DEERYCONSULTING STRUCTURALENGINEER

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117.05

Project No:

COMPUTATIONS

Project:

54 & 54A Beresford Drive Cape Woolamai Additions

Client:

Grimwade

Codes Used:

AS1170 – Loading code AS4100 – Steel Structures AS3600 – Concrete Structures

Description:

Design of post, columns, pad footings and lintels

Computations:

Pages 1 - 7

Steel colun	nn design V3.0	0a	0.55	CONTRACTOR OF THE PARTY OF THE	Sectional S	De	ery Consu	itling Pty Ltd	Paul	Deery	
Member:	(Post P1) 89 x 5	i.0 SHS (Conne	ction '	100mm from fa	ce)						
Compr:	Nc* = 19.1kN <						OK (0.07) OK (0.18)				
Bending:	Mx* = 2.8kNm <	$Mx^* = 2.8kNm < gMb(3000, \alpha m = 1.75) = 15.5kNm$									
_	No minor bendi	ing									
Combined:	I: In-plane = 0.25, Out-of-plane = 0.25							OK (0.25)			
Geometry							_				
	Segment ler		3000		L = Lx	= Ly =	Y	(Y)es,(N)o			
	Major axis leng	• , .	3000								
	Minor axis leng	•	3000								
	Eff. X factor		1.00			αm =	1.75				
	Eff. Y facto	or (key) =	1.00	N.				2			
Loadings	S.Wt =	0.12 k N /m	(exclu	ded)	ŀ	Holes =	0	mm²			
					Analysis	h	-	(4) = 4 = = = = = (1	2)		
	Dead load com			! kN	Analysis			(1)st order,(2 (B)raced/(S)		uer	
	Live load con			kN		Type =			•	0.60	
	$Nc^* = 1.2*Ndl$	+1.5°NII =	19.1		nu = am//1 N/*/N/a	βm =	1.00	cm =		0.60	
	Dandina				bx = cm/(1-N*/No	mox) –	1.00	and δby =	1.00		
Majara	Bending r			(C)ap,(F)ace,(I kNm	vi)anuai						
iviajor a)	xis Mx*=δbx.Nc*(Da Minor axis My*=δ) kNm	Minor bending ((M)/*) -	0.0	kNm			
	WILLION AXIS IVIY -C	D =			about the strong a		0.0	KINIII			
Capacity		D-	08	min (bending a	about the strong a	ixis offiy)					
	Description = 89	v E O CHC			Maraina constan	+ (bar) =	0	x10 ⁹ mm ⁶			
Elan	•	350 MPa			Warping constan	- '		x10 mm⁴			
Flati	ge yield (Fyf) =	1590 mm ²		⊏ #- •4	Torsional consta	. ,		x10 mm ³			
	Area (Ag) =	1.82 x10 ⁶	4		ive section mod.						
	Stiffness (Ix) =		mm	Effect	ive section mod.			x10 ³ mm ³			
. Snear	modulus (G) =	80000 MPa			Elastic modulu	. ,	200000				
	rx =	33.8 mm			A1 - 66	αb =		(Comp.)			
E(()/	ry =	33.8 mm			Nett area		1590				
	Length (Lex) =	3000 mm			$mx = \pi^2 * E * Ix/(kex)$	•	399				
Eff. Y	Length (Ley) =	3000 mm		Noi	my = π²*E*ly/(key	/*Ly)² =	399	kN			
	Bending	47.0 (-1)			45.5.1.20						
	Msx =	17.2 kNm	~~ -	øMsx =	15.5 kNm		øMsy =		kNm		
	Moa =	312.6 kNm	as –	1.000	$\alpha m = 1.75$		øMbx =		kNm		
	Compression					ØMb	$\kappa(\alpha m=1) =$	15.5	kNm		
	Compression			αNo = 0.0	*kf* 1 n*fi -	500 0 kN					
	acx =	0.564			*kf*An*fy = øNs*αcx =	500.9 kN 282.7 kN					
	αcx1 =	0.564			ØNS αCX = 8Ns*αcx1 =	282.7 KN					
	acy =	0.564			øNs*αcy =	282.7 kN					
	αcy1 =	0.564		•	Ns*αcy1 =	282.7 kN					
	ωο, ,	0.001		Divoy! - E	øNc =	282.7 kN					
	Combined										
		øMrxc =	øMsx*	(1-Nc*/øNs) =	14.9 k N m			OK (0.19)			
		øMixc = øN	/lsx*(1-	Nc*/øNcx1) =	14.4 kNm			OK (0.19)			
		øMoxc = ø	Mbx*(1	-Nc*/øNcy) =	14.4 kNm			OK (0.19)			
		ber ratio = Mx*/s			0.25			OK (0.25)			
	Out-of-plane men				0.25			OK (0.25)			
		øMcx = mi	n(øMo	xc & øMixc) =	14.4 kNm						

