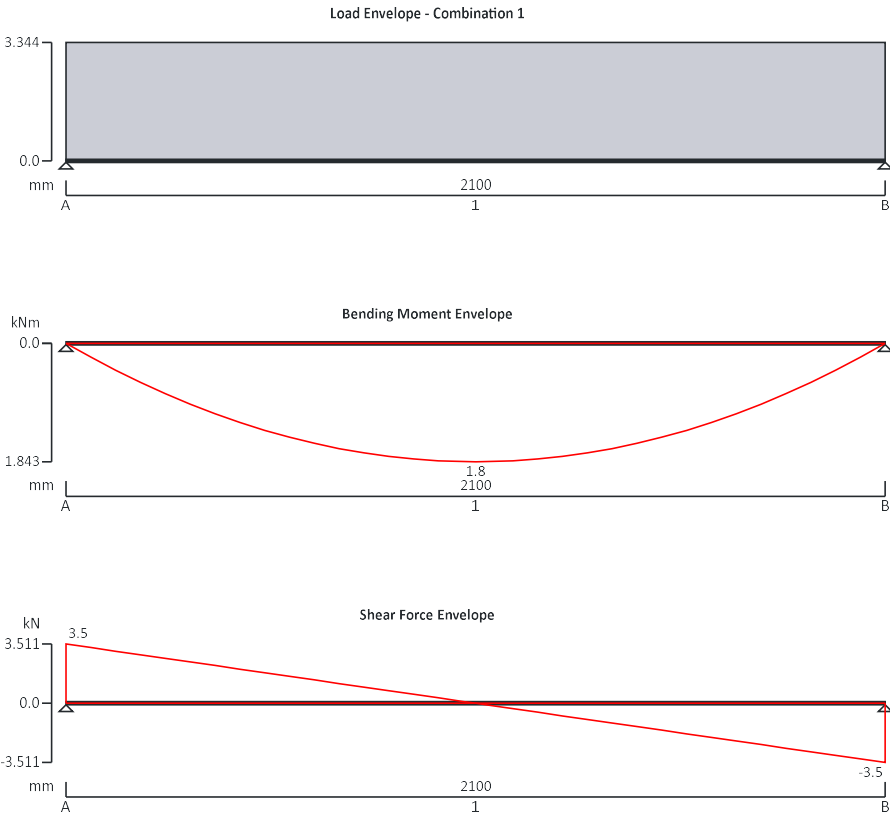
use 30ft 50x175 C24 joists. III

ROOF TRIMMER RT100

TIMBER BEAM ANALYSIS & DESIGN TO EN1995-1-1:2004

In accordance with EN1995-1-1:2004 + A2:2014 and Corrigendum No.1 and the UK National Annex incorporating National Amendment No.1

Tedds calculation version 1.7.05



Applied loading

Beam loads

UDL gk

UDL qk

Permanent self weight of beam × 1

Permanent full UDL 1.200 kN/m

Variable full UDL 1.100 kN/m

Load combinations

Load combination 1	Support A	Permanent × 1.35
		Variable × 1.50
	Span 1	Permanent × 1.35
		Variable × 1.50
	Support B	Permanent × 1.35
		Variable × 1.50

Analysis results

Design moment	M = 1.843 kNm	Design shear	F = 3.511 kN
Total load on member	W _{tot} = 7.022 kN		

