

# Results

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<b>To:</b>	Paul Charteris	<b>From:</b>	Doug Gaunt
<b>Organisation:</b>	Saveboard (NZ) Ltd	<b>Subject:</b>	P21:2010 1200 mm x 2.4m 9.5mm RAB Saveboard with Brackets
<b>Location:</b>	New Plymouth	<b>Date:</b>	22 December 2021
<b>Mob No.:</b>	021 581046	<b>No. of</b>	5
<b>Tel No.:</b>		<b>Pages:</b>	

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Paul

Please find below your P21 bracing results for your three 1200mm x 2.40m 9.5mm RAB Saveboard walls as tested with brackets.

1. BU wind = 126 (105 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 142 (118 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

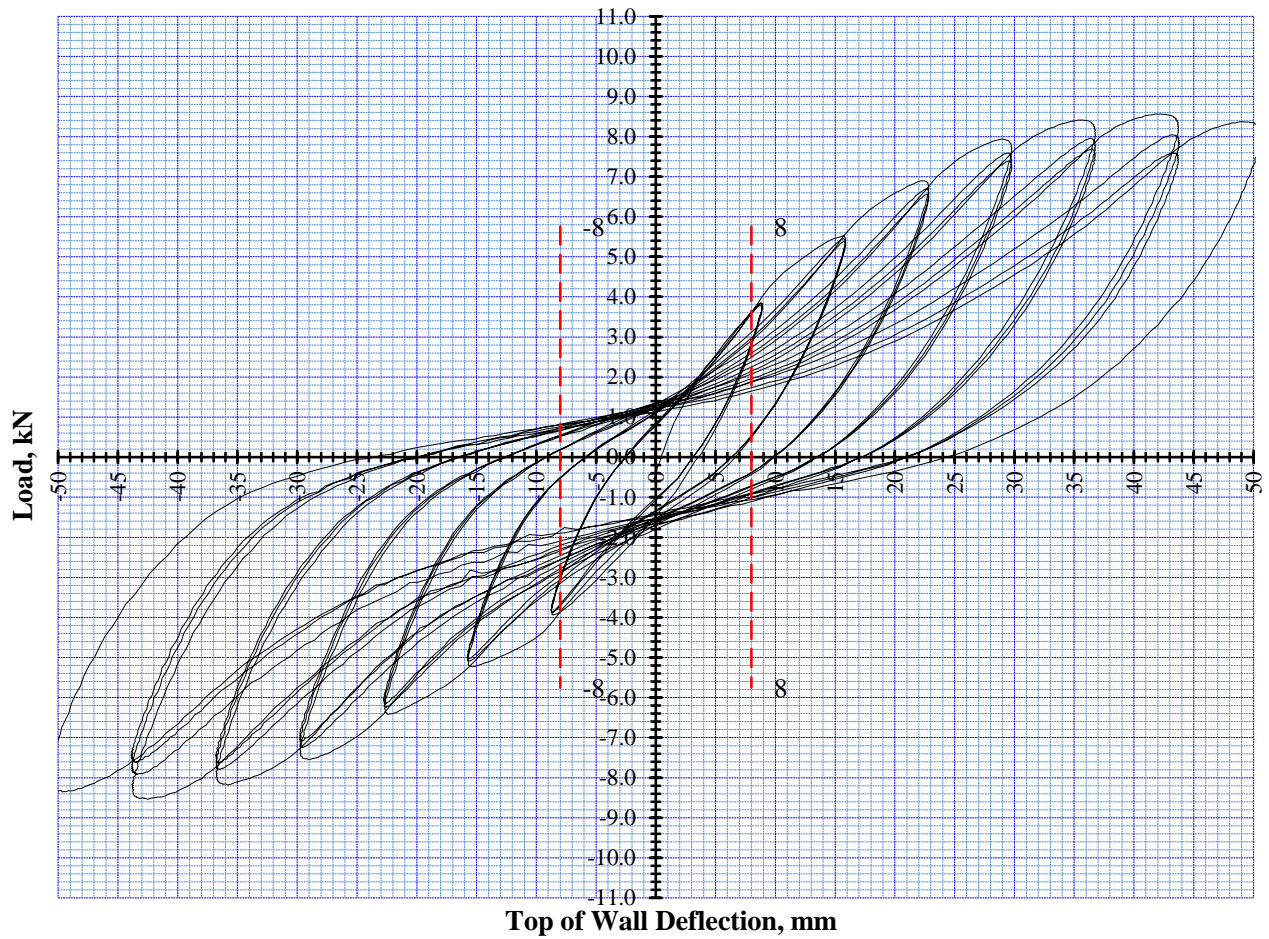
- 90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
- 9.5mm RAB Saveboard lining one side,
- RAB Saveboard fixed with Gibgrabber 6g x 32mm plasterboard screws to 50,50,50,75,75,150,150mm.... spacing, 300mm centres on internal stud.
- GIB Handibrac brackets each end
- M12 hold down rods to bottom plate and brackets

