

 ${\rm Davies}\ T{\rm orres}\ {\rm Design}\ {\rm Ltd}$

Clarence House Church Street Nailsworth Gloucestershire GL6 0BP

01453 350 546

Project: The Old Forge

Project Ref: 200814

Calculations for: Resin Beam Connections for Replacement Beams RevA

Client: Property Repair Systems

Date: September 2020

	Project				Job Ref.		
	The Old Forge				200814		
Davies Torres Design Ltd Clarence House Church Street, Nailsworth GL6 0BP	Section	Introc	duction		Sheet no./rev. 1/A		
	Calc. by RD	Date 29/09/20	Chk'd by	Date	App'd by	Date	

Proposals

It is proposed to carry out resin beam strengthening at The Old Forge.

Calculations carried out in conjunction with Property Repair Systems proposals and sketch details.

References

BS6399-1: 1996 Loading for Buildings – Code of Practice for dead and imposed 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

Revisions

RevA – Repair proposal amended to replace timber with suitable size and installed in three sections for access connected by resin/bars.

Calculations prepared by

Russell Davies MEng PhD CEng MIStructE

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Dead Loads

Floor Existing

75mm Flagstones between beams

1.50	kN/m² on plan
	kN/m ²
	kN/m ²
	kN/m ²
1.50	kN/m ²

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Existing Beam Assessment

Assess existing beam with central supporting post removed.



Load take down

Beams Item Floor	Load per sqm	Width/Height	Load per m	Category
Imposed	1.50	1.1	1.65	Dead
Floor Dead	1.5	1.1	1.65	Snow

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I	Total Dead Load	1.65	kN/m					
	Total Imposed and Snow	1.65	kN/m					
	Check Total	3.30	kN/m					

Timber beam analysis & design (BS5268) - Existing Beam

TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.02





Applied loading

Beam loads Imposed Dead Self Weight

Load combinations

Load combination 1

Imposed full UDL 1.650 kN/m Dead full UDL 1.650 kN/m Dead self weight of beam * 1

Support A

Span 1

Dead * 1.00 Imposed * 1.00 Dead * 1.00 Imposed * 1.00

The Old Farge200814Davies Torres Design LidSectionExisting BeamSectionCauch Street, NatisseninSectionExisting BeamSectionOut 30PRD23/09/20Other mutperBack Street, NatisseninRD23/09/20Other mutperCauch Street, NatisseninMaximum moment; RDMaximum moment; RD		Project				Job Ref.	
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Image: section details Breadth of sections; Depth of sections; Number of sections in member; Number of sections in member; N = 1 Overall breadth of member; Data duration; Length of span; Length of span; Length of section area of member; Cross section al area of member; Section modulus; $b = 100 \text{ mm}$ Section properties Cross section al area of member; Beck and the family of the span; Length of bearing; $L = 100 \text{ mm}$ Section modulus; Section modulus; $Z_s = N \times b \times h = 36550 \text{ mm}^2$ Section modulus; $Z_s = N \times b \times h^2 / 6 = 1035583 \text{ mm}^3$ $Z_y = h \times (N \times b)^2 / 6 = 1309708 \text{ mm}^3$ Second moment of area; Hadius of gyration; $L_s = 1.00$ Modification factors Duration of loading - Table 17; Bearing stress - Table 18; Crost strength - cl.2.10.6; Crost strength - cl.2.9;Ks = 1.00							
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Radius of gyration; $i_x = \sqrt{(l_x / A)} = 49.1 \text{ mm}$ $i_y = \sqrt{(l_y / A)} = 62.1 \text{ mm}$ Modification factorsDuration of loading - Table 17; $K_3 = 1.00$ $K_4 = 1.00$ Bearing stress - Table 18; $K_4 = 1.00$ $K_7 = (300 \text{ mm / h})^{0.11} = 1.06$ Load sharing - cl.2.9;KallKallLoad sharing - cl.2.9; $K_8 = 1.00$			$I_y = h \times (N)$	× b) ³ / 12 = 140 7	793646 mm ⁴		
is a classification factorsModification factorsDuration of loading - Table 17; $K_3 = 1.00$ Bearing stress - Table 18; $K_4 = 1.00$ Total depth of member - cl.2.10.6; $K_7 = (300 \text{ mm / h})^{0.11} = 1.06$ Load sharing - cl.2.9; $K_8 = 1.00$	Radius of avration:		$i_x = \sqrt{(I_x / A)}$	= 49.1 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; $K_7 = (300 \text{ mm / h})^{0.11} = 1.06$ Load sharing - cl.2.9; $K_8 = 1.00$			$i_v = \sqrt{(I_v / A)}$	= 62.1 mm			
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Duration of roading - rable 17; $K_3 = 1.00$ Bearing stress - Table 18; $K_4 = 1.00$ Total depth of member - cl.2.10.6; $K_7 = (300 \text{ mm / h})^{0.11} = 1.06$ Load sharing - cl.2.9; $K_8 = 1.00$							
Bearing stress - Table T8; $K_4 = 1.00$ Total depth of member - cl.2.10.6; $K_7 = (300 \text{ mm / h})^{0.11} = 1.06$ Load sharing - cl.2.9; $K_8 = 1.00$	Duration of loading - Table 1/;		$n_3 = 1.00$				
Load sharing - cl.2.9; $K_7 = (300 \text{ mm / h})^{0.11} = 1.06$	bearing stress - Lable 18;	0.	$\kappa_4 = 1.00$		~		
Load sharing - Cl.2.9; $K_8 = 1.00$	i otal depth of member - cl.2.10.	ь;	$\kappa_7 = (300 \text{ n})$	$nm / n)^{v.v} = 1.00$	D		
-	Load sharing - cl.2.9;		K ₈ = 1.00				

