Davies Torres Design Ltd
Clarence House
Church Street
Nailsworth
Gloucestershire
GL6 0BP

01453 350 546

Project: 57 High Street, Fareham

Project Ref: 190503

Calculations for: Beam End Repairs

Client: Property Repair Systems

Date: May 2019

Building Standards Approved Certifier
The Scottish Government

Proposals

Resin Repairs to beams at 57 High Street, Fareham.

Calculations carried out in conjunction with information supplied by Property Repair Systems.

Calculations carried out assuming working load stresses, linear behaviour and assuming that all tension forces are resisted by the bars in tension and shear bond into timber and none carried by resin in tension below neutral axis.

References

BS6399-1: 1996 Loading for Buildings – Code of Practice for dead and imposed loads
BS6399-2:1997 Loadings for buildings – Code of practice for wind loads
BS6399-3:1988 Loadings for Buildings – Code of practice for imposed roof loads
BS5268-2:2002 Structural use of timber – Code of practice for permissible stress design
BS449-2:1969 The use of structural steel in building
Structural Engineers Pocket Book, 2nd Ed. - Cobb

Calculations prepared by

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MEng PhD CEng MIStructE

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Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project 57 High Street, Fareham			Job Ref. 190503	
	Section Introduction			Sheet no./rev. 2	
	Calc. by RD	Date 09/05/19	Chk'd by	Date	App'd by	Date

Contents

Davies Torres Design Ltd
Clarence House
Church Street, Nailsworth
GL6 0BP

Project				Job Ref.	
57 High Street, Fareham				190503	
Section				Sheet no./rev.	
Dead and Imposed Loads				3	
Calc. by	Date	Chk'd by	Date	App'd by	Date
RD	09/05/19				

Dead Loads

Allow Dead Load of say 0.75kN/sqm for self weight of floor

Allow Partition Load of 0.25kN/sqm onto floor

Imposed Loads

Domestic Loading 1.5kN/sqm

Beam Loadings

Refer to layout for potential loading onto beams

Load on beam = (0.75+0.25+1.50) = 2.5kN/sqm

Area of floor applying load onto beam = 13.0sqm

Total Load = 2.5x13 = 32.5kN

Maximum potential bending moment = $\frac{WL}{8} = \frac{32.5x4.4}{8}$ = 17.9kNm at centre of beam

Maximum reaction = 32.5/2 = 16.3kN

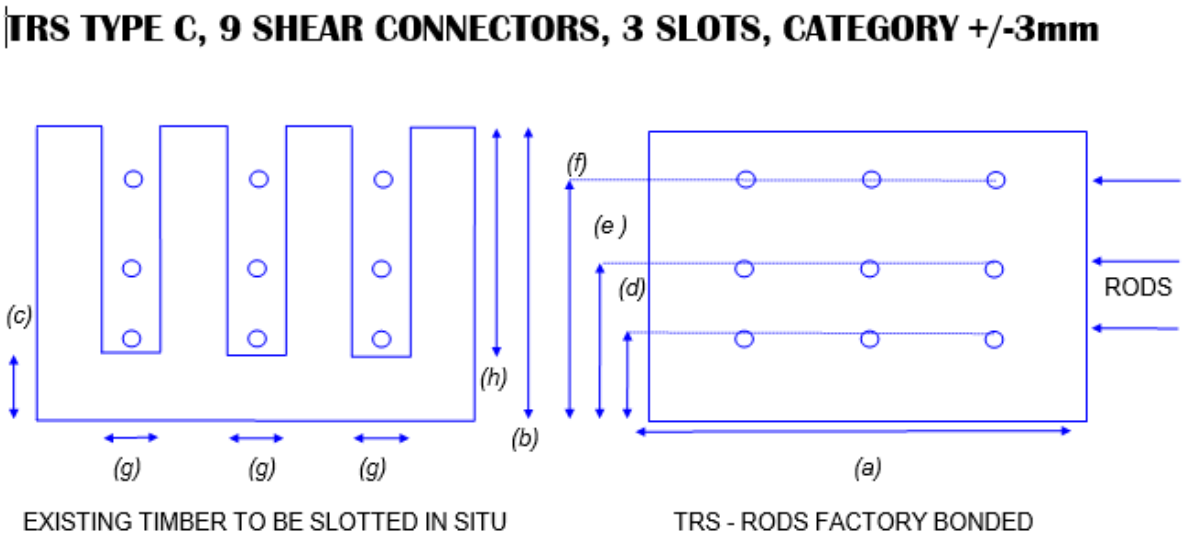
Bending Moment at Repair Position

Assess at 300mm from bearing
Width of loading onto beam = (3.75+2.15)/2 = 2.95m

M = Rx - w$\frac{x^2}{2}$ = 16.3x0.3- (3.0x2.95)x0.3^2/2 = 4.5kNm

Assess repairs with lower value of bending moment of bending moment capacity of section or 4.5kNm

Beam Repair No1



Adjust bending moment and shear force so that unity value is equal to 1.0 to determine section capacity

Timber member design (BS5268) - Beam1

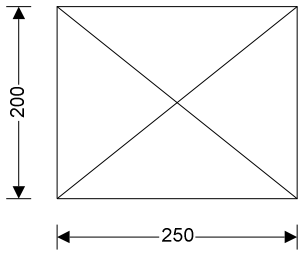
TIMBER MEMBER DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.01

Analysis results

Design moment in major axis; M_x = **13.070** kNm

Design shear; F = **23.660** kN



Timber section details

Breadth of sections; b = **250** mm

Depth of sections; h = **200** mm

Number of sections in member; N = **1**

Overall breadth of member; b_b = N × b = **250** mm

Timber strength class; **C24**

Member details

Service class of timber; **1**

Load duration; **Long term**

Section properties

Cross sectional area of member; $A = N \times b \times h =$ **50000** mm^2

Section modulus; $Z_x = N \times b \times h^2 / 6 =$ **1666667** mm^3

$Z_y = h \times (N \times b)^2 / 6 =$ **2083333** mm^3

Second moment of area; $I_x = N \times b \times h^3 / 12 =$ **166666667** mm^4

$I_y = h \times (N \times b)^3 / 12 =$ **260416667** mm^4

Radius of gyration; $i_x = \sqrt{(I_x / A)} =$ **57.7** mm

$i_y = \sqrt{(I_y / A)} =$ **72.2** mm

Modification factors

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

Total depth of member - cl.2.10.6; $K_7 = (300 \text{ mm} / h)^{0.11} =$ **1.05**

Load sharing - cl.2.9; $K_8 =$ **1.00**

Lateral support - cl.2.10.8

No lateral support

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

Actual depth-to-breadth ratio; $h / (N \times b) =$ **0.80**

PASS - Lateral support is adequate

Bending parallel to grain

Permissible bending stress; $\sigma_{m\_adm} = \sigma_m \times K_3 \times K_7 \times K_8 =$ **7.842** N/mm^2

Applied bending stress; $\sigma_{m\_a} = M_x / Z_x =$ **7.842** N/mm^2

$\sigma_{m\_a} / \sigma_{m\_adm} =$ **1.000**

PASS - Applied bending stress is less than permissible bending stress

Shear parallel to grain

Permissible shear stress; $\tau_{adm} = \tau \times K_3 \times K_8 =$ **0.710** N/mm^2

