



35 Whitworth Road, Rochdale

ES670

SCOPE

Design calculations for proposed works for Remedial Works at A Two Storey Property

FROM SITE MEASUREMENTS



RELEVANT ARCHITECTURAL DRAWINGS



MERIDIAN CONSTRUCTION AND REFURBS

RELEVANT CODES OF PRACTICE

BRITISH STANDARDS		EUROCODES
GENERAL	Building Regulations 2010 PP7312 :2002	EN 1990 - Eurocode 0: Basis of structural design
LOADING	BS 6399 (1:1996 ; 2:1997 ; 3:1988)	EN 1991 - Eurocode 1: Actions on structures
STEELWORK	BS 5950 (1: 2000) SCI Steelwork Design Guide to BS 5950 - 6 th Edition	EN 1993 - Eurocode 3: Design of steel structures
TIMBER	BS 5268 (2:2002 ; 3:1998)	EN 1995 - Eurocode 5: Design of timber structures
MASONRY	BS 5628 (1:1992 ; 2:2000)	EN 1996 - Eurocode 6: Design of masonry structures
CONCRETE	BS 8110 (1:1997)	EN 1992 - Eurocode 2: Design of concrete structures
FOUNDATIONS	BS 8004 (1986)	

NOT FOR BUILDERS
Builders must use drawings only

LOADINGS

		Project.	
Prepared by.		35 Whitworth Road, Rochdale	
Sheet No.		Project Ref.	ES670
01		Date	23/04/2022
<u>LOADS</u>		<u>SLS</u>	<u>ULS</u>
ROOF			
Coverings (Tiles)		0.60	
Battens, Felt, Insulation		0.05	
Rafters / Trussed Rafters		0.15	
Ceiling Joists		0.25	
Ceiling			
DEAD		1.05	
IMPOSED		0.75	1.20
TOTAL		1.80	2.70
FLAT ROOF			
Chippings, 3 Layer Felt, Boards, Joists, Insulation & Ceiling		0.80	1.12
FLOOR			
Coverings		0.10	
Joists/PC Planks		0.15	
Ceiling		0.25	
Partitions generally			
DEAD		0.50	0.70
IMPOSED		1.50	2.40
TOTAL		2.00	3.10
WALLS			
Brickwork outer leaf (102 mm - fair faced)		2.00	2.80
Brickwork outer leaf (102 mm - rendered)		2.50	3.50
Brickwork inner leaf (102 mm - plastered)		2.25	3.15
Blockwork inner Leaf (100mm - plastered /1)		1.75	2.50
Blockwork partition (100mm - plastered/2)		2.10	3.00
Timber stud (75mm - plastered/2)		0.70	1.00
Lightweight stud		0.50	0.70



Project.

35 Whitworth Road, Rochdale

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Project Ref.

ES670

Sheet No.

02

Date

23/04/2022

① New PURLINE @ 4230mm SPAN

LAND	DL	LC
Roof	1.05 x (3 1/2)	0.75 x (3 1/2)
W	1.63m	1.16m

* TOO HIGH SHEAR NOT ENOUGH SPACE FOR CONNECTION
PAGE, AS 370mm TOU SHEET *

REF CALC SHEET
03



USE 225 x 100mm, C14
CARP TIMBER

② New FLOOR JOISTS @ 4230mm SPAN

LAND	DL	LC
FLOOR	0.5 x 0.4	1.5 x 0.4
W	0.21m	0.61m

REF CALC SHEET
04



USE 175 x 63mm, C24
GRADE JUST

③ New FLOOR JOISTS @ 4230mm SPAN

LAND	DL	LC
FLOOR	0.5 x 0.4	1.5 x 0.4
W	0.21m	0.61m

REF CALC SHEET
05



USE ① 175 x 63mm, C14 Grade
② 200 x 50mm, C24 Grade
③ 400mm C/S

④ SIMPOSE TRIMMER @ 960mm SPAN

LAND	DL	LC
FLOOR	0.5 x (3 1/2)	1.5 x (3 1/2)
W	0.73m	2.18m

REF CALC SHEET
06



USE 675 x 63mm, C24
CARP TIMBER

 9 Crossley St- Halifax-HX1 1UG 07450482148 info@elysiumstructures.co.uk	Project 35 Whitworth Road, Rochdale				Job Ref. ES670	
	Section New Purlin				Sheet no./rev. 63	
	Calc. by SB	Date 23/04/2022	Chk'd by SB	Date 23/04/2022	App'd by	Date