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	Section				Sheet no./rev.	Sheet no./rev.			
Davies Torres Design Ltd		Exist	ing Beam		7				
Clarence House	Calc. by	Date	Chk'd by	Date	App'd by	Date			
GL 6 0BP	RD	29/09/20							
Lateral support - cl.2.10.8									
Ends held in position and mem	bers held in lin	e, as by direct co	onnection of s	heathing, deck	or joists				
Permissible depth-to-breadth ra	Permissible depth-to-breadth ratio - Table 19;								
Actual depth-to-breadth ratio;		h / (N * b) = 0.79							
				PAS	S - Lateral supp	ort is adequate			
Compression perpendicular	to grain								
Permissible bearing stress (no	wane);	$\sigma_{c_adm} = \sigma$	cp1 * K3 * K4 *	K ₈ = 3.400 N/n	nm²				
Applied bearing stress;		$\sigma_{c_a} = R_{A_a}$	$\sigma_{c_a} = R_{A_{max}} / (N * b * L_b) = 0.305 \text{ N/mm}^2$						
	$\sigma_{\rm c} = -$								
PAS	S - Applied co	ompressive stre	ss is less th	an permissible	compressive st	ress at bearing			
Bending parallel to grain									
Permissible bending stress;		$\sigma_{\rm m}$ adm = 0	5m * K3 * K7 *	K ₈ = 11.709 N/r	mm²				
Applied bending stress:		$\sigma_{ma} = M$	$\sigma_{m_a} = M / Z_x = 5.850 \text{ N/mm}^2$						
		σ _{m a} /σ _m	adm = 0.500						
		PASS - Applie	ed bending s	stress is less ti	han permissible l	bending stress			
Shear parallel to grain			-			-			
Permissible shear stress:		$\tau_{odm} = \tau^*$	K₂ * K₂ = 1 7 (00 N/mm ²					
Applied shear stress:		$\tau_{a} = 3 * F$	$\tau_{a} - 3 * F / (2 * \Delta) = 0.269 \text{ N/mm}^2$						
		$t_a = 0$	0 158						
		PASS - A	Applied shea	ar stress is les	s than nermissib	le shear stress			
Deflection			ipplied elled						
Deflection Medulus of electicity for deflect	ion	г г.	CEOO N/mm	2					
Recrementation deflection:	ion,	$\Box = \Box min =$	$E = E_{min} = 6500 \text{ N/mm}^2$						
Pending deflection,	O _{adm} = IIII	$\delta_{adm} = min(0.551 \text{ in}, 0.003 ^{\circ}\text{L}_{s1}) = 11.100 \text{ mm}$							
Shoar doflaction:		$0b_{s1} = 13$	00 mm						
		$0_{V_{S1}} = 0.4$		80 mm					
		$o_a = o_{b_s1}$	$+ 0v_{s1} = 13.3$	03					
		Oa / Oadm =	ΓΛΙΙ - Τ	ntal deflection	avoade normia	sible deflection			

Beam would not be stiff enough to support applied loadings even assuming no notches or reductions in section where the existing post is connected to the beam. Therefore, replace beams with suitable sized section.