Applied shear stress; $\tau_a = 3 \times F / (2 \times A) =$ **0.710** N/mm^2

$\tau_a / \tau_{adm} =$ **1.000**

PASS - Applied shear stress is less than permissible shear stress

Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project: 57 High Street, Fareham				Job Ref.: 190503	
	Section: Beam Repair 1				Sheet no./rev.: 7	
	Calc. by: RD	Date: 09/05/19	Chk'd by:	Date:	App'd by:	Date:

Resin Repair Beam 1

Esteel	205000	N/sqmm
Etimber	7200	N/sqmm
Modular Ratio	28.5	

Tension Steel		
No of Bars per layer	3	
Diameter	16	mm
Total Area per layer	603.2	sqmm
Equivalent Area	17174.0	sqmm

Compression Steel		
No of Bars	3	
Diameter	16	mm
Total Area	603.2	sqmm
Equivalent Area	16570.9	sqmm

Bending Moment 4.5 kNm

Dimensions of Timber		
Depth	200	mm
Breadth	250	mm

Depth to Steel		
Compression	50	mm
Tension		
Length of Steel Bars	700	mm
Slot Depth	163	mm
Slot Width	25	mm

Tension Bars	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	
d	150	120							mm
d-x	61.77152	31.77151661							mm
EquivArea x (d-x)	1060866	545645.292							mm^3

Solve for Neutral Axis Depth

x = 88.22848 mm

Qabove NA	1606512
Qbelow NA	1606512

Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project: 57 High Street, Fareham				Job Ref.: 190503	
	Section: Beam Repair 1				Sheet no./rev.: 8	
	Calc. by: RD	Date: 09/05/19	Chk'd by:	Date:	App'd by:	Date:

Cracked Section Moment of Inertia

164317063.8 mm^4

Stresses in Bars (Lowest Bars First)

Stress N/sqmm	48.2	24.8
Force per row kN	29.1	14.9

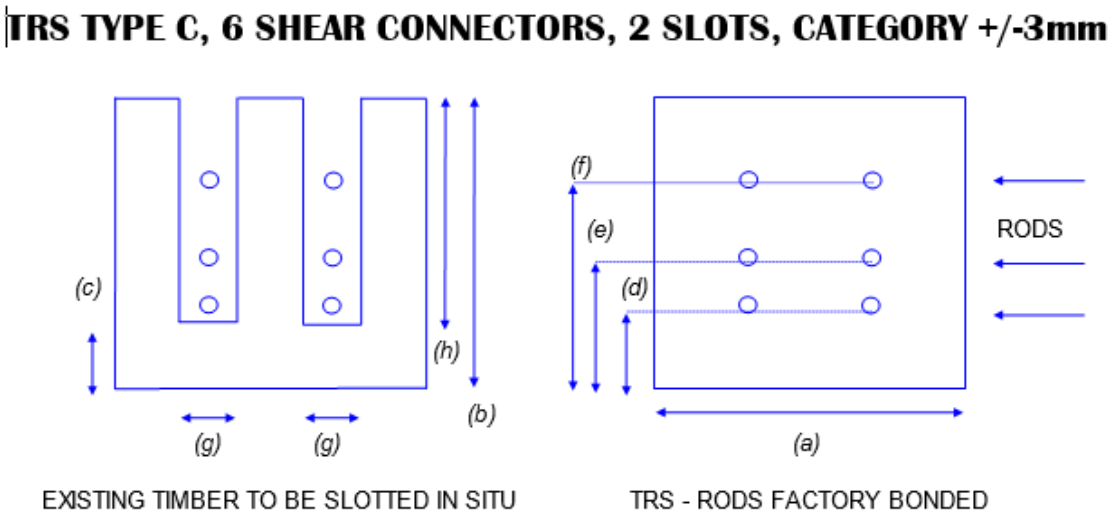
Actual Stresses from Bending		
Timber Compression	2.4	N/sqmm
Tension Steel (Max)	48.2	N/sqmm
Compression Steel	29.8	N/sqmm

Tension Force	29.1	kN
Tension per Bar	9.7	kN

			Allowable for C24 Timber	
Bond Stress into New Timber	0.49	N/sqmm	0.71	N/sqmm
Bond Stress into Old Timber	0.49	N/sqmm	0.71	N/sqmm

Proposed repair of 9No 16mm bars of 700mm length acceptable

Beam Repair No2



Timber member design (BS5268) - Beam2

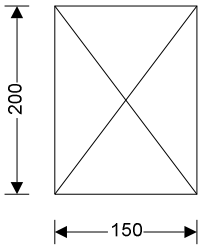
TIMBER MEMBER DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.01

Analysis results

Design moment in major axis; M_x = **7.840** kNm

Design shear; F = **14.200** kN



Timber section details

Breadth of sections; b = **150** mm

Depth of sections; h = **200** mm

Number of sections in member; N = **1**

Overall breadth of member; b_b = N × b = **150** mm

Timber strength class; **C24**

Member details

Service class of timber; **1**

Load duration; **Long term**

Section properties

Cross sectional area of member; $A = N \times b \times h =$ **30000** mm^2

Section modulus; $Z_x = N \times b \times h^2 / 6 =$ **1000000** mm^3

$Z_y = h \times (N \times b)^2 / 6 =$ **750000** mm^3

Second moment of area; $I_x = N \times b \times h^3 / 12 =$ **100000000** mm^4

$I_y = h \times (N \times b)^3 / 12 =$ **56250000** mm^4

Radius of gyration; $i_x = \sqrt{(I_x / A)} =$ **57.7** mm

$i_y = \sqrt{(I_y / A)} =$ **43.3** mm

Modification factors

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

Total depth of member - cl.2.10.6; $K_7 = (300\ mm / h)^{0.11} =$ **1.05**

Load sharing - cl.2.9; $K_8 =$ **1.00**

Lateral support - cl.2.10.8

No lateral support

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

Actual depth-to-breadth ratio; $h / (N \times b) =$ **1.33**

PASS - Lateral support is adequate

Bending parallel to grain

Permissible bending stress; $\sigma_{m\_adm} = \sigma_m \times K_3 \times K_7 \times K_8 =$ **7.842** N/mm^2

Applied bending stress; $\sigma_{m\_a} = M_x / Z_x =$ **7.840** N/mm^2

$\sigma_{m\_a} / \sigma_{m\_adm} =$ **1.000**

PASS - Applied bending stress is less than permissible bending stress

Shear parallel to grain

Permissible shear stress; $\tau_{adm} = \tau \times K_3 \times K_8 =$ **0.710** N/mm^2

Applied shear stress; $\tau_a = 3 \times F / (2 \times A) =$ **0.710** N/mm^2

$\tau_a / \tau_{adm} =$ **1.000**

PASS - Applied shear stress is less than permissible shear stress

Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project: 57 High Street, Fareham				Job Ref.: 190503	
	Section: Beam Repair 2				Sheet no./rev.: 11	
	Calc. by: RD	Date: 09/05/19	Chk'd by:	Date:	App'd by:	Date:

Resin Repair Beam 2

Esteel	205000	N/sqmm
Etimber	7200	N/sqmm
Modular Ratio	28.5	

Tension Steel		
No of Bars per layer	2	
Diameter	16	mm
Total Area per layer	402.1	sqmm
Equivalent Area	11449.4	sqmm

Compression Steel		
No of Bars	2	
Diameter	16	mm
Total Area	402.1	sqmm
Equivalent Area	11047.2	sqmm

Bending Moment	4.5	kNm

Dimensions of Timber		
Depth	200	mm
Breadth	150	mm

Depth to Steel		
Compression	50	mm
Tension		
Length of Steel Bars	750	mm
Slot Depth	163	mm
Slot Width	25	mm

Tension Bars	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	
d	150	120							mm
d-x	60.39959	30.39959204							mm
EquivArea x (d-x)	691536.7	348055.8699							mm^3

Solve for Neutral Axis Depth

x =	89.60041	mm
Qabove NA	1039593	
Qbelow NA	1039593	

Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project: 57 High Street, Fareham				Job Ref.: 190503	
	Section: Beam Repair 2				Sheet no./rev.: 12	
	Calc. by: RD	Date: 09/05/19	Chk'd by:	Date:	App'd by:	Date:

Cracked Section Moment of Inertia

105640127.7 mm^4

Stresses in Bars (Lowest Bars First)

Stress N/sqmm	73.3	36.9
Force per row kN	29.5	14.8

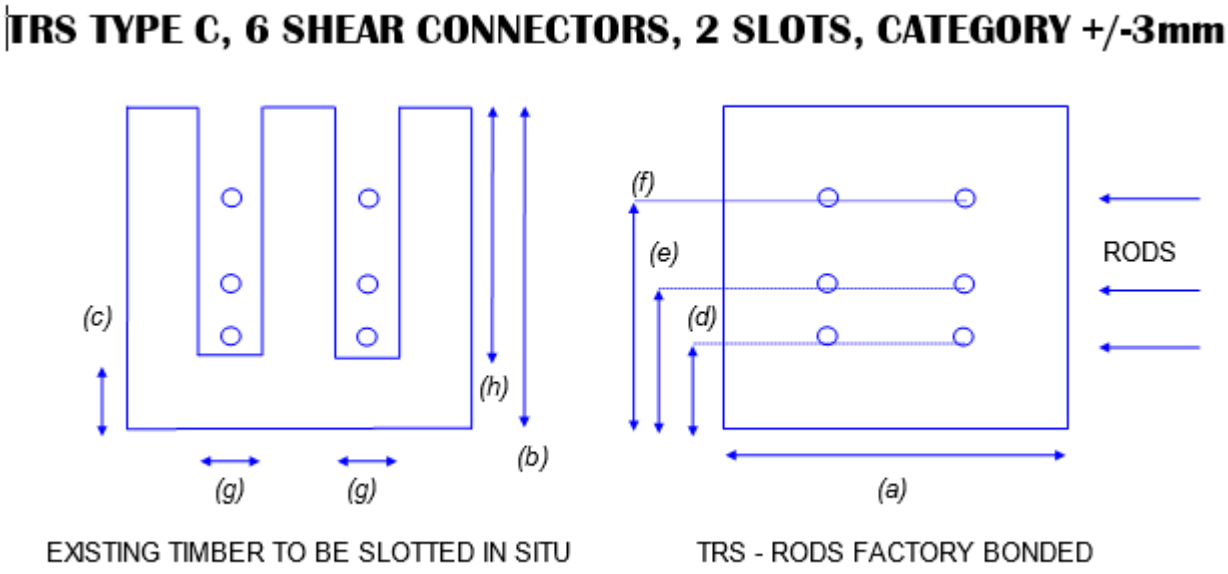
Actual Stresses from Bending		
Timber Compression	3.8	N/sqmm
Tension Steel (Max)	73.3	N/sqmm
Compression Steel	48.0	N/sqmm

Tension Force	29.5	kN
Tension per Bar	14.7	kN

			Allowable for C24	
Bond Stress into New Timber	0.69	N/sqmm	0.71	N/sqmm
Bond Stress into Old Timber	0.69	N/sqmm	0.71	N/sqmm

Proposed repair of 6No 16mm bars of 600mm length acceptable

Beam Repair No3



Timber member design (BS5268) - Beam3

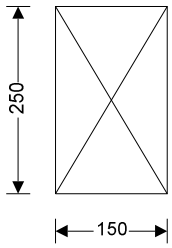
TIMBER MEMBER DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.01

Analysis results

Design moment in major axis; M_x = **11.956** kNm

Design shear; F = **17.750** kN



Timber section details

Breadth of sections; b = **150** mm

Depth of sections; h = **250** mm

Number of sections in member; N = **1**

Overall breadth of member; b_b = N × b = **150** mm

Timber strength class; **C24**

Member details

Service class of timber; **1**

Load duration; **Long term**

Section properties

Cross sectional area of member; $A = N \times b \times h =$ **37500** mm^2

Section modulus; $Z_x = N \times b \times h^2 / 6 =$ **1562500** mm^3

$Z_y = h \times (N \times b)^2 / 6 =$ **937500** mm^3

Second moment of area; $I_x = N \times b \times h^3 / 12 =$ **195312500** mm^4

$I_y = h \times (N \times b)^3 / 12 =$ **70312500** mm^4

Radius of gyration; $i_x = \sqrt{(I_x / A)} =$ **72.2** mm

$i_y = \sqrt{(I_y / A)} =$ **43.3** mm

Modification factors

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

Total depth of member - cl.2.10.6; $K_7 = (300 \text{ mm} / h)^{0.11} =$ **1.02**

Load sharing - cl.2.9; $K_8 =$ **1.00**

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

Bending parallel to grain

Permissible bending stress; $\sigma_{m\_adm} = \sigma_m \times K_3 \times K_7 \times K_8 =$ **7.652** N/mm^2

Applied bending stress; $\sigma_{m\_a} = M_x / Z_x =$ **7.652** N/mm^2

$\sigma_{m\_a} / \sigma_{m\_adm} =$ **1.000**

PASS - Applied bending stress is less than permissible bending stress

Shear parallel to grain

Permissible shear stress; $\tau_{adm} = \tau \times K_3 \times K_8 =$ **0.710** N/mm^2

Applied shear stress; $\tau_a = 3 \times F / (2 \times A) =$ **0.710** N/mm^2

$\tau_a / \tau_{adm} =$ **1.000**

PASS - Applied shear stress is less than permissible shear stress

Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project: 57 High Street, Fareham				Job Ref.: 190503	
	Section: Beam Repair 3				Sheet no./rev.: 15	
	Calc. by: RD	Date: 09/05/19	Chk'd by:	Date:	App'd by:	Date:

Resin Repair Beam 3

Esteel	205000	N/sqmm
Etimber	7200	N/sqmm
Modular Ratio	28.5	

Tension Steel		
No of Bars per layer	2	
Diameter	16	mm
Total Area per layer	402.1	sqmm
Equivalent Area	11449.4	sqmm

Compression Steel		
No of Bars	2	
Diameter	16	mm
Total Area	402.1	sqmm
Equivalent Area	11047.2	sqmm