Analysis for a simply-supported single-span timber beam to BS 5268

TEDDS calculation version 1.0.02

Span length & partial factors for loading

Span (mm)	γ_{fs}	Factors for moments & forces			Factors for deflection		
		γ_m	γ_{fw}	γ_{fd}	γ_{di}	γ_{dw}	
4230	1.00	1.00	1.00	1.00	1.00	1.00	

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	"ROOF"				
2	"Imposed"	"ROOF"				

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	UDL	1.6	0	-	4230
2	"Imposed"	UDL	1.2	0	-	4230

Analysis results - entire span

R_a kN (fac)	R_b kN (fac)	V kN (fac)	M kNm (fac)	Sense	Deflection: δEI kNm ³	Direction
5.9	5.9	5.9	6.2	"Sagging"	11.63	"Down"

Unfactored support reactions

Support A: Dead load; -3.4 kN; Live load; -2.5 kN; Wind load; 0.0 kN;
Support B: Dead load; -3.4 kN; Live load; -2.5 kN; Wind load; 0.0 kN;

Member design checks for a simply-supported single-span timber beam to BS 5268

Timber member design BS 5268-2:2002

Summary of results;				
Section size;	D = 225 mm;	B = 100 mm;	A = 22500 mm ² ;	
Section properties (x-x);	$I_{xx} = 94921880 \text{ mm}^4$;	$Z_{xx} = 843750 \text{ mm}^3$;	$r_{xx} = 65.0 \text{ mm}$;	
(y-y);	$I_{yy} = 18750000 \text{ mm}^4$;	$Z_{yy} = 375000 \text{ mm}^3$;	$r_{yy} = 28.9 \text{ mm}$;	
Grade;	"C24";	$\sigma_c = 7.90 \text{ N/mm}^2$;		
Check;	Stress;	Capacity;	Notes;	Result;
Bending stress;	$\sigma_{m.s.para} = M / Z_{xx} = 7.40 \text{ N/mm}^2$;	$\sigma_{m.adm.para} = 7.74 \text{ N/mm}^2$;	Moment; M = 6.2 kNm;	Pass
Shear stress;	$\tau_s = 0.39 \text{ N/mm}^2$;	$\tau_{adm} = 0.71 \text{ N/mm}^2$;	Shear; V = 5.9 kN;	Pass
Deflection;	$\delta = 11.8 \text{ mm}$;	14 mm;		Pass
	$\delta / L_s = 0.00280$;	0.003;		Pass



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Project

35 Whitworth Road, Rochdale

Job Ref.

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Section

New Joist

Sheet no./rev.

04

Calc. by

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Date

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App'd by

Date

Analysis for a simply-supported single-span timber beam to BS 5268

TEDDS calculation version 1.0.02

Span length & partial factors for loading

Span (mm)	γ_{fd}	Factors for moments & forces			Factors for deflection		
		γ_{fi}	γ_{fw}		γ_{fd}	γ_{di}	γ_{dw}
4230	1.00	1.00	1.00		1.00	1.00	1.00

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	"floor"				
2	"Imposed"	"floor"				

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	UDL	0.2	0	-	4230
2	"Imposed"	UDL	0.6	0	-	4230

Analysis results - entire span

R_a kN (fac)	R_b kN (fac)	V kN (fac)	M kNm (fac)	Sense	Deflection: δEI kNm ³	Direction
1.7	1.7	1.7	1.8	"Sagging"	3.33	"Down"

Unfactored support reactions

Support A; Dead load; -0.4 kN; Live load; -1.3 kN; Wind load; 0.0 kN;
Support B; Dead load; -0.4 kN; Live load; -1.3 kN; Wind load; 0.0 kN;

Member design checks for a simply-supported single-span timber beam to BS 5268

Timber member design BS 5268-2:2002

Summary of results;				
Section size;	D = 175 mm;	B = 63 mm;	A = 11025 mm ² ;	
Section properties (x-x);	$I_{xx} = 28136720 \text{ mm}^4$;	$Z_{xx} = 321563 \text{ mm}^3$;	$r_{xx} = 50.5 \text{ mm}$;	
(y-y);	$I_{yy} = 3646520 \text{ mm}^4$;	$Z_{yy} = 115763 \text{ mm}^3$;	$r_{yy} = 18.2 \text{ mm}$;	
Grade;	"C24";	$\sigma_c = 7.90 \text{ N/mm}^2$;		
Check;	Stress;	Capacity;	Notes;	Result;
Bending stress;	$\sigma_{m,adm} = M / Z_{xx} = 5.56 \text{ N/mm}^2$;	$\sigma_{m,adm,para} = 7.96 \text{ N/mm}^2$;	Moment; M = 1.8 kNm;	Pass
Shear stress;	$\tau_a = 0.23 \text{ N/mm}^2$;	$\tau_{adm} = 0.71 \text{ N/mm}^2$;	Shear; V = 1.7 kN;	Pass
Deflection;	$\delta = 11.3 \text{ mm}$;	14 mm;		Pass
	$\delta / L_s = 0.00266$;	0.003;		Pass