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		Beam Str	rengthening		8	/A
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GL6 0BP	RD	29/09/20				

Beam Strengthening assuming 8No 20mm bars

It is proposed to replace the timber beam with a suitable sized section, installed in sections for installation purposes.

Determine size of required timber using same loadings and span as previous.

Timber beam analysis & design (BS5268) - New Timber Beam

TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.02



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	Section				Sheet no./rev	/.
Davies Torres Design Ltd		Beam St	renathenina			9 /A
Clarence House	Calc by	Date	Chk'd by	Date	App'd by	Date
Church Street, Nailsworth	BD	29/09/20	onicaby	Duio	, ipp a by	Duito
GL6 0BP	TID TID	20/00/20				
		Support B		Dead	* 1.00	
				Impo	sed * 1.00	
Analysis results						
Maximum moment:		M -61	73 kNm·	M · ·	– 0 000 kNm	
Design moment:		$M_{max} = 0.1$	be(M) abe(I	(Maria)) – 6 173 kM		
Maximum shear:		F = 6.67		Vimin)) = 0.175 Ki	-6 673 kN	
Design shear:		F = max(ab)	s (Franch) abe(F	1 min = 	-0.075 KIN	
Total load on beam:		W/ 13 3	47 kN	min)) – 0.073 Kiv		
Beactions at support A:		$\mathbf{R}_{\text{tot}} = 13.3$	673 kNI	B	– 6 673 kN	
Linfactored doad load reaction a	t cupport A:	$P_{A} = 0$	621 KN	LIA_mi	n = 0.073 KN	
Unfactored imposed load reactiv	an at support A .	$I A_Dead = J$. 3 053 kN			
Reactions at support R	ση αι συρρυπ Α,		673 kNI	Po ·	- 6 673 LN	
Infactored dead load reaction of	at support R.	$R_{\text{D}} = 0$	621 kN		- 0.073 NIN	
Linfactored imposed load reaction a	ar support D,		.021 KIN			
		TB_imposed -	3.032 KN			
- 178				\sim		
<u>↓</u> <u>∠</u> 275	` ▶	\mathbf{X}				
·		↓ 100 ↓				
Timber section details						
Breadth of sections;		b = 275 mr	n			
Depth of sections;		h = 178 mr	n			
Number of sections in member;		N = 1				
Overall breadth of member;		$b_b = N \times b$	= 275 mm			
Timber strength class;		D30				
Member details						
Service class of timber:		1				
Load duration:		l ong term				
Length of span:		Let = 3700	mm			
Length of bearing:		Ls = 100 m	m			
Section properties				0		
Cross sectional area of member	r;	$A = N \times b$	< h = 48950 m	m²		
Section modulus;		$Z_x = N \times b$	× h² / 6 = 1452	2 183 mm ³		
		$Z_y = h \times (N)$	$(\times b)^2 / 6 = 224$	43542 mm ³		
Second moment of area;		$I_x = N \times b >$	k h ³ / 12 = 129	244317 mm⁴		
		$I_y = h \times (N$	× b) ³ / 12 = 30	8486979 mm ⁴		
Radius of gyration;		$i_x = \sqrt{(I_x / A)}$) = 51.4 mm			
		$i_y = \sqrt{(I_y / A)}$) = 79.4 mm			
Modification factors						
Duration of loading - Table 17		K3 = 1.00				
Bearing stress - Table 18:		$K_4 = 1.00$				
Total depth of member - cl.2 10	.6:	$K_7 = (300 \text{ r})$	nm / h) ^{0.11} = 1	.06		
Load sharing - cl.2.9:	,	$K_8 = 1.00$				