Bending Moment	4.5	kNm

Dimensions of Timber		
Depth	250	mm
Breadth	150	mm

Depth to Steel		
Compression	50	mm
Tension		
Length of Steel Bars	825	mm
Slot Depth	213	mm
Slot Width	25	mm

Tension Bars	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	
d	200	170							mm
d-x	87.09713	57.0971345							mm
EquivArea x (d-x)	997206.4	653725.6417							mm^3

Solve for Neutral Axis Depth

x =	112.9029	mm

Qabove NA	1650932
Qbelow NA	1650932

Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Project: 57 High Street, Fareham				Job Ref.: 190503	
	Section: Beam Repair 3				Sheet no./rev.: 16	
	Calc. by: RD	Date: 09/05/19	Chk'd by:	Date:	App'd by:	Date:

Cracked Section Moment of Inertia

239850025 mm^4

Stresses in Bars (Lowest Bars First)

Stress N/sqmm	46.5	30.5
Force per row kN	18.7	12.3

Actual Stresses from Bending		
Timber Compression	2.1	N/sqmm
Tension Steel (Max)	46.5	N/sqmm
Compression Steel	33.6	N/sqmm

Tension Force	18.7	kN
Tension per Bar	9.4	kN

			Allowable for C24	
Bond Stress into New Timber	0.40	N/sqmm	0.71	N/sqmm
Bond Stress into Old Timber	0.40	N/sqmm	0.71	N/sqmm

Proposed repair of 6No 16mm bars of 825mm length acceptable

Appendix

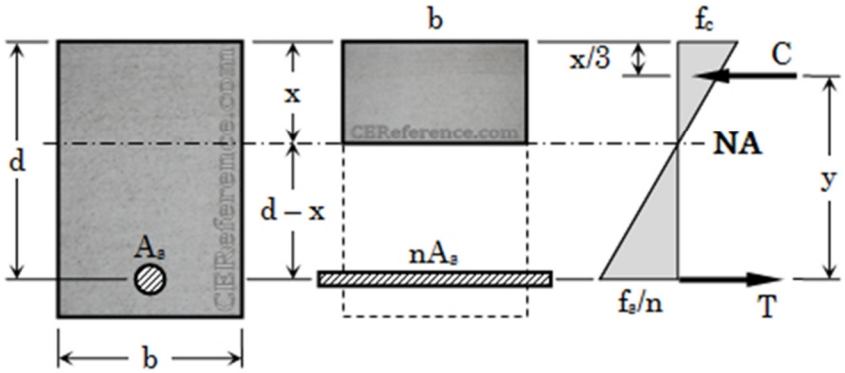
Resin Design Methodology

Resin Repair proposals

Resin Data Sheet

Transformed Section Method

Convert steel area to equivalent concrete area by multiplying A_s with modular ratio, n.



Location of the neutral axis from extreme compression fiber

Singly reinforced: $\frac{1}{2}bx^2 = nA_s(d-x)$

Doubly reinforced: $\frac{1}{2}bx^2 + (2n-1)A'_s(x-d') = nA_s(d-x)$

Cracked section moment of inertia ($I_{NA} = I_{cr}$)

Singly reinforced: $I_{NA} = \frac{bx^3}{3} + nA_s(d-x)^2$

Doubly reinforced: $I_{NA} = \frac{bx^3}{3} + (2n-1)A'_s(x-d')^2 + nA_s(d-x)^2$

Actual stresses (calculate using Flexure Formula)