Steel colun	nn design V3.0	0a	8/18/	Control of the Contro	EISTERNE STATE	De	ery Consu	tling Pty Lte	d Paul I	Deery
Member: Compr: Bending:	(Column C1) 89 Nc* = 43.9kN < Mx* = 6.3kNm < No minor bendi		OK (0.14) OK (0.41)							
Combined:		In-plane = 0.55, Out-of-plane = 0.55								
Geometry										
	Segment ler	• , ,	2700		L = L	x = Ly =	Υ (Y)es,(N)o		
	Major axis leng		2700							
	Minor axis leng		2700			am -	1.75			
	Eff. X facto		1.00			am =	1.75			
	Eff. Y facto	or (key) –	1.00			Holes =	O r	nm²		
Loadings_	S.Wt =	0.12 kN/m	(exclu	ded)		110163 -				
		(4.1.11)	47.0	l. s.	A L '		4 4	4)-4	(O)l	.l
	Dead load com		17.8		Anaiysi	s type =		1)st order,		aer
	Live load com	. , ,	15.0			Type =	10	B)raced/(S cm		0.60
	Nc* = 1.2*Ndi-	= IINI"C.1 +	43.9		x = cm/(1-N*/N	βm =	0.0 1.00	and δby		0.60
	Bending r	moment =	F	(C)ap,(F)ace,(N	•	OHIDA) -	1.00	and oby	- 1.00	
Maior av	is Mx*=δbx.Nc*(D			kNm	njanuai					
Wajor ax	Minor axis My*=č			kNm	Minor bending	(Mv*) =	0.0	κNm		
		D =		mm (Bending a						
Capacity										
	Description = 89	x 5 0 SHS		,	Narping consta	nt (lw) =	0 :	x10 ⁹ mm ⁶		
Fland	ge yield (Fyf) =	350 MPa			Torsional consta			x10³ mm⁴		
Tidit	Area (Ag) =	1590 mm²			ve section mod.	` '		k10 ³ mm ³		
	Stiffness (Ix) =	1,82 ×10 ⁶ i	mm ⁴		ve section mod.	` '		k10 ³ mm ³		
	modulus (G) =	80000 MPa		Lilcon	Elastic modul		200000 1			
Onoai	rx =	33.8 mm			Liadio modal	αb =		(Comp.)		
	ry =	33.8 mm			Nett are		1590 (
Fff X	Length (Lex) =	2700 mm		Nor	nx = π²*E*lx/(ke		493 1			
	Length (Ley) =	2700 mm			ny = π²*E*ly/(ke		493 1			
2		2700 11111			, ,,,(·) -)/	400 1			
	Bending	47.0.11								
	Msx =	17.2 kNm		øMsx =	15.5 kNm		øMsy =		5 kNm	
	Moa =	347.3 k N m	as =	1.000	$\alpha m = 1.75$		øMbx =		5 kNm	
	Compression					ØIVID	k(am=1) =	15.	5 kNm	
	Compression			$\alpha N s = 0.9$	'kf*An*fy =	500.9 kN				
	acx =	0.642			øNs*acx =	321.5 kN				
	acx1 =	0.642			Ns*acx1 =	321.5 kN				
	acy =	0.642			øNs*αcy =	321.5 kN				
	αcy1 =	0.642		øNcy1 = ø		321.5 kN				
	•			•	øNc =	321.5 kN				
	Combined									
				1-Nc*/øNs) =	14.1 kNm	1	(OK (0.45)		
				Nc*/øNcx1) =	13.4 k N m			OK (0.47)		
				-Nc*/øNcy) =	13.4 kNm	1	(OK (0.47)		
	-	ber ratio = M x*/			0.55			OK (0.55)		
	Out-of-plane men			-	0.55		(OK (0.55)		
		ø M cx = mi	n(øMo:	xc & øMixc) =	13.4 kNm	1				