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Davies Torres Design Ltd		Beam S	trengthening			10 /A	
Clarence House	Calc. by	Date	Chk'd by	Date	App'd by	Date	
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		•		•		•	
Lateral support - cl.2.10.8							
Ends held in position and memb	pers held in line	, as by direct co	nnection of s	heathing, deck or	joists		
Permissible depth-to-breadth ra	tio - Table 19;	5.00					
Actual depth-to-breadth ratio;		h / (N * b)	= 0.65				
				PASS	- Lateral suppo	ort is adequate	
Compression perpendicular te	o grain						
Permissible bearing stress (no v	$\sigma_{c_{adm}} = \sigma_{c}$	cp1 * K3 * K4 *	K ₈ = 2.800 N/mm	l ²			
Applied bearing stress;		$\sigma_{c_a} = R_{A_a}$	max / (N * b *	L _b) = 0.243 N/mm	2		
	σ_{c_a} / σ_{c_a}	lm = 0.087					
PASS	5 - Applied col	mpressive stre	ss is less tha	an permissible c	ompressive str	ess at bearing	
Bending parallel to grain							
Permissible bending stress;	$\sigma_{m_adm} = \sigma_{m_adm}$	5m * K3 * K7 *	K ₈ = 9.532 N/mm ²	2			
Applied bending stress;		$\sigma_{m_a} = M /$	Z _x = 4.251 N	J/mm²			
		$\sigma_{m_a} / \sigma_{m_adm} = 0.446$					
		PASS - Applie	d bending s	tress is less tha	n permissible l	pending stress	
Shear parallel to grain							
Permissible shear stress;		$ au_{adm} = au$ *	K ₃ * K ₈ = 1.40	00 N/mm²			
Applied shear stress;		$\tau_a = 3 * F / (2 * A) = 0.204 N/mm^2$					
		$\tau_{a} / \tau_{adm} = 0.146$					
		PASS - A	pplied shea	nr stress is less t	han permissibl	e shear stress	
Deflection							
Modulus of elasticity for deflection	on;	E = Emin =	6000 N/mm ²	2			
Permissible deflection;		$\delta_{adm} = min$	(0.551 in, 0.0	004 * L _{s1}) = 13.99	5 mm		
Bending deflection;		$\delta_{b_{s1}} = 11.$	352 mm				
Shear deflection;		$\delta_{v_s1} = 0.4$	04 mm				
Total deflection;		$\delta_{a} = \delta_{b_{s1}} + \delta_{v_{s1}} = 11.755 \text{ mm}$					
		δ_a / δ_{adm} =	0.840				
		F	ASS - Total	deflection is les	s than permiss	ible deflection	
For resin beam connections, us	e maximum mo	oment at centre o	of section. 6.2	2kNm			
TRS TYPE E, 8	8 SHEAR CO	ONNECTORS	for each	connection			

Beam to be made in 3 sections of 500mm - 1800mm - 1700mm 4 SLOTS in both ends of the centre section, holes in one end of the outer sections to join with the centre section



	Project	Project					Job Ref.		
	Section	The Old Forge				Shoot n	200814		
Davies Torres Design Ltd	Geolion	Beam Strengthening				Oneet In	11 /A		
Clarence House	Calc. by	Calc. by Date Chk'd by Date			App'd by	App'd by Date			
GL6 0BP	R	D	29/09/20						
Befer to proposal sheet inclu	ded within A	Annendix	for full dimen	sions					
		тррении		5015					
Esteel	205000	N/sam	m						
Etimber	6000	N/sqm	m						
		•							
Modular Ratio	34.2								
Tension Steel				Compressi	on Steel				
No of Bars per layer	4			No of Bars		4			
Diameter	20	mm		Diameter		20	mm		
Total Area per layer	1256.6	sqmm		Total Area		1256.6	sqmn	n	
Equivalant Area	12025 1	camm		Equivalant	Aroa	11670 E	camp		
Equivalent Area	42935.1	sqmm		Equivalent	Area	410/8.5	sqmn		
Bending Moment	6.2	kNm							
bending woment	0.2	KINIII							
Dimensions of Timber				Depth to S	teel				
Depth	178	mm		Compressi	on	44	mm		
Breadth	275	mm		Tension					
				Length of S	Steel Bars	800	mm		
				Slot Depth		138	mm		
				Slot Width		32	mm		
Tonsion Pars Pow 1	Pow 2	Pow	2 Pow/	Pow 5	Pow 6	Pow 7	Pow 8		
d 133	NOW Z	NOW	5 1.010 4			NOW /	10000	mm	
d-x 53.98484								mm	
EquivArea x (d-									
x) 2317845								mm^3	
Solve for Neutral Axis Depth									
x = 79.01516	mm								
Only and NA	2247045								
	231/845								
QDEIOW INA	2317845)							
Cracked Section Moment of	Inertia								
489510864.6 mm^4									

