

Results

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To:	John Woodman	From:	Doug Gaunt
Organisation:	Prowood	Subject:	5920mm PLX20 Portal, 360/290
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John, Daniel, Andrew

Please find below your P21 bracing results for your three 5920mm PLX20 Portal, 360/290.

- 1. BU wind = 163 BU as limited by the service load capacity.
- 2. BU Earthquake = 196BU as limited by the ultimate load capacity.

Figures 1, 3 & 3 shows the load deflection plots, Figure 4 shows the P21:2010 calculations.

Portal Construction

- 5920mm, long PLX portal,
- Legs 360x90x2550mm GL12 Douglas fir
- Beam PLX20 290x90x5200mm
- M12 rods top and bottom connected to 40x8 steel PLX reinforcement + Spax screw at rod/40x8 connection.
- 12mm curved backing plate outside columns 50mm rebate to columns
- Prowood shear brackets + two VGZ7x200 screws
- VGS 9x200mm screws two at M12 bolts inner face of column
- Prowood base bracket, ten VGS9x160 Rothoblass screws to fix to base of timber column
- M12 hold down rods bracket to reaction beam,
- P21 Supplementary restraints used

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Top of Wall Deflection, mm

Figure 1: Portal 290704

Observations

- Beam/Column joint opening up on top side
- Columns rotating at base
- Prowood base fitting distorting



Top of Wall Deflection, mm

Figure 2: Portal 290705



Figure 3: Portal 290706

P21:2010 BRACING	RAG	CKING TEST	RESULT EVA						
Wall Construction									
5920mm. long PL>	(por	tal. Legs 360) x90x2550mr	n. Beam PL	x20 290x90x5	5200mm			
M12 rods top and bottom connected to 40x8 steel PLX reinforcement + snax screw									
12mm curved bac	kina	plate outside	columns 50)mm rebate	to columns	Summary			
Prowood shear brackets + two VG77x200 screws								BU	
VGS 9x200mm scr	Wind	163 (S)	BU						
Prowood base bracket ten VGS9v160 rothoblass screws to fix to base of timber column									
M12 hold down rods bracket to reaction beam P21 Sunnlementary restraints used									
Date of test:-		28-Mar-23	Ship No	3287		Tested by	Doug Ga	unt	
Date of calc's:-		29-Mar-23		TE22-053		Analysed by	Doug Ga	unt	
Calculated to BRANZ P21:2010 AS/NZS1170.285 A				3604.2011	Scion Private	Bag 3020 Rot	nua		
Calculated to Brown		Serviceability	Cycles	Lilitimate Cvc		Bug 0020 Mot			
		Ω cle to H/300 c		Cycle to Dis			Wall dim	ensions	
		8 5	Xmm	v = (mm)	blacement		l (mm)	H(mm)	
Lah Number	с	ebeo L	Residual	Maximum			5020	2550	
	ctio		Defin C		dof @ D		d at D/2	4th D	
	ire	(P8)	Delin, C	Load				401, K	
		KN	mm	P(KN)	y (mm)	P/2 (KN)	d mm	KN	
000704		4 70	4.40	40.75		0.00	40.4	40.40	
290704	+	4.70	1.40	13.75	38.3	6.88	13.4	13.40	
	-	5.20	0.50	13.45	38.3			12.20	
290705	+	4.50	1.00	12.50	38.3	6.25	12.5	12.00	
	-	4.75	0.40	12.80	38.3	0.40	10.0	12.50	
290706	+	4.60	1.00	12.35	38.3	6.18	12.0	11.85	
	-	5.10	0.30	13.60	38.3			13.40	
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)	
Averages		4.81	0.77	13.08	38.30	6.43	12.63	12.56	
Coefficient of Variation % 5.32 51.4				4.19	0.00	4.88	4.59	5.00	
y = average failure c	leflec	tion or peak d	eflection of the	e three tests.					
d= average first cyc	le dis	placement at	half peak, (the	e very first cy	cle wall reache	es the load)			
R = Residual load, I	P = P	eak Load, S =	Serviceabilit	y load					
Displacement Reco	very F	actor (K1), (0	.8 <= K1 <= `	1.0)	System	Systems factor K2 = 1.2			
Average Structural	Displa	acement Ducti	lity factor			u = y/d	3.03		
Ductility Modificatio	n fact	or				K4 =	0.78		
DLW = Selected de	on limit for win	d forces	DLQ = Selected deflection limit for earthquake for			es			
P21:2010 BR Calc	's	K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service			
Lab Number		(= 1.4 - C/X)	BU's	BU's	BU's	BU's			
290704	(BU)	1.00	199.9	216.0	272.0	167.3			
(1	BU/m)		34	36	46	28			
290705	(BU)	1.00	191.3	201.8	253.0	156.3			
(BU/m)		32	34	43	26			
290706	(BU)	1.00	197.1	211.6	259.5	163.9			
(1	BU/m)	000704	33	36	44	28			
		290704	3% Ok result	4% Ok result	6% Ok result	4% Ok result			
<20% Result Check		290705	-4% Ok result	-6% Ok result	-5% Ok result	-6% Ok result			
		290706	1% Ok result	1% Ok result	-1% Ok result	1% Ok result			
Note: Where the val	lue of	BR Wind or BR I	EQ for any spec	imen is more th	an 20% greater t	han			
either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.									
						o			
Average Earthquake BR		κ	<u>Ultimate</u>			Serviceabili	<u>ty</u>		
EQ (BU's)		$20 \times K4 \times Ry =$	196	(P8 x K1)	x (K2/0.55) =	210			
		196	BU		Limited by	Ultimate lim	it state		
Average Wind BR			<u>Ultimate</u>			<u>Serviceabili</u>	t <u>y</u>		
Wind (BU's)		20 * P =	262	(P8 x K1	l) x (K2/0.71) =	163			
		163	BU		Limited by	Serviceabili	ty limit s	ate	

Figure 4: P21:2010 calculations for the PLX 20 5920x360/290 Portal

Please feel free to contact me to discuss this information. g Cant

Doug Gaunt