Floor beam design V3.0	10a		Deery Cor	sutling Pty Ltd Paul Deery	
Bending: $M^*(max) = 28$ Deflection: $\delta dl = L/1173$ Precamber: Not required	FB1) 250x90PFC 3.7kNm < øMb(6000,αm= (5mm), Ψs.δII = L/2221 tdl = 8.2kN, RII = 6.2kN,	OK (0.57) OK			
Geometry					
Span (L) = Centres (cts) =	6000 mm 1000 mm	Effective le	ength (Le) = 600 am = 1.1	00 mm 13	
Design at =	M mm from LF	HS, (M)ax, (S)eg			
Effective length (Le) = αm =	6000 mm 1.13				
Loadings		-			
Floor area = Apply reduction = Floor reduction (Ψa) =	6.0 m ² N (Y)es,(N)o 1.00 Cl 3.4.2	Load type = Short term LL (Ψs) =	N (N)ormal, 0.7	(S)torage	
Uniform dea	d loads				
Floor dead load (wdl) = Super. dead load (wdl) = Other dead load (wdl) = Include S.Wt =	0.40 kPa * Ψa * 0.40 kPa * 0.40 kPa * Y (Y)es,(N)o	1000 mm + 2700 mm + 2250 mm +	kN/m = kN/m = kN/m = S.Wt =	0.40 kN/m 1.08 kN/m 0.90 kN/m 0.36 kN/m	
Uniform live	landa		Σwd	= 2.74 kN/m	
Floor live load (wll) = Partitions (wll) =	1.50 kPa * 0.25 kPa *	1000 mm + 2250 mm +	kN/m = kN/m = Σwl	1.50 kN/m 0.56 kN/m = 2.06 kN/m	
Point loads Point dead load (pdl) = Point live load (pll) =	kN kN	Position =	3000 mm from	LHS	
p* = 1.2*pc	dI + 1.5*pII = 0.00 Max M* at = 3000	3 kN/m) kN) mm / kNm (Maximum)	RII = 6	3.2 kN 3.2 kN 3.1 kN	
Capacity					
Description = Flange yield (fyf) = Area (Ag) = Stiffness (Ix) = Shear modulus (G) =	250x90PFC 300 MPa 4520 mm² 45.1 x10 ⁶ mm ⁴ 80000 MPa	Warping cor Torsional co Effective section n Effective section n Elastic mo	onstant (J) = 25 nod. (Zex) = 45 nod. (Zey) = 88	3.9 x10 ⁹ mm ⁶ 38 x10 ³ mm ⁴ 21 x10 ³ mm ³ 3.7 x10 ³ mm ³ 00 MPa	
Msx = Moa =	126.3 kNm 64.8 kNm αs =				
Deflections					
Ireq'd DL (L/360) = Ireq'd Ψs.LL (L/360) = Ireq'd DL+Ψs.LL (L/250) =	13.8 x10 ⁶ mm ⁴ 7.3 x10 ⁶ mm ⁴ 14.7 x10 ⁶ mm ⁴	$\begin{array}{c} \delta DL = \\ \Psi s. \delta LL = \\ < Critical \end{array}$	5.1 mm 2.7 mm 7.8 mm	Span / 1173 Span / 2221 Span / 767	
Max. precamber (0. Precamber 80		'	precamber = precamber =	15 mm 0 mm	
		1kN midspan δ =	0.5 mm		