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Project 35 Whitworth Road, Rochdale				Job Ref. ES670	
Section New Floor				Sheet no./rev. 65	
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Analysis for a simply-supported single-span timber beam to BS 5268

TEDDS calculation version 1.0.02

Span length & partial factors for loading

Span (mm)	Factors for moments & forces			Factors for deflection		
	γ_{fd}	γ_f	γ_{fw}	γ_{sd}	γ_{di}	γ_{dw}
4230	1.00	1.00	1.00	1.00	1.00	1.00

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	"floor"				
2	"Imposed"	"floor"				

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	UDL	0.2	0	-	4230
2	"Imposed"	UDL	0.6	0	-	4230

Analysis results - entire span

R_a kN (fac)	R_b kN (fac)	V kN (fac)	M kNm (fac)	Sense	Deflection: δEI kNm ³	Direction
1.7	1.7	1.7	1.8	"Sagging"	3.33	"Down"

Unfactored support reactions

Support A;	Dead load; -0.4 kN;	Live load; -1.3 kN;	Wind load; 0.0 kN;
Support B;	Dead load; -0.4 kN;	Live load; -1.3 kN;	Wind load; 0.0 kN;

Member design checks for a simply-supported single-span timber beam to BS 5268

Timber member design BS 5268-2:2002

Summary of results;				
Section size;	D = 175 mm;	B = 63 mm;	A = 11025 mm ² ;	
Section properties (x-x);	$I_{xx} = 28136720 \text{ mm}^4$;	$Z_{xx} = 321563 \text{ mm}^3$;	$r_{xx} = 50.5 \text{ mm}$;	
(y-y);	$I_{yy} = 3646520 \text{ mm}^4$;	$Z_{yy} = 115763 \text{ mm}^3$;	$r_{yy} = 18.2 \text{ mm}$;	
Grade;	"C24";	$\sigma_c = 7.90 \text{ N/mm}^2$;		
Check;	Stress;	Capacity;	Notes;	Result;
Bending stress;	$\sigma_{m,s,para} = M / Z_{xx} = 5.56 \text{ N/mm}^2$;	$\sigma_{m,adm,para} = 7.96 \text{ N/mm}^2$;	Moment; M = 1.8 kNm;	Pass
Shear stress;	$\tau_a = 0.23 \text{ N/mm}^2$;	$\tau_{adm} = 0.71 \text{ N/mm}^2$;	Shear; V = 1.7 kN;	Pass
Deflection;	$\delta = 11.3 \text{ mm}$;	14 mm;		Pass
	$\delta / L_s = 0.00266$;	0.003;		Pass



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Project 35 Whitworth Road, Rochdale				Job Ref. ES670	
Section Stair Trimmers 1				Sheet no./rev. 06	
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Analysis for a simply-supported single-span timber beam to BS 5268

TEDDS calculation version 1.0.02

Span length & partial factors for loading

Span (mm)	Factors for moments & forces			Factors for deflection		
	γ_{fd}	γ_f	γ_{fw}	γ_{dd}	γ_{di}	γ_{dw}
900	1.00	1.00	1.00	1.00	1.00	1.00

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	"floor"				
2	"Imposed"	"floor"				

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	UDL	0.7	0	-	900
2	"Imposed"	UDL	2.2	0	-	900

Analysis results - entire span

R_a kN (fac)	R_b kN (fac)	V kN (fac)	M kNm (fac)	Sense	Deflection: δ/EI kNm ³	Direction
1.3	1.3	1.3	0.3	"Sagging"	0.02	"Down"

Unfactored support reactions

Support A;	Dead load; -0.3 kN;	Live load; -1.0 kN;	Wind load; 0.0 kN;
Support B;	Dead load; -0.3 kN;	Live load; -1.0 kN;	Wind load; 0.0 kN;