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Reactions at support A	$R_{A_max} = 3.511 \text{ kN}$	$R_{A_min} = 3.511 \text{ kN}$
Unfactored permanent load reaction at support A	$R_{A_Permanent} = 1.318 \text{ kN}$	
Unfactored variable load reaction at support A	$R_{A_Variable} = 1.155 \text{ kN}$	
Reactions at support B	$R_{B_max} = 3.511 \text{ kN}$	$R_{B_min} = 3.511 \text{ kN}$
Unfactored permanent load reaction at support B	$R_{B_Permanent} = 1.318 \text{ kN}$	
Unfactored variable load reaction at support B	$R_{B_Variable} = 1.155 \text{ kN}$	
Timber section details		
Breadth of section	$b = 47 \text{ mm}$	Depth of section $h = 170 \text{ mm}$
Number of sections	$N = 2$	Breadth of member $b_b = 94 \text{ mm}$
Inclination of section	$\theta = 30.0 \text{ deg}$	
Timber strength class	C24	
Member details		
Service class of timber	1	Load duration Medium-term
Length of span	$L_{s1} = 2100 \text{ mm}$	
Length of bearing	$L_b = 100 \text{ mm}$	
Compression perpendicular to grain - cl.6.1.4		
Design compressive stress	$\sigma_{c,90,d} = 0.374 \text{ N/mm}^2$	Design compressive strength $f_{c,90,d} = 1.538 \text{ N/mm}^2$
PASS - Design compressive strength exceeds design compressive stress at bearing		
Biaxial bending - cl 6.1.6		
Des.bend.stress in maj.axis	$\sigma_{m,y,d} = 3.526 \text{ N/mm}^2$	Des.bend.stress in min.axis $\sigma_{m,z,d} = 3.682 \text{ N/mm}^2$
Design bending strength	$f_{m,d} = 14.769 \text{ N/mm}^2$	
PASS - Design bending strength exceeds design bending stress		
Shear - cl.6.1.7		
Applied shear stress	$\tau_d = 0.492 \text{ N/mm}^2$	Permissible shear stress $f_{v,d} = 2.462 \text{ N/mm}^2$
PASS - Design shear strength exceeds design shear stress		
Deflection - cl.7.2		
Deflection limit	$\delta_{lim} = 8.400 \text{ mm}$	Total final deflection $\delta_{fin} = 2.436 \text{ mm}$
PASS - Total final deflection is less than the deflection limit		

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Loft Conversion and Alterations

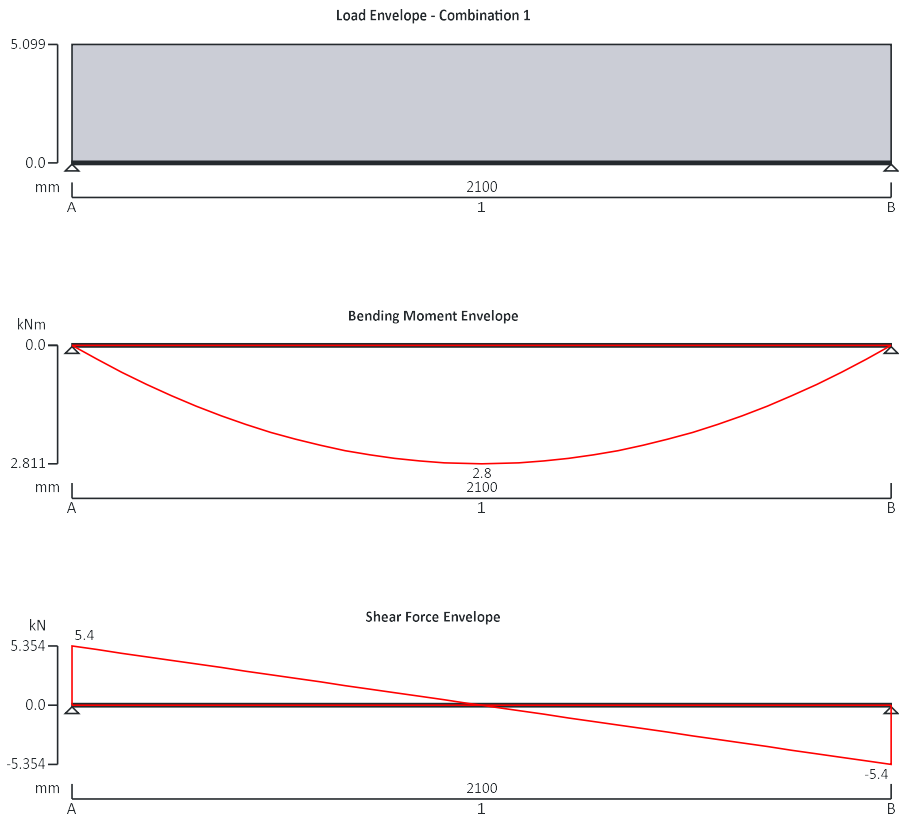
Initials Date		
Prepared by	AH	04/24
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ROOF TRIMMER RT101

TIMBER BEAM ANALYSIS & DESIGN TO EN1995-1-1:2004

In accordance with EN1995-1-1:2004 + A2:2014 and Corrigendum No.1 and the UK National Annex incorporating National Amendment No.1