Concrete

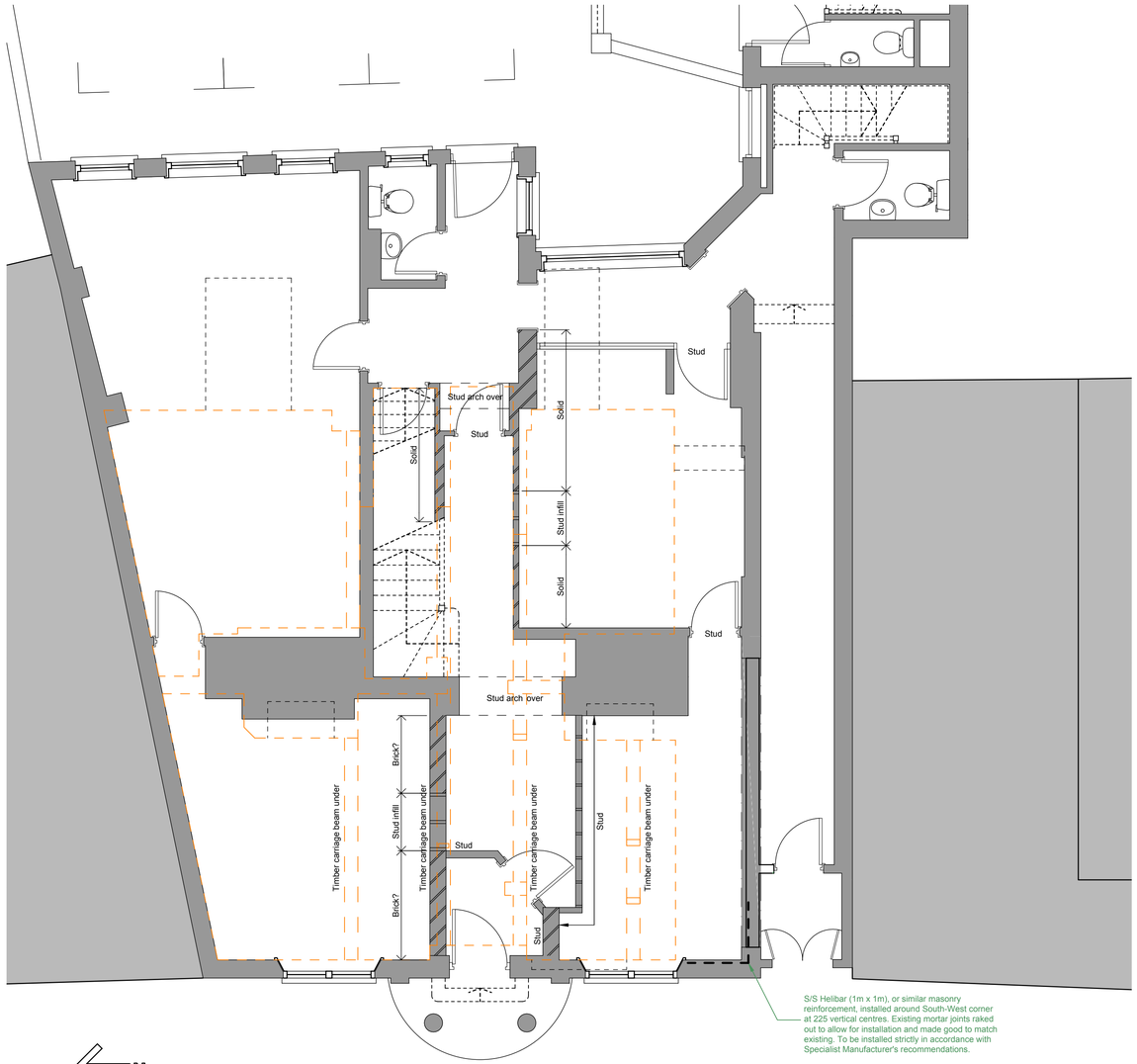
$$f_c = \frac{Mx}{I_{NA}}$$

Tension steel

$$\frac{f_s}{n} = \frac{M(d-x)}{I_{NA}}$$

Compression steel for doubly reinforced

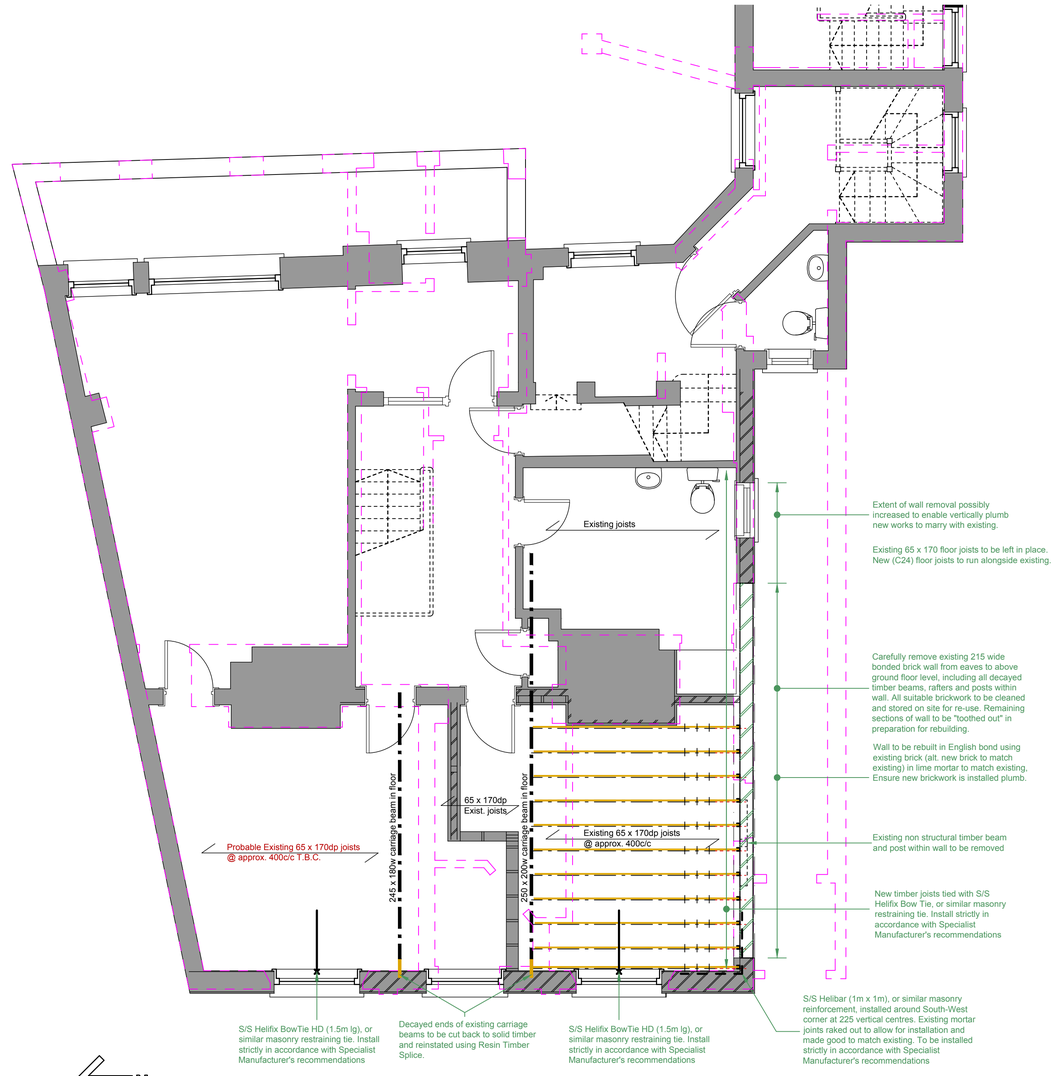
$$\frac{f'_s}{2n} = \frac{M(x-d')}{I_{NA}}$$



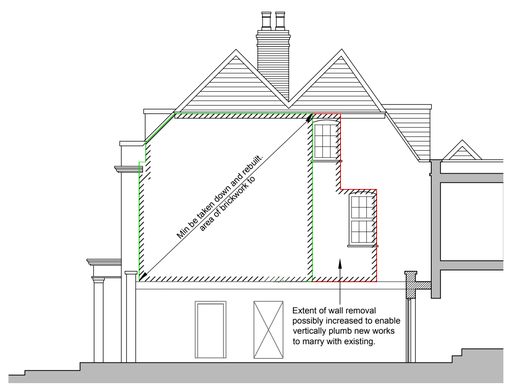
Existing Ground floor plan showing basement walls dotted below
(1:50)

ALL TEMPORARY WORKS TO CONTRACTOR'S SPECIFICATION AND DETAIL.

ALL DIMENSIONS, LEVELS ETC. MUST BE CONFIRMED ON SITE PRIOR TO FABRICATION / CONSTRUCTION



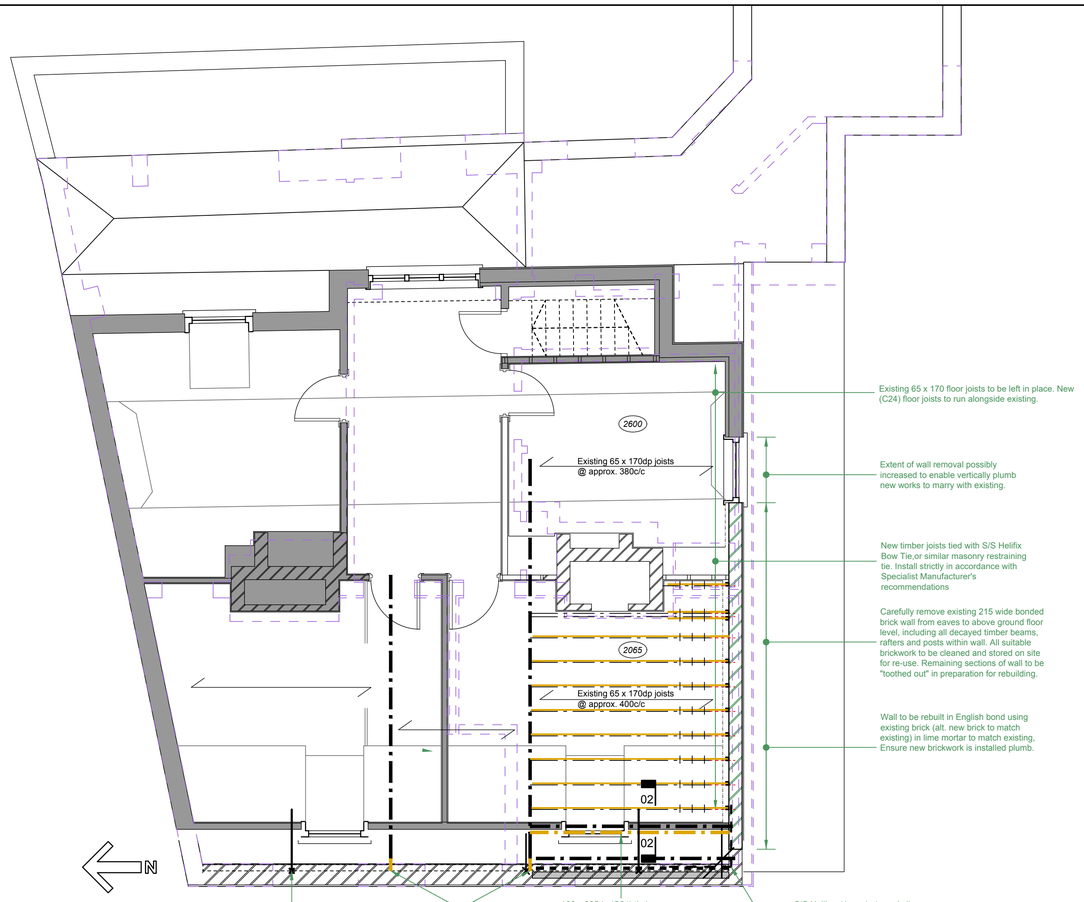
Existing First floor plan showing ground floor walls dotted below
(1:50)