Deery Consutling Pty Ltd | Paul Deery "T" Lintel V3.00b (Brickwork Lintel BL1) 250mm x 12mm pl. vertical, 250mm x 10mm pl. horizontal Geometry: OK (0.57) $M^* = 28.2 \text{kNm} < \emptyset \text{Mb}(4700, \alpha \text{m} = 1.13) = 49.3 \text{ kNm}$ Design: OK δdI = 6.2mm (Span / 756), δII = 0.0mm (Span / -) Defl'n: (Each end) RdI = 17.8kN, RII = 0.0kN, R*dn = 24.0kN Reactions: Geometry 4700 mm Span = Le = am = 1.13 12mm 250mm Vertical web Horizontal flange 10 mm Thickness = Thickness = 12 mm Width = 250 mm 10mm Height = 250 mm 250 MPa 250 MPa Yield strength = Yield strength = 250mm Loading Uniform dead loads 0.00 kN/m kN/m =kPa * Roof dead load (wdl) = mm + 1500 mm + kN/m =0.00 kN/m kPa * Floor dead load (wdl) = kN/m = 7.14 kN/m 4.20 kPa * 1700 mm + Wall dead load (wdl) = kN/m =0.00 kN/m Other dead load (wdl) = kPa* mm + S.Wt = 0.43 kN/m Include S.Wt = Y (Y)es,(N)o Σ wdl = 7.57 kN/m Uniform live loads kPa * kN/m =0.00 kN/m Roof live load (wll) = mm + kPa * 1500 mm + kN/m =0.00 kN/m Floor live load (wll) = kPa * kN/m =0.00 kN/m mm + Other live load (wll) = Σ wll = 0.00 kN/m Short term LL (Ψs) = 0.7 Point loads 2350 mm from LHS Dead load (Pdl) = kN Position = Live load (PII) = kN 10.22 kNm $RdI = wdl^*L/2 + pdl^*(L-pos)/L =$ 17.8 kN $w^* = 1.35*wdl =$ $p^* = 1.2*pdl + 1.5*pll =$ 0.00 kNm RII = wII*L/2 + pII*(L-pos)/L =0.0 kN M* = R* = 1.35*Rdl = 24.0 kN 28.2 kNm (Max at 2350mm) **Properties** 5500 mm² 0 mm⁶ (Cl H4) Warping constant (lw) = Area = 227 x10³ mm⁴ 38.7 x106 mm4 Stiffness (lx) = Torsional constant (J) = 13.06 x106 mm4 210 x103 mm3 Elastic modulus (Zt) = Stiffness (Iy) = 510 x10³ mm³ 80000 MPa Elastic modulus (Zb) = Shear modulus (G) = 210 x10³ mm³ 200000 MPa Min. elastic modulus (Zmin) = Elastic modulus (E) = 382 x10³ mm³ Elastic (y.top) = 184 mm Plastic modules (S) = 315 x103 mm3 Plastic (yp.top) = 229 mm Eff. elastic mod.(Compact) (Zc) = Capacity - CI 5.6.1.2 Web $\lambda e = dw/tw*\sqrt{(fvw/250)} =$ 20.8 < 22, Non-compact CI 5.2.2 Zex = Zmin+[(22-Sw)/(22-8)*(Zc-Zmin)] =219 x103 mm3 54.7 kNm 49.3 kNm 182.5 Msx = øMsx = $\beta x =$ Moa = 286.9 kNm 0.931 1.13 as = $\alpha m =$ $\emptyset Mbx = \alpha m^* \alpha s^* \emptyset Msx \le \emptyset Msx =$ 49.3 kNm **Deflections** 18.4 x106 mm4 Ireq'd DL (L/360) = < Critical $\delta DL =$ 6.2 mm Span / 756 0.0 x106 mm4 Ireq'd LL (L/360) = Ψs.δLL = 0.0 mm Span / -1kN midspan δ = 0.3 mm

