

# Results

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<b>To:</b>	Jeff Price	<b>From:</b>	Doug Gaunt
<b>Organisation:</b>	ITI Timspec	<b>Subject:</b>	P21:2010 400mm x 2.4m 7.0mm Plywood with Brackets
<b>Location:</b>	Manukau	<b>Date:</b>	18 November 2021
<b>Mob No.:</b>	0277 880005	<b>No. of</b>	5
<b>Tel No.:</b>		<b>Pages:</b>	

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Please call +64 7 343 5763 if transmission incomplete

Jeff

Please find below your P21 bracing results for your three 400mm x 2.40m 7.0mm Plywood walls as tested with brackets.

1. BU wind = 24 (59 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 29 (73 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

## Wall Construction

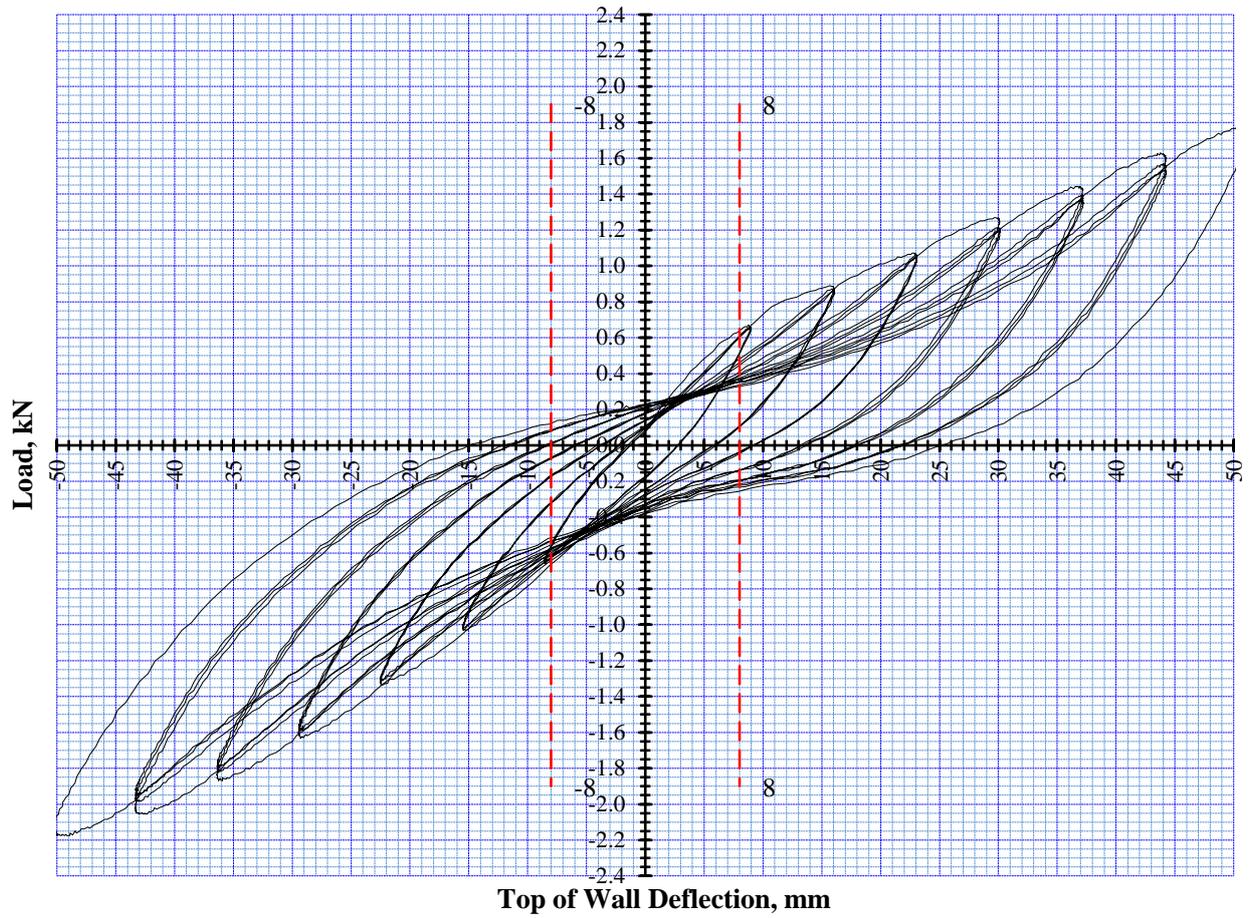
- 90x45 H1.2 SG8 framing, Studs at 400mm centres, no noggs
- 7.0mm 5-ply Plywood one side,
- Plywood fixed 50x2.8mm Galv steel nails at 150mm centres to plates and end studs
- GIB Handibracs hold down brackets each end.
- M12 hold down rods to bottom plate and brackets.