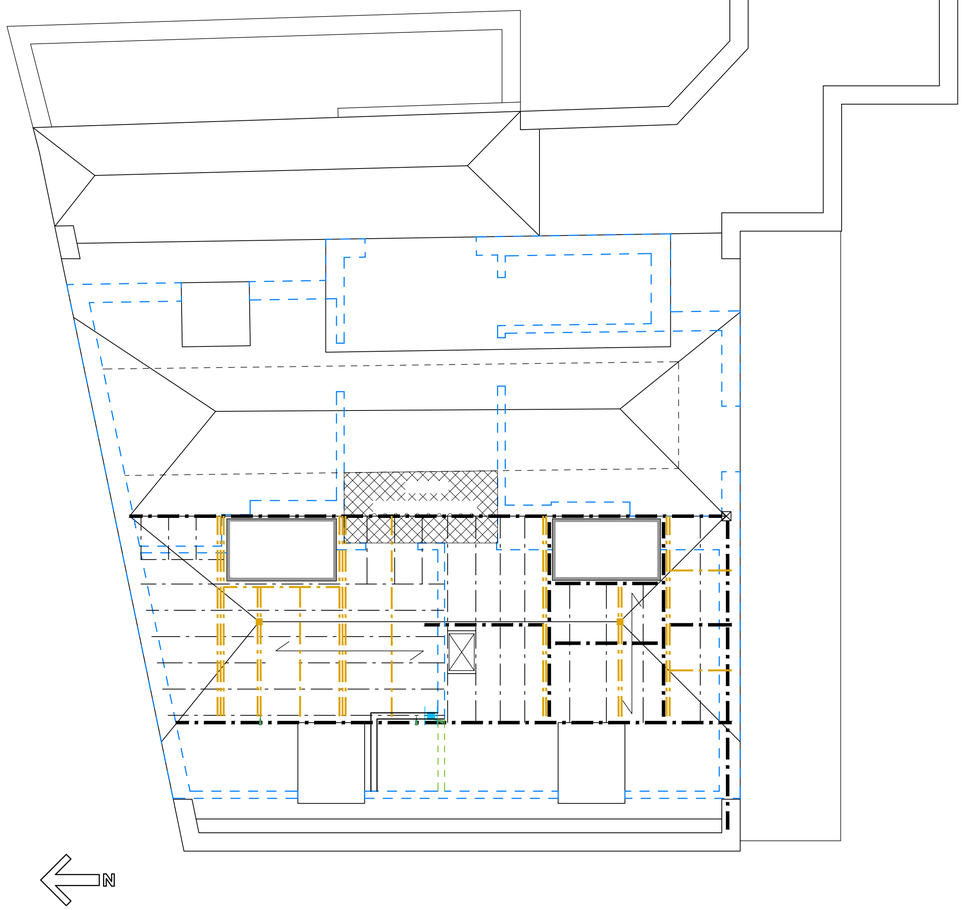
South Elevation Extent of Masonry to be Rebuilt
Scale 1:100

Floor Joist Splice - Plan
(1:20)

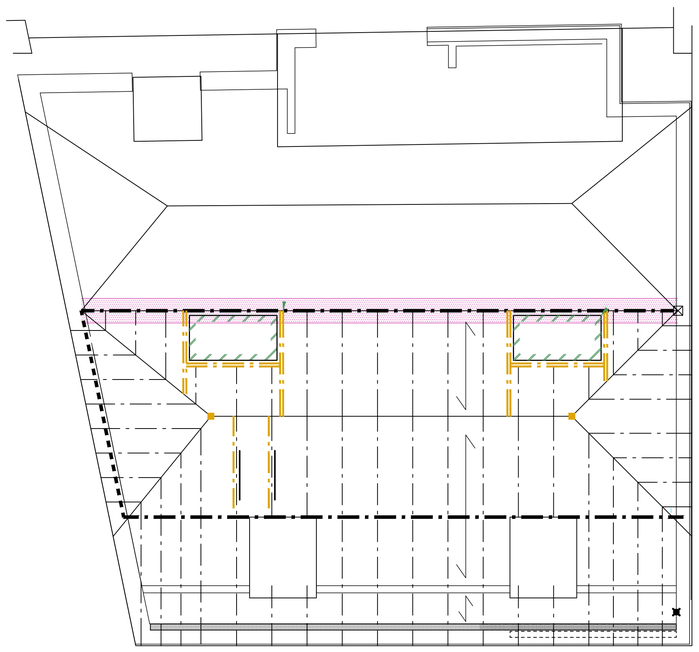
JOB TITLE	57 High Street Fareham
CLIENT	S. Robinson
SCALES: 1:50	DRG. SIZE: A1
DATE: Oct 2017	ENG / TECH:
CHECKED:	
DRAWING TITLE	Proposed remedial / repair works at Ground Floor and First Floor
DRAWING No.	3602 / 0.3
REVISION	P2



Existing Second Floor Plan showing first floor walls dotted below
(1:50)



Existing Ceiling Plan showing Second floor walls dotted below
(1:50)



Existing rafter plan showing roof structure
(1:50)

ALL TEMPORARY WORKS TO CONTRACTOR'S SPECIFICATION AND DETAIL.

ALL DIMENSIONS, LEVELS ETC. MUST BE CONFIRMED ON SITE PRIOR TO FABRICATION / CONSTRUCTION

JOB TITLE
57 High Street
Fareham

CLIENT
S. Robinson

SCALES		DRG. SIZE
1:50		A1
DATE	ENG / TECH	CHECKED
Oct 2017		

DRAWING TITLE
Proposed remedial / repair works at Second Floor, Ceiling and Roof

DRAWING No.	REVISION
3602 / 0.4	P2

9th February 2019

57 HIGH STREET
FAREHAM
HAMPSHIRE
PO16 7BG

Remedial/Repair works to southern elevation external wall, 1st floor and 2nd floor.