"T" Lintel \	73.000						Deery Consu	itling Pty Ltd	Paul De
Geometry: Design: Defl'n: Reactions:	(Brickwork Lin M* = 10.8kNm δdl = 2.5mm ((Each end) Ro	< øMb(2800 Span / 1135)	,αm=1.13 , δII = 1.0) = 19.9 kNm mm (Span / 2	943)	10mm pl. h		OK (0.54) OK	
Seometry	(2001) 0114/110	,		,					
eomeny_									
	Span = Le =	2800 m	nm						
					αm =	1.13		10mm	
	Vertical web				Horizontal f	lange		[] ≱	150n
	Thickness =	10 m	ım		Thickness =		mm	•	
	Height =	150 m			Width =		mm		10mm
Y	ield strength =	250 N	1 Pa	Yie	ld strength =	250	MPa	250mm	
.oading									
	Uniform dead	loads							
	ad load (wdl) =	The second second	Pa *		mm +		kN/m =	0.00	k N /m
	ad load (wdl) =	0.90 k			mm +		kN/m =		kN/m
	ad load (wdl) =	4.20 k		900	mm +		kN/m =		kN/m
	ad load (wdl) = nclude S.Wt =		Pa * Y)es,(N)o		mm +		kN/m = S.Wt =		kN/m kN/m
'	Holdde O.VV		1)03,(14)0				Σ wdl =		kN/m
	Uniform live le	oads						0.44	13,47111
	ive load (wll) =		Pa *		mm +		k N /m =	0.00	kN/m
	ive load (wll) =	2.00 k		1500	mm +		kN/m =	3.00	k N /m
	ive load (wll) =		Pa *		mm +		k N /m =		k N /m
Short t	erm LL (Ψs) =	0.7					Σwll =	3.00	k N/ m
_	Point loads								
	ad load (Pdl) = ive load (Pll) =	k k	N N		Position =	1400	mm from LHS	S	
	w* = 1.2*wdl -	+ 1 5*wll =	11 01	3 kNm	Rdl -	\\\d*1 /2 + no	di*(L-pos)/L =	7.6	kN
	p* = 1.2*pdl) kNm			II*(L-pos)/L =		kN
		M* =	10.8	3 kNm		,	dl + 1.5*RII =	15.4	
roperties		1)	Max at 140	00mm)					
roperaes									
,	Area =	4000 m				nstant (Iw) =		mm ⁶ (Cl H4)	
	Stiffness (lx) = Stiffness (ly) =	13.03 x	10 ⁶ mm⁴			onstant (J) =		x10³ mm⁴	
	modulus (G) =	80000 M				odulus (Zt) =		x10 ³ mm ³	
	modulus (E) =	200000 M		Min	elastic modu	dulus (Zb) =		x10³ mm³ x10³ mm³	
	lastic (y.top) =	125 m		IVIIII.		odules (S) =		x10° mm³	
	stic (yp.top) =	152 m		Eff. elas	tic mod.(Con	` '		x10 mm ³	
apacity - CI	5.6.1.2				,	, , , ,			
		.e =dw/tw*√(fvw/250) -	15.0	< 22, Non-co	mnact	Cl 5.2.2		
Z	ex = Zmin+[(22-5	•			x10 ³ mm ³	Прасі	CI 5.2.2		
	Msx =	22.1 ki	٧m	øMsx =	19.9	kNm	βx =	77.1	
	Moa =	352.4 kl		αs =	1.002		αm =	1.13	
eflections		øMbx =	am*as*øl	Msx ≤ øMsx =	19.9	kNm			
lrea's	d DL (L/360) =	2 R v	I0 ⁶ mm⁴	< Critical	 δDL =	2.5	mm	0 1	1125
	d LL (L/360) =		I0 ⁶ mm⁴	- Ontical	Ψs.δLL =		mm mm	Span / Span /	
54	()	٨			. 5.022	1.0		оран /	2343
				1kN r	nidspan δ =	0.3	mm		