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## CAUTION

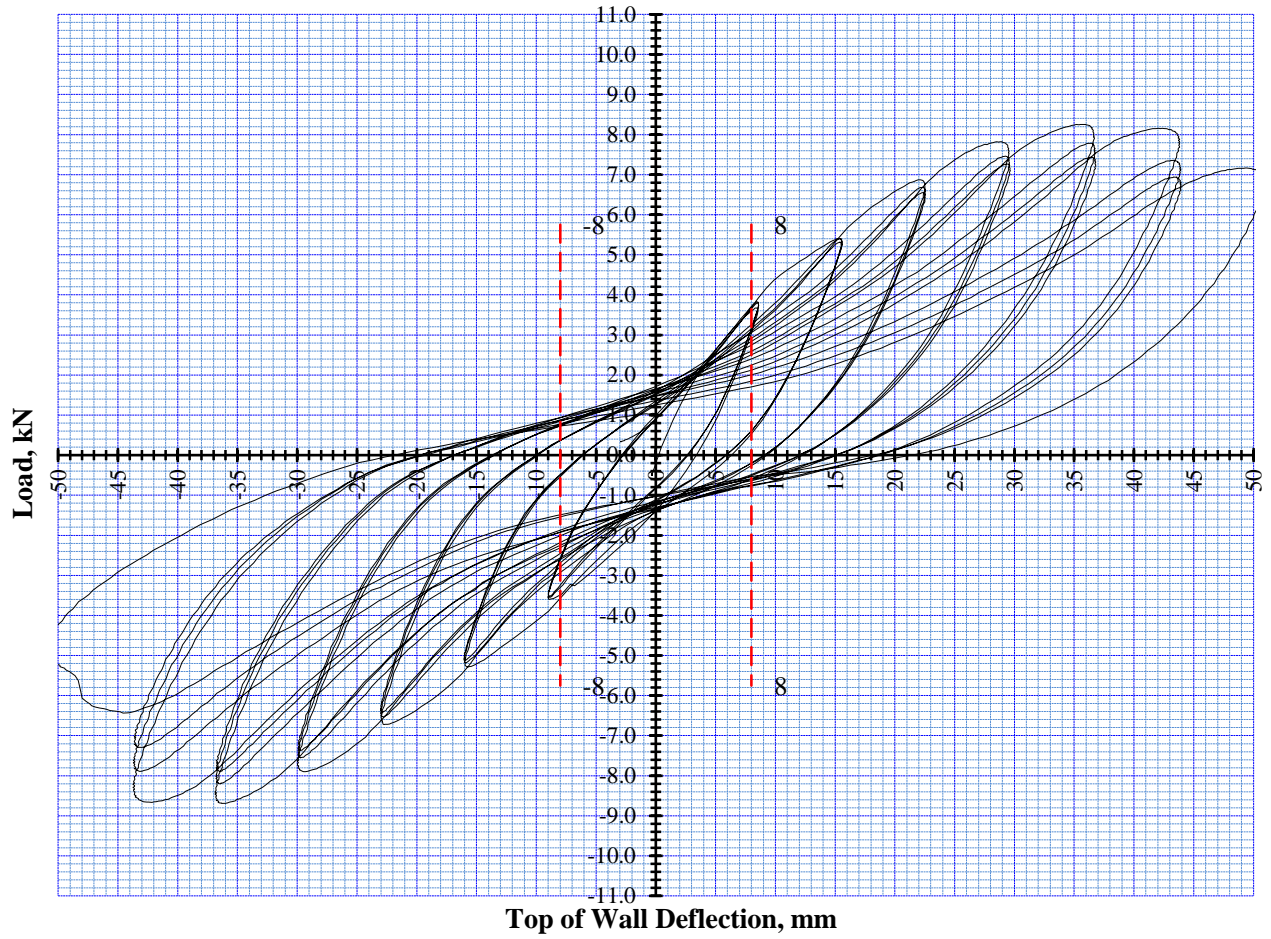
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