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**USE OF NAME:** The Client will not use Scion's name in association with the sale and/or marketing of any goods or services

## CAUTION

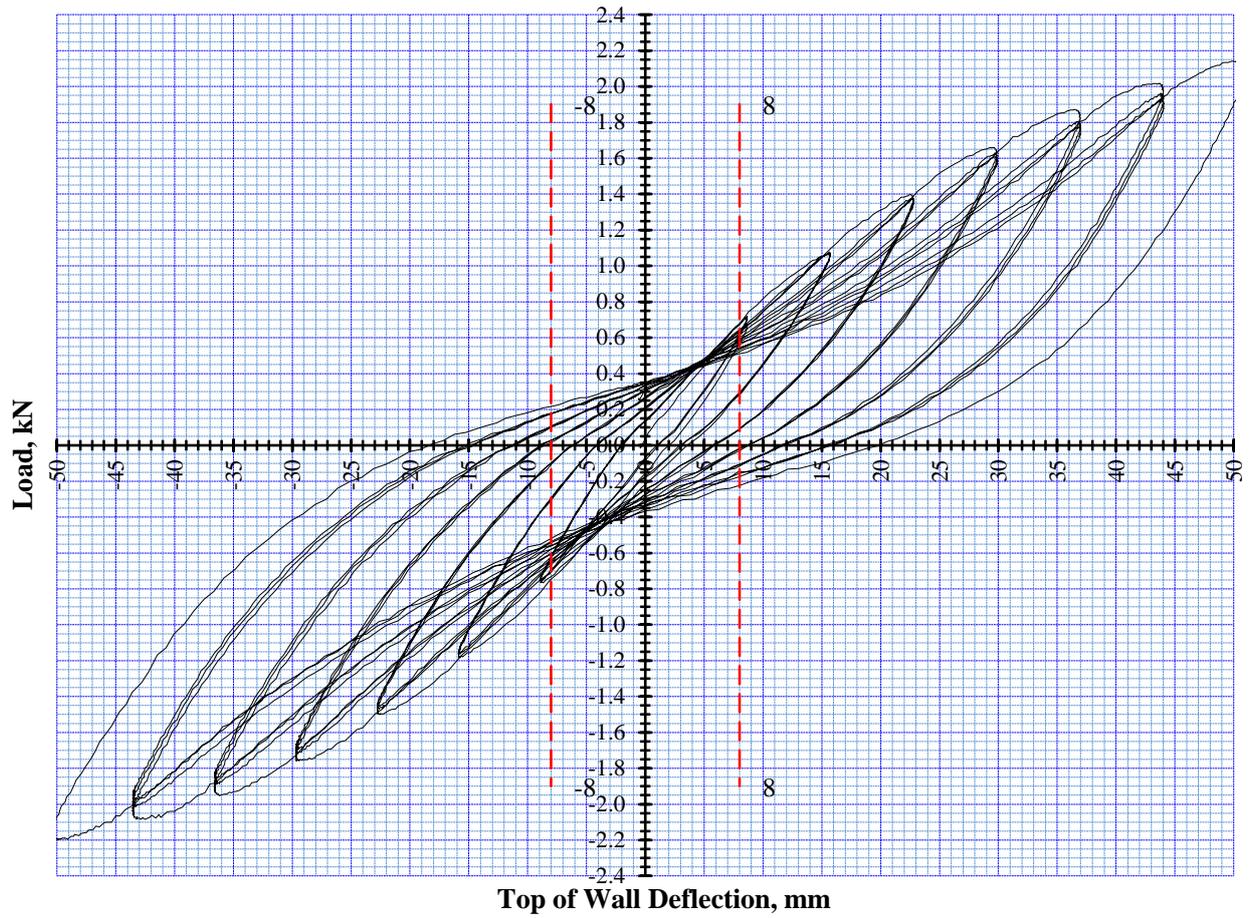
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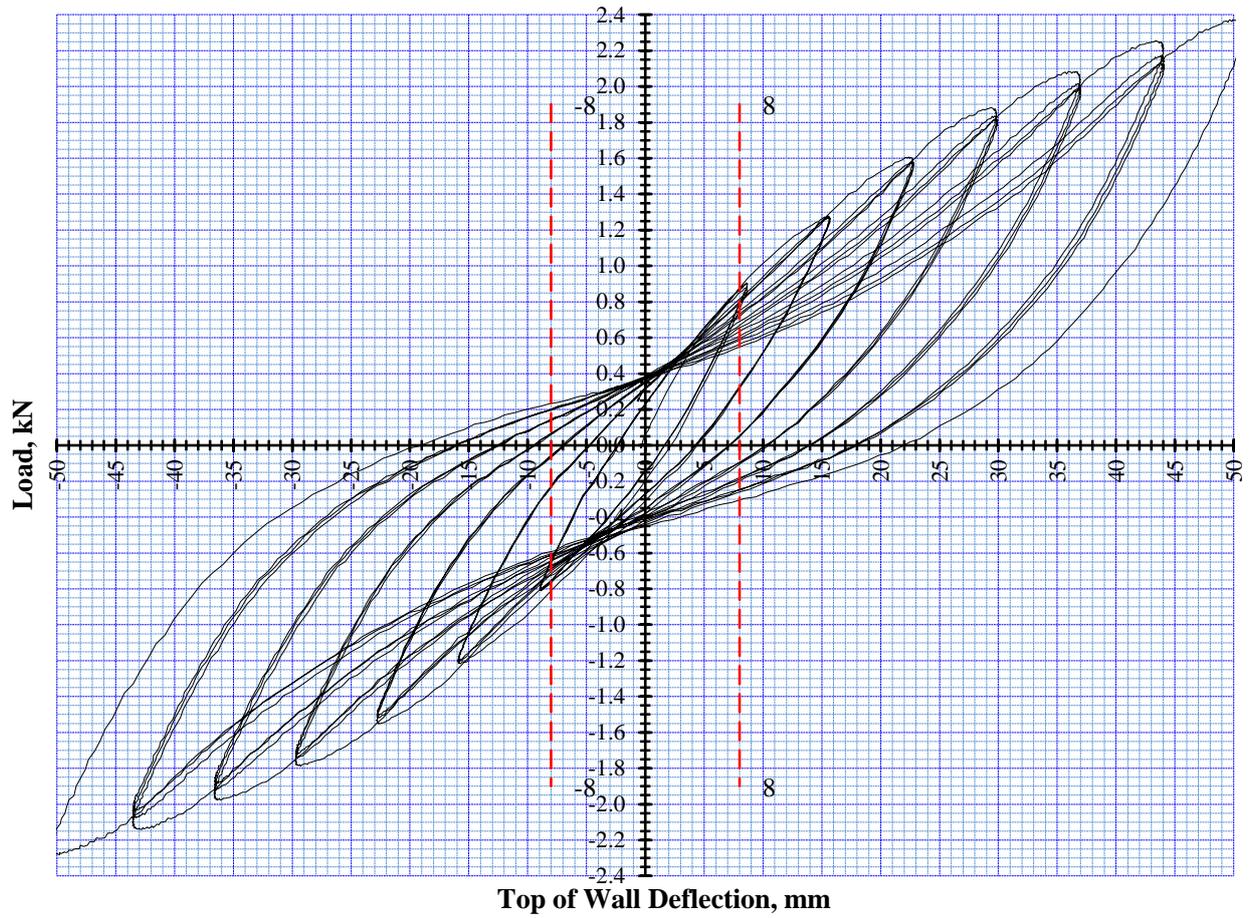
**Figure 1:** Wall 288271