"T" Lintel \	/3.00b	MEN SHE	5000	The state of the same of the s			Deery Consu	tling Pty Ltd	Paul Deery
Geometry: Design: Defi'n: Reactions:	(Brickwork Lir M* = 4.0kNm < δdl = 1.2mm (\$ (Each end) Rd	· øMb(1700,αn Span / 1462), δ	n=1.13) = 5II = 0.5n	= 8.3 kNm nm (Span / 3	753)	nm pl. horiz	(OK (0.48) OK	
Geometry									
	Span = Le =	1700 mm							
					am =	1.13		8mm	
	Vertical web				Horizontal flai	nge		- ∳	100mm
	Thickness =	8 mm			Thickness =	10 n			
	Height =	100 mm			Width =	250 r			10mm
Y	ield strength =	250 MP	a	Yie	ld strength =	250 N	MPa -	250mm	
Loading									
	Uniform dead	loads							
	ad load (wdl) =	kPa			mm +		(N/m =		kN/m
	ad load (wdl) =	0.90 kPa			mm +		(N/m =		kN/m
	ad load (wdl) =	4.20 kPa kPa		900	mm +		(N/m = (N/m =		kN/m kN/m
	ad load (wdl) = Include S.Wt =		es,(N)o		mm +		3.Wt =		kN/m
	include 3.vvi -	1 (1)	55,(IN)O			•	Σwdl = _		kN/m
	Uniform live lo	oads					24401	0.00	NIWIII
Roof I	ive load (wll) =	kPa	ı *		mm +	HE LETTER H	(N /m =	0.00	kN/m
	live load (wll) =	2.00 kPa	ı *	1500	mm +		(N/m =		kN/m
Other I	live load (wll) =	kPa	ı *		mm +	k	(N/m =	0.00	kN/m
Short	term LL (Ψs) =	0.7					Σ wII =	3.00	kN/m
	Point loads								
	ad load (Pdl) = .ive load (Pll) =	kN kN			Position =	850 r	nm from LHS	8	
	w* = 1.2*wdl ·	+ 1.5*wll =	10.97	kNm	Rdl = w	dl*L/2 + pdl*	*(L-pos)/L =	4.6	kN
	$p^* = 1.2*pdl$	+ 1.5*pll =	0.00	kNm		wll*L/2 + pll*		2.6	kN
		M* =		kNm	1	$R^* = 1.2*Rd$	+ 1.5*RII =	9.3	kN
Properties		(Ma	x at 850	mm)					
			2						
	Area =	3300 mm			Warping cons	, ,		mm ⁶ (Cl H4)	
	Stiffness (Ix) =	2.5 x10			Torsional con	. ,		x10 ³ mm ⁴	
	Stiffness (ly) =	13.03 x10			Elastic mod	. ,		x10 ³ mm ³	
	modulus (G) =	80000 MP		A.4:	Elastic modu			x10 ³ mm ³	
	modulus (E) =	200000 MP 92 mm		IVIII.	. elastic modulu	` ,		x10³ mm³ x10³ mm³	
	Elastic (y.top) = astic (yp.top) =	103 mm		Eff. elas	Plastic mod	, ,		x10° mm°	
Capacity - C	i 5.6.1.2								
) a = du/hu*=1/6:	/250\ -	40.5	4.00 Non		21.5.0.0		<u> </u>
2	. vveb 2-3/Zex = Zmin+	λe =dw/tw*√(fy Sw)/(22-8)*(Zc-	,		< 22, Non-com x10 ³ mm ³	pact (CI 5.2.2		
	Msx =	9.2 kNr		øMsx =	8.3 kt	Nm	βx =	11.5	
	Moa =	323.1 kNr øMbx = 0		αs = = Msx ≤ øMsx	1.022 8.3 kt	٧m	αm =	1.13	
Deflections		MINIOX - U	43 1011	- YEIV - YEIV -	U.J KI	*111			
Ireq	'd DL (L/360) =	0.6 x10	⁶ mm⁴	< Critical	δDL =	1.2 r	nm	Span /	1462
	'd LL (L/360) =	0.2 x10	⁶ mm⁴		Ψs.δLL =	0.5 r	nm	Span /	
				1kN	midspan δ=	0.2 r	mm		