PROPOSED SEQUENCE OF WORKS

1. At 1st and 2nd Floor level South Elevation Prop existing ceiling joists and carriage beams at West Elevation with Acrow Props. All propping must be taken down to basement level (i.e. not supported on upper floors).

2. At 1st Floor Level Introduce new C24 ceiling Joists adjacent existing. Removing rotten timber wall plate and replacing with brick and mortar, matching original (as analyzed by The Lime Centre). Existing ceiling joists to remain in situ.

3. At 1st and 2nd Floor level, HeliBar SS or similar masonry reinforcement to be installed around South-west corner at 225mm vertical centres.

4. 1st floor carriage beam bearings into 330mm solid brickwork wall (West elevation) have decayed. Cut back carriage beams to sound timber.

5. Timber resin splice to be joined to end of carriage beams and sat on masonry bed in front (West) elevation wall.

6. At 1st floor level, West Elevation, Helifix Bow Tie HD or similar masonry tie inserted through brickwork into first two parallel joists, masonry end to be resin grouted in place.

7. At 1st Floor level, South Elevation, Helifix Bow Tie or similar masonry tie inserted through brickwork into perpendicular joists, masonry end to be resin grouted in place.

8. At 1st Floor level, West Elevation, Helifix Bow Tie HD or similar masonry tie inserted through brickwork into carriage beams, masonry end to be resin grouted in place.

9. At 2nd Floor Level Introduce new C24 ceiling joists adjacent existing. Removing rotten timber wall plate and replacing with brick and mortar, matching original surruounding (as analyzed by The Lime Centre). Existing ceiling joists to remain in situ.

10. At 2nd Floor level, West Elevation, Helifix Bow Tie HD or similar masonry tie inserted through brickwork into first two parallel joists, masonry end to be resin grouted in place.

11. At 2nd Floor level, West Elevation, Helifix Bow Tie HD or similar masonry tie inserted through brickwork into carriage beams, masonry end to be resin grouted in place.

12. Provide weather tight cover at high level over south elevation scaffold, down to neighbour's roof/party wall and to cover gap between properties full height of front elevation.

13. Carefully remove 215mm South wall from eaves level to ground floor along with decayed timber beams and posts within solid wall.

14. All suitable brickwork is to be cleaned off and stored on site to be reused. Any additional bricks required must match existing

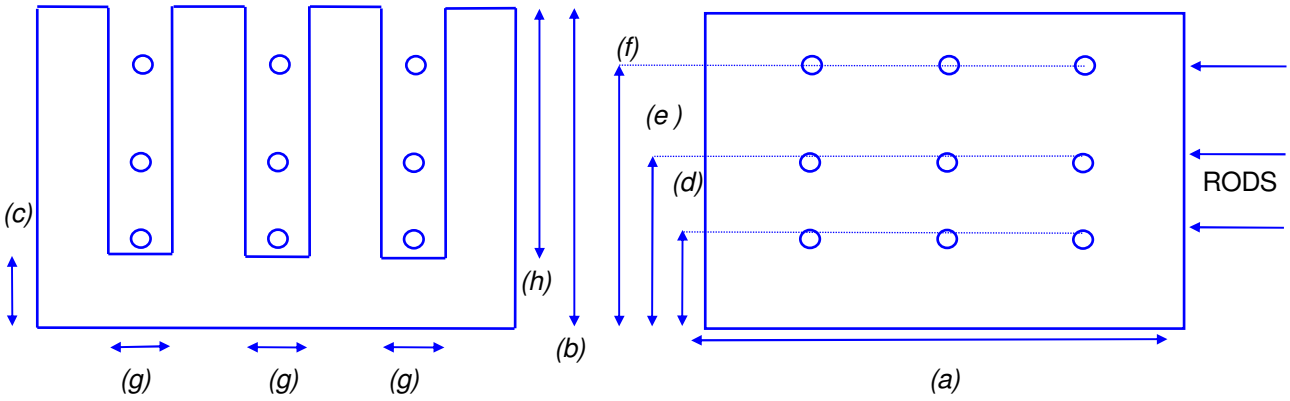
15. Existing mortar has been analysed by the Lime Centre, Winchester and matched for new works.

16. "Tooth out" existing masonry at each end of the remaining sections of wall.

17. Rebuild South elevation wall between remaining masonry in English bonded brickwork and ensure new masonry is now plumb.

18. During the construction of the South elevation wall, at 2nd Floor level, Helifix Bow Tie or similar masonry tie inserted through rebuilt brickwork into perpendicular joists, masonry end to be resin grouted in place.

TRS TYPE C, 9 SHEAR CONNECTORS, 3 SLOTS, CATEGORY +/-3mm



EXISTING TIMBER TO BE SLOTTED IN SITU

TRS - RODS FACTORY BONDED

COMPANY - Steve Robinson **CONTACT -** Steve Robinson

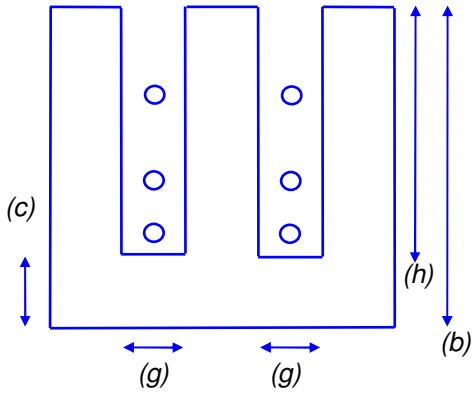
SITE - 57 High Street **ENQ/JOB NO:** 5151 **DATE -** 19/02/2019

BEAM REFERENCE NO. 1	**NO. TO REPAIR** 2
DIMENSIONS ***(NOT TO SCALE)***	
WIDTH (mm) *(a)*	250
DEPTH (mm) *(b)*	200
OVERALL LENGTH (mm)	600
BASE THICKNESS (mm) *(c)*	37
SHEAR CONNECTOR (ROD) CENTRES (mm) *(d/e/f)*	50/80/150
SHEAR CONNECTORS (RODS)	
LENGTH OVERALL (mm) ***(50:50 EXISTING/TRS)***	700
DIAMETER (mm)	16
NUMBER	9
MATERIAL	HT/BZP/STEEL
SLOTS ***(DO NOT SCALE FROM SKETCH)***	
NUMBER	3
WIDTH (mm) *(g)* **(MAX. FOR RESIN VOLUME ALLOWED)**	25
DEPTH (mm) *(h)* **(MAX. FOR RESIN VOLUME ALLOWED)**	163