**Observations**

- No obvious damage seen to plywood



**Figure 2: Wall 288272**



**Figure 3: Wall 288273**

P21:2010 BRACING RACKING TEST RESULT EVALUATION								
<b>Wall Construction</b>								
400mm, 7.0mm 5-ply Plywood one side								
90x45 H1.2 SG8 framing, studs at 400mm centres, no nogs								
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres to plate and external studs						Summary		
7mm min edge distances all around. GIB Handibracs used each end						Earthquake	73 (U)	BU/m
M12 hold down bolts to bottom plate & brackets						Wind	59 (S)	BU/m
P21 Supplementary restraints used								
Date of test:-		17-Nov-21	Ship No.		3218	Tested by Jamie Agnew		
Date of calc's:-		17-Nov-21	Job No.		TE21-023	Analysed by Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.								
Serviceability Cycles			Ultimate Cycles					
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement		Wall dimensions		
		8.0	X mm	y=(mm)		L(mm)	H(mm)	
		Loads	Residual	Maximum		400	2410	
		(P <sub>8</sub> )	Defln, C	Load	def @ P	d at P/2	4th, R	
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN
288271	+	0.64	2.80	1.43	36.0	0.72	9.8	1.33
	-	0.62	1.20	1.86	36.0			1.80
288272	+	0.67	1.00	1.87	36.0	0.94	12.2	1.75
	-	0.73	2.00	1.95	36.0			1.85
288273	+	0.87	1.70	2.18	36.0	1.09	11.2	1.94
	-	0.76	2.30	1.97	36.0			1.87
		(P <sub>8</sub> )	(C)	(P)	(y)	P/2 (kN)	(d)	(R <sub>y</sub> )
<b>Averages</b>		0.72	1.83	1.88	36.00	0.91	11.07	1.76
<b>Coefficient of Variation %</b>		11.83	33.72	12.03	0.00	16.85	8.89	11.36
y = average failure deflection or peak deflection of the three tests.								
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)								
R = Residual load, P = Peak Load, S = Serviceability load								
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)					Systems factor K2 = 1.2			
Average Structural Displacement Ductility factor					u = y/d 3.25			
Ductility Modification factor					K4 = 0.83			
DLW = Selected deflection limit for wind forces					DLQ = Selected deflection limit for earthquake forces			
<b>P21:2010 BR Calc's</b>		<b>K1</b>	<b>EQ ultimate</b>	<b>EQ service</b>	<b>Wind Ultimate</b>	<b>Wind Service</b>		
<b>Lab Number</b>		(= 1.4 - C/X)	<b>BU's</b>	<b>BU's</b>	<b>BU's</b>	<b>BU's</b>		
288271	(BU)	1.00	25.9	27.5	32.9	21.3		
	(BU/m)		65	69	82	53		
288272	(BU)	1.00	29.8	30.5	38.2	23.7		
	(BU/m)		74	76	96	59		
288273	(BU)	1.00	31.5	35.6	41.5	27.5		
	(BU/m)		79	89	104	69		
<b>&lt;20% Result Check</b>		288271	-18% Ok result	-20% Ok result	-21% Ok result	-20% Ok result		
		288272	4% Ok result	-3% Ok result	3% Ok result	-3% Ok result		
		288273	12% Ok result	33	39.5	25.6		
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.								
<b>Average Earthquake BR</b>			<b>Ultimate</b>			<b>Serviceability</b>		
EQ (BU's)		20 x K4 x R <sub>y</sub> =	29	(P8 x K1) x (K2/0.55) =		30		
		73	BU/m	Limited by		Ultimate limit state		
<b>Average Wind BR</b>			<b>Ultimate</b>			<b>Serviceability</b>		
Wind (BU's)		20 * P =	37	(P8 x K1) x (K2/0.71) =		24		
		59	BU/m	Limited by		Serviceability limit state		

Figure 4: P21:2010 calculations for the 400mm x 2.4m, 7.0mm Plywood with brackets

Please feel free to contact me to discuss this information.

Doug Gaunt 