"T" Lintel	V3.00b	11070			Deery Consutling Pty Ltd Paul Deery					
Geometry: Design: Defl'n: Reactions:	(Brickwork Lin M* = 5.0kNm < δdl = 3.6mm (\$ (Each end) Rd	øMb(2500,αn Span / 700), δ	n=1.13) = II = 0.5m	: 10.9 kNm m (Span / 470	14)	mm pl. horizon	О	OK (0.46) OK		
Geometry				_	_					
	Span = Le =	2500 mm	1							
	opan 10				am =	1.13		10mm		
	Vertical web				Horizontal flan	ge		∏ ≱	100mm	
	Thickness =	10 mm	1		Thickness =	10 mm		♦		
	Height =	100 mm	1		Width =	250 mm			10mm	
,	Yield strength =	250 MF	'a	Yiel	d strength =	250 MPa	-	250mm		
Loading										
	Uniform dead	loads								
Roof de	ead load (wdl) =	0.40 kP	a *	3600	mm +	kN/m	=	1.44	k N /m	
Floor de	ead load (wdl) =	kP			mm +	kN/m	=	0.00	kN/m	
Wall de	ead load (wdl) =	4.20 kP	a *	600	mm +	kN/m	=	2.52	kN/m	
Other de	ead load (wdl) =	kP	a *		mm +	k N /m		0.00	k N /m	
	Include S.Wt =	Y (Y)	es,(N)o			S.Wt	= _		k N /m	
	Uniform live le	nade					Σ wdl =	4.24	k N /m	
Roof	live load (wll) =	0.25 kP	a *	3600	mm +	kN/m	=	0.90	k N /m	
	live load (wll) =	kP.			mm +	kN/m			kN/m	
	live load (wll) =	kP			mm +	kN/m			kN/m	
	t term LL (Ψs) =	0.7	-			1	Σ wII =		kN/m	
	Point loads									
De	ead load (Pdl) =	kN			Position =	1250 mm f	rom LHS			
	Live load (PII) =	kN			1 OSIGOTI —	1250 111111	ioni Eno	'		
	w* = 1.2*wdl	+ 1.5*wll =	6.43	kNm	Rdl = wo	d *L/2 + pd *(L-p	os)/L =	5.3	kN	
	p* = 1.2*pdl			kNm		vll*L/2 + pll*(L-p	•	1.1		
	F F	M* =		kNm		R* = 1.2*Rdl + 1.	,	8.0		
		(M	ax at 125	0mm)						
Properties	_	`								
	Area =	3500 mn	n²		Warping const	ant (lw) =	0 n	nm ⁶ (Cl H4)		
	Stiffness (Ix) =	3.0 x10			Torsional cons			(10³ mm⁴		
	Stiffness (ly) =	13.03 x10			Elastic modu	` '		(10 ³ mm ³		
Shea	r modulus (G) =	80000 MF			Elastic modu	` '		(10 ³ mm ³		
	c modulus (E) =	200000 MF		Min	elastic modulus			(10 ³ mm ³		
	Elastic (y.top) =	89 mn			Plastic mod	. ,		(10 ³ mm ³		
	Plastic (yp.top) =	103 mm		Eff. elas	tic mod.(Compa	. ,		(10 ³ mm ³		
Capacity - C	CI 5.6.1.2									
	Weh	λe =dw/tw*√(fy	nw/250) =	10.0	< 22, Non-comp	pact CI 5.2	2.2		_	
	Zex = Zmin+[(22-5				x10 ³ mm ³	Jack 01 3.2	۷.۷			
	Msx =	12.1 kN	m	øMsx =	10.9 kN	lm	βx =	13.0		
	Moa =	224.6 kN		as =	1.008		am =	1.13		
Doftestier-				⁄lsx ≤ øMsx =	10.9 kN	lm				
Deflections	•									
Ired	q'd DL (L/360) =	1.6 x10		< Critical	δDL =	3.6 mm		Span /	700	
	q'd LL (L/360) =	0.2 x10	0° mm⁴		Ψs.δLL =	0.5 mm		Span /		
	-									
				1k N r	nidspan δ =	0.5 mm				