Tedds calculation version 1.7.05



Applied loading

Beam loads

UDL gk
UDL qk

Permanent self weight of beam × 1
Permanent full UDL 2.500 kN/m
Variable full UDL 1.100 kN/m

Load combinations

Load combination 1

Support A	Permanent × 1.35 Variable × 1.50
Span 1	Permanent × 1.35 Variable × 1.50
Support B	Permanent × 1.35 Variable × 1.50

Analysis results

Design moment	M = 2.811 kNm	Design shear	F = 5.354 kN
Total load on member	W _{tot} = 10.708 kN		

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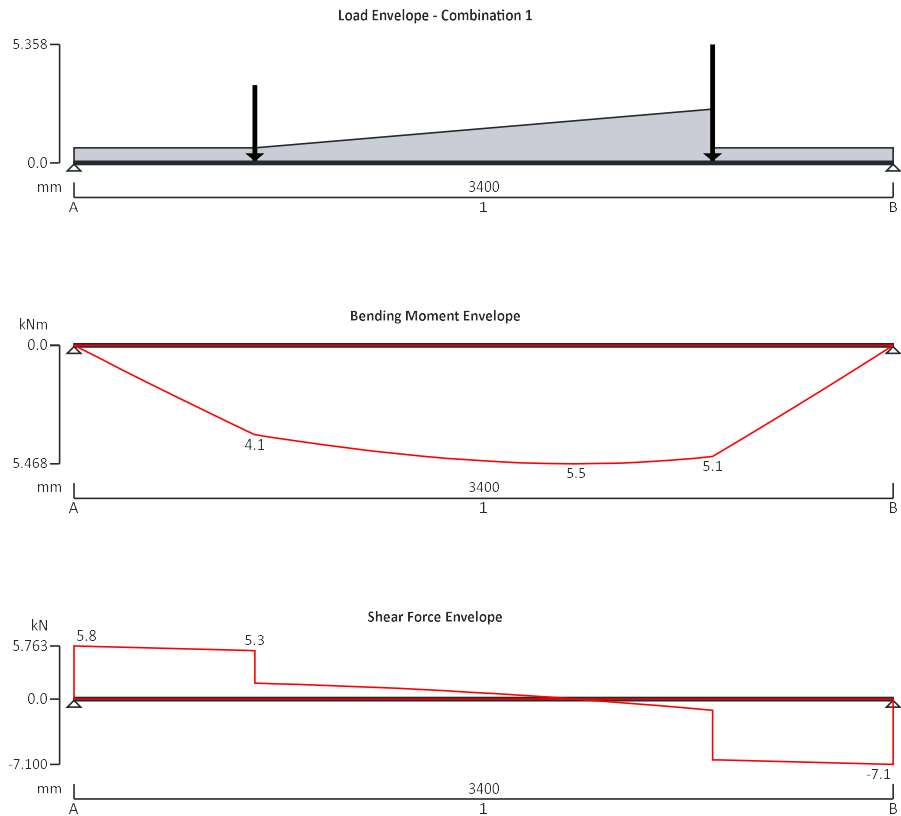
Reactions at support A	$R_{A_max} = 5.354 \text{ kN}$	$R_{A_min} = 5.354 \text{ kN}$
Unfactored permanent load reaction at support A	$R_{A_Permanent} = 2.683 \text{ kN}$	
Unfactored variable load reaction at support A	$R_{A_Variable} = 1.155 \text{ kN}$	
Reactions at support B	$R_{B_max} = 5.354 \text{ kN}$	$R_{B_min} = 5.354 \text{ kN}$
Unfactored permanent load reaction at support B	$R_{B_Permanent} = 2.683 \text{ kN}$	
Unfactored variable load reaction at support B	$R_{B_Variable} = 1.155 \text{ kN}$	
Timber section details		
Breadth of section	$b = 47 \text{ mm}$	Depth of section $h = 170 \text{ mm}$
Number of sections	$N = 2$	Breadth of member $b_b = 94 \text{ mm}$
Inclination of section	$\theta = 30.0 \text{ deg}$	
Timber strength class	C24	
Member details		
Service class of timber	1	Load duration Medium-term
Length of span	$L_{s1} = 2100 \text{ mm}$	
Length of bearing	$L_b = 100 \text{ mm}$	
Compression perpendicular to grain - cl.6.1.4		
Design compressive stress	$\sigma_{c,90,d} = 0.570 \text{ N/mm}^2$	Design compressive strength $f_{c,90,d} = 1.538 \text{ N/mm}^2$
PASS - Design compressive strength exceeds design compressive stress at bearing		
Biaxial bending - cl 6.1.6		
Des.bend.stress in maj.axis	$\sigma_{m,y,d} = 5.376 \text{ N/mm}^2$	Des.bend.stress in min.axis $\sigma_{m,z,d} = 5.614 \text{ N/mm}^2$
Design bending strength	$f_{m,d} = 14.769 \text{ N/mm}^2$	
PASS - Design bending strength exceeds design bending stress		
Shear - cl.6.1.7		
Applied shear stress	$\tau_d = 0.750 \text{ N/mm}^2$	Permissible shear stress $f_{v,d} = 2.462 \text{ N/mm}^2$
PASS - Design shear strength exceeds design shear stress		
Deflection - cl.7.2		
Deflection limit	$\delta_{lim} = 8.400 \text{ mm}$	Total final deflection $\delta_{fin} = 4.066 \text{ mm}$
PASS - Total final deflection is less than the deflection limit		