Member design checks for a simply-supported single-span timber beam to BS 5268

Timber member design BS 5268-2:2002

Summary of results;				
Section size;	D = 175 mm;	B = 63 mm;	A = 11025 mm ² ;	
Section properties (x-x);	$I_{xx} = 28136720 \text{ mm}^4$;	$Z_{xx} = 321563 \text{ mm}^3$;	$r_{xx} = 50.5 \text{ mm}$;	
(y-y);	$I_{yy} = 3646520 \text{ mm}^4$;	$Z_{yy} = 115763 \text{ mm}^3$;	$r_{yy} = 18.2 \text{ mm}$;	
Grade;	"C24";	$\sigma_c = 7.90 \text{ N/mm}^2$;		
Check;	Stress;	Capacity;	Notes;	Result;
Bending stress;	$\sigma_{m.a.para} = M / Z_{xx} = 0.92 \text{ N/mm}^2$;	$\sigma_{m.adm.para} = 7.96 \text{ N/mm}^2$;	Moment; M = 0.3 kNm;	Pass
Shear stress;	$\tau_a = 0.18 \text{ N/mm}^2$;	$\tau_{adm} = 0.71 \text{ N/mm}^2$;	Shear; V = 1.3 kN;	Pass
Deflection;	$\delta = 0.1 \text{ mm}$;	14 mm;		Pass
	$\delta / L_s = 0.00014$;	0.003;		Pass



Project.

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ES670

Sheet No.

67

Date

23/04/2022

5) SANITARY TANK II @ 800mm SPAN

LOAD	DL	LL
FLOOR	$0.5 \times (3\frac{5}{2})$	$1.5 \times (3\frac{5}{2})$
W	0.38k/m	2.63k/m

REF CALC S11607
08



USE 150 x 50mm C24
GRADE TIMBER

6) SHOP FRONT STALL @ 3300mm SPAN

LOAD	DL	LL
ROOF	$1.05 \times (2\frac{9}{2})$	$0.75 \times (2\frac{9}{2})$
FLOOR	$0.5 \times (3\frac{1}{2})$	$1.5 \times (3\frac{1}{2})$
WALL	2.6×2.75	
W	0.75k/m	3.45k/m

REF CALC S11607

09



USE TWO 178 x 102 x 44kgh/m
UB



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35 Whitworth Road, Rochdale

Job Ref.

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Section

Stair Trimmers 2

Sheet no./rev.

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Date

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Chk'd by

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Date

08

Analysis for a simply-supported single-span timber beam to BS 5268

TEDDS calculation version 1.0.02

Span length & partial factors for loading

Span (mm)	Factors for moments & forces			Factors for deflection		
	γ_{fd}	γ_{fi}	γ_{fw}	γ_{fd}	γ_{fi}	γ_{fw}
800	1.00	1.00	1.00	1.00	1.00	1.00

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	"floor"				
2	"Imposed"	"floor"				

Loading data (unfactored)

Ref.	Category	Type	Load kN/m	Position mm	Load kN/m	Position mm
1	"Dead"	UDL	0.9	0	-	800
2	"Imposed"	UDL	2.6	0	-	800

Analysis results - entire span

R_s kN (fac)	R_b kN (fac)	V kN (fac)	M kNm (fac)	Sense	Deflection: δEI kNm ³	Direction
1.4	1.4	1.4	0.3	"Sagging"	0.02	"Down"

Unfactored support reactions

Support A: Dead load; -0.4 kN; Live load; -1.1 kN; Wind load; 0.0 kN;
Support B: Dead load; -0.4 kN; Live load; -1.1 kN; Wind load; 0.0 kN;

Member design checks for a simply-supported single-span timber beam to BS 5268

Timber member design BS 5268-2:2002

Summary of results;				
Section size;	D = 150 mm;	B = 50 mm;	A = 7500 mm ² ;	
Section properties (x-x);	$I_{xx} = 14062500 \text{ mm}^4$;	$Z_{xx} = 187500 \text{ mm}^3$;	$r_{xx} = 43.3 \text{ mm}$;	
(y-y);	$I_{yy} = 1562500 \text{ mm}^4$;	$Z_{yy} = 62500 \text{ mm}^3$;	$r_{yy} = 14.4 \text{ mm}$;	
Grade;	"C24";	$\sigma_c = 7.90 \text{ N/mm}^2$;		
Check;	Stress;	Capacity;	Notes;	Result;
Bending stress;	$\sigma_{m,a,para} = M / Z_{xx} = 1.50 \text{ N/mm}^2$;	$\sigma_{m,adm,para} = 8.09 \text{ N/mm}^2$;	Moment; M = 0.3 kNm;	Pass
Shear stress;	$\tau_a = 0.28 \text{ N/mm}^2$;	$\tau_{adm} = 0.71 \text{ N/mm}^2$;	Shear; V = 1.4 kN;	Pass
Deflection;	$\delta = 0.2 \text{ mm}$;	14 mm;		Pass
	$\delta / L_s = 0.00024$;	0.003;		Pass