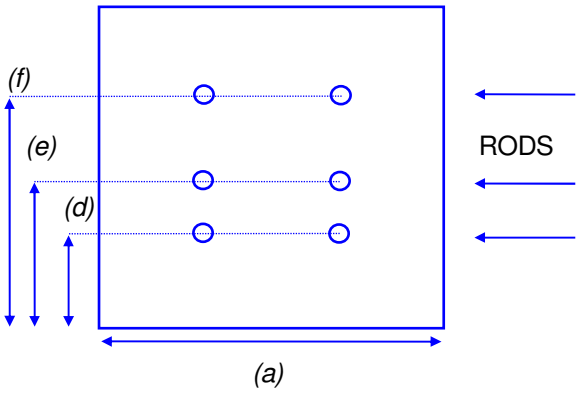
SCHEMATIC ONLY - NOT TO SCALE

ALL PROPOSALS TO BE VERIFIED BY A STRUCTURAL ENGINEER

TRS TYPE C, 6 SHEAR CONNECTORS, 2 SLOTS, CATEGORY +/-3mm



EXISTING TIMBER TO BE SLOTTED IN SITU



TRS - RODS FACTORY BONDED

CONTACT - Steve Robinson

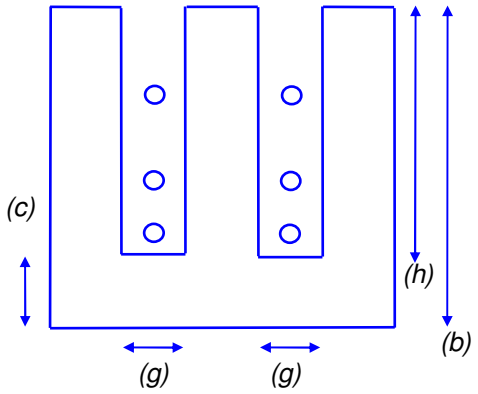
SITE - 57 High Street **ENQ/JOB NO:** 5151 **DATE -** 19/02/2019

BEAM REFERENCE NO. 2	**NO. TO REPAIR** 1
DIMENSIONS ***(NOT TO SCALE)***	
WIDTH (mm) *(a)*	150
DEPTH (mm) *(b)*	200
OVERALL LENGTH (mm)	600
BASE THICKNESS (mm) *(c)*	37
SHEAR CONNECTOR (ROD) CENTRES (mm) *(d/e/f)*	50/80/150
SHEAR CONNECTORS (RODS)	
LENGTH OVERALL (mm) ***(50:50 EXISTING/TRS)***	600
DIAMETER (mm)	16
NUMBER	6
MATERIAL	HT/BZP/STEEL
SLOTS ***(DO NOT SCALE FROM SKETCH)***	
NUMBER	2
WIDTH (mm) *(g)* **(MAX. FOR RESIN VOLUME ALLOWED)**	25
DEPTH (mm) *(h)* **(MAX. FOR RESIN VOLUME ALLOWED)**	163

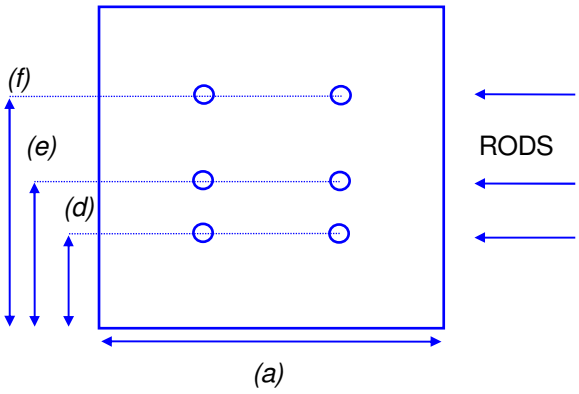
SCHEMATIC ONLY - NOT TO SCALE

ALL PROPOSALS TO BE VERIFIED BY A STRUCTURAL ENGINEER

TRS TYPE C, 6 SHEAR CONNECTORS, 2 SLOTS, CATEGORY +/-3mm



EXISTING TIMBER TO BE SLOTTED IN SITU



TRS - RODS FACTORY BONDED

CONTACT - Steve Robinson

SITE - 57 High Street **ENQ/JOB NO:** 5151 **DATE -** 19/02/2019

BEAM REFERENCE NO. 3	**NO. TO REPAIR** 1
DIMENSIONS ***(NOT TO SCALE)***	
WIDTH (mm) *(a)*	150
DEPTH (mm) *(b)*	250
OVERALL LENGTH (mm)	600
BASE THICKNESS (mm) *(c)*	37
SHEAR CONNECTOR (ROD) CENTRES (mm) *(d/e/f)*	50/80/200
SHEAR CONNECTORS (RODS)	
LENGTH OVERALL (mm) ***(50:50 EXISTING/TRS)***	825
DIAMETER (mm)	16
NUMBER	6
MATERIAL	HT/BZP/STEEL
SLOTS ***(DO NOT SCALE FROM SKETCH)***	
NUMBER	2
WIDTH (mm) *(g)* **(MAX. FOR RESIN VOLUME ALLOWED)**	25
DEPTH (mm) *(h)* **(MAX. FOR RESIN VOLUME ALLOWED)**	213

SCHEMATIC ONLY - NOT TO SCALE

ALL PROPOSALS TO BE VERIFIED BY A STRUCTURAL ENGINEER

THIXOTROPIC EPOXY RESIN

An Ultra Low Disturbance Building Solution

Property Repair Systems
01626 331351

DESCRIPTION

THIXOTROPIC EPOXY RESIN is a two part, non-slump gel adhesive, designed to bond materials together or to inject into cracks, fissures and holes. THIXOTROPIC EPOXY RESIN can be injected from a standard 400cc cartridge or applied directly from the mixing pot in a film as thin as 0.2mm. THIXOTROPIC EPOXY RESIN does not contain solvent or water, so can be applied to difficult substrates.

Features

- Adhesion greater than the cohesive strength of timber
- Solvent and water free
- Impermeable to vapour
- Working pot life: 5 – 10 minutes at 15 – 20 C.
- Set time: 1 - 2 hours initial at 15 – 20 degrees C, 5 - 7 days full cure.

TYPICAL USES

For bonding timber, stone and metal and for injecting into cracks and holes in timber and masonry. For bonding dowels into timber and masonry. For laminating timbers and repairing Glulam beams. Suitable for high humidity environments.

PREPARATION & METHOD

Cut out all rotted, loose or flaking material and vacuum to remove dust. Abrade or grind as necessary to provide clean, stable surfaces free of all contaminants.
Mix the two components thoroughly with a stiff, square edged pallet knife until the two colours blend into an even colour.
Approximate spreading 'open' time is 5 - 10 minutes at 15 - 20 degrees centigrade, initial set in 1 - 2 hours. Initial cure minimum 12 hours, full cure 5 -7 days.
Either apply the adhesive to both surfaces to be bonded, or dispense into a cartridge kit for injection.
Ensure that the temperature is above 5 degrees Centigrade, or pre-warm the materials, otherwise curing may be delayed or prevented.

TECHNICAL DATA

Active Substance
Bisphenol A/F epoxy & Aliphatic Amines
Other Components
Glycidyl ether and inert fillers
Mix ratio - Do not vary the mix ratio – 2:1
2 measures of Base to 1 measure of Activator
Bond Strength/Tensile Shear Adhesion - 6 N/mm^2
Compressive Strength - 30 N/mm^2
Tensile Strength - 16 N/mm^2
Flexural Strength - 20 N/mm^2
Flexural Modulus - 503 N/mm^2
Young's Modulus >370 N/mm^2
Aggressivity to other materials
No known aggressivity
Classification
Irritant and corrosive
Packaging
Optional 400cc cartridge, skeleton guns
Colour
Blue/Cream – Mixed = Off White

Property Repair Systems - 01626 331351
Unit 3, Olympus Business Park, TQ12 2SN
DCM – 08/18