ROOF TRIMMER RT102

TIMBER BEAM ANALYSIS & DESIGN TO EN1995-1-1:2004

In accordance with EN1995-1-1:2004 + A2:2014 and Corrigendum No.1 and the UK National Annex incorporating National Amendment No.1

Tedds calculation version 1.7.05



Applied loading

Beam loads

RT100 Gk	Permanent self weight of beam × 1
RT100 Qk	Permanent point load 1.320 kN at 750 mm
RT101 Gk	Variable point load 1.160 kN at 750 mm
RT101 Qk	Permanent point load 2.680 kN at 2650 mm
VDL gk	Variable point load 1.160 kN at 2650 mm
mm	Permanent partial VDL 0.000 kN/m at 750 mm to 1.300 kN/m at 2650
UDL gk	Permanent full UDL 0.200 kN/m
UDL qk	Variable full UDL 0.200 kN/m

Load combinations

Load combination 1	Support A	Permanent × 1.35
		Variable × 1.50
	Span 1	Permanent × 1.35

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		Support B	Variable × 1.50
			Permanent × 1.35
			Variable × 1.50
Analysis results			
Design moment	M = 5.468 kNm	Design shear	F = 7.100 kN
Total load on member	W _{tot} = 12.863 kN		
Reactions at support A	R _{A_max} = 5.763 kN	R _{A_min} = 5.763 kN	
Unfactored permanent load reaction at support A	R _{A_Permanent} = 2.602 kN		
Unfactored variable load reaction at support A	R _{A_Variable} = 1.500 kN		
Reactions at support B	R _{B_max} = 7.100 kN	R _{B_min} = 7.100 kN	
Unfactored permanent load reaction at support B	R _{B_Permanent} = 3.592 kN		
Unfactored variable load reaction at support B	R _{B_Variable} = 1.500 kN		
Timber section details			
Breadth of section	b = 47 mm	Depth of section	h = 170 mm
Number of sections	N = 3	Breadth of member	b _b = 141 mm
Timber strength class	C24		
Member details			
Service class of timber	1	Load duration	Medium-term
Length of span	L _{s1} = 3400 mm		
Length of bearing	L _b = 100 mm		
Compression perpendicular to grain - cl.6.1.4			
Design compressive stress	σ _{c,90,d} = 0.504 N/mm ²	Design compressive strength	f _{c,90,d} = 1.538 N/mm ²
PASS - Design compressive strength exceeds design compressive stress at bearing			
Bending - cl 6.1.6			
Design bending stress	σ _{m,d} = 8.051 N/mm ²	Design bending strength	f _{m,d} = 14.769 N/mm ²
PASS - Design bending strength exceeds design bending stress			
Shear - cl.6.1.7			
Applied shear stress	τ _d = 0.663 N/mm ²	Permissible shear stress	f _{v,d} = 2.462 N/mm ²
PASS - Design shear strength exceeds design shear stress			
Deflection - cl.7.2			
Deflection limit	δ _{lim} = 13.600 mm	Total final deflection	δ _{fin} = 11.370 mm
PASS - Total final deflection is less than the deflection limit			