		Project					Job Ref.		1
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	Dooign Ltd	Section Sheet no./rev.							
Clarance			Beam Strengthening 12 /A						
Church Street	Nailsworth	Calc. by	Date		Chk'd by	Date	App'd by	Date	
GL6 0	BP	RD	29	9/09/20					
									1
Stresses in Bars	(Lowest Bars F	irst)		1					
Stress									
N/sqmm	23.4								
Force per row									
kN	29.4								
				-					
Actual Stresses	from Bending								
Timber									
Compression		1.0	N/sqmm						
Tension Steel									
(Max)		23.4	N/sqmm						
Compression									
Steel		15.2	N/sqmm						
				7					
Tension Force		29.4	kN						
Tension per Bar		7.3	kN						
· ·				-					
						Allowable f	or D30 Oak		
Bond Stress into)						2. 200 Ouk		
Hole			0.27	N/sam	m	1.40	N/samm		
Bond Stress into)			,1		•	, <u>1</u>		
Slot			0.19	N/sqm	m	1.40	N/sqmm		

Stresses in timber resin connections

Holed Connections

Take area of contact between resin and timber as Circumference of (Bar Dimameter + 2mm) x Embedment Length

Slotted Connections

Take area of contact as slot width x (2xslot width to allow for sides of slot) x Embedment Length

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Summary

Upgrade strengthening will be acceptable with 8No 20mm diameter bars at centres as proposed with timber installed in three sections.

Stresses in timber and steel both acceptable

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Appendix

Resin Design Methodology

Resin Repair proposals

Drawings

Resin Data Sheet

	Project				Job Ref.	
		200814				
Davies Torres Design I to	Section	Sheet no./rev.				
		Арр	15			
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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 $\frac{f'_s}{2n} = \frac{M(x-d')}{I_{NA}}$

TRS TYPE E, 8 SHEAR CONNECTORS for each connection

Beam to be made in 3 sections of 500mm - 1800mm - 1700mm 4 SLOTS in both ends of the centre section, holes in one end of the outer sections to join with the centre section



COMPANY - Eradicure (Stratford Upon Avon) Ltd **CONTACT -** Des Parry

SITE - The Old Forge ENQ/JOB NO: 5368 DATE - 17/09/2020

BEAM REFERENCE NO. 1	NO. TO REPAIR 1
DIMENSIONS (NOT TO SCALE)	
WIDTH (mm)	275
DEPTH (mm)	178
OVERALL LENGTH (mm)	4000
BASE THICKNESS (mm)	30
SHEAR CONNECTOR (ROD) CENTRES (mm)	45/134
SHEAR CONNECTORS (RODS)	
LENGTH OVERALL (mm) (50:50)	800
DIAMETER (mm)	20
NUMBER	8 each joint
MATERIAL	HT BZP Steel
SLOTS (DO NOT SCALE FROM SKETCH)	
NUMBER	4
WIDTH (mm) (MAX. FOR RESIN VOLUME ALLOWED)	32
DEPTH (mm) (MAX. FOR RESIN VOLUME ALLOWED)	138

SCHEMATIC ONLY - NOT TO SCALE

©D C MOORE 1997

ALL PROPOSALS TO BE VERIFIED BY A STRUCTURAL ENGINEER

REF: THE OLD FORGE

REQUEST FOR STRUCTURAL CALCULATION

UPGRADE

215 WIDTH OF TIMBER (mm) 170 **DEPTH OF TIMBER (mm)** 3.7 LENGTH (excluding bearing) (m) 150 LENGTH OF BEARING (mm) HARD TIMBER TYPE (softwood or hardwood) FUNCTION OF COMPONENT (supports what?) CARRIERS FOR FLAG FLOOR 3.6×3-3 SIZE OF ROOM (m x m) 3 NUMBER OF CARRIER BEAMS IN ROOM NO ANY OTHER TIMBERS ON CARRIERS (BELOW JOISTS) NONE SIZE OF JOISTS (mm x mm x m) NONE NUMBER OF JOISTS N/A. SPACING OF JOISTS (mm) FLAG STONES FLOOR COVERING (Butt edged/T & G) 75mm THICK Dom LOADING (Domestic/Commercial/Special)

Please attach a Sketch or scale drawing of the room and its floor components.



flagstöre Floor abave.

THIXOTROPIC EPOXY RESIN

An Ultra Low Disturbance Building Solution

DESCRIPTION

THIXOTROPIC EPOXY RESIN is a two part, nonslump 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.

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.

THIXOTROPIC EPOXY RESIN INJECTION & LAMINATING 400cc & 1000cc



Property Repair Systems 01626 331351

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.

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/mm² Tensile Strength - 16 N/mm² Flexural Strength - 20 N/mm² Flexural Modulus - 503 N/mm² Young's Modulus >370 N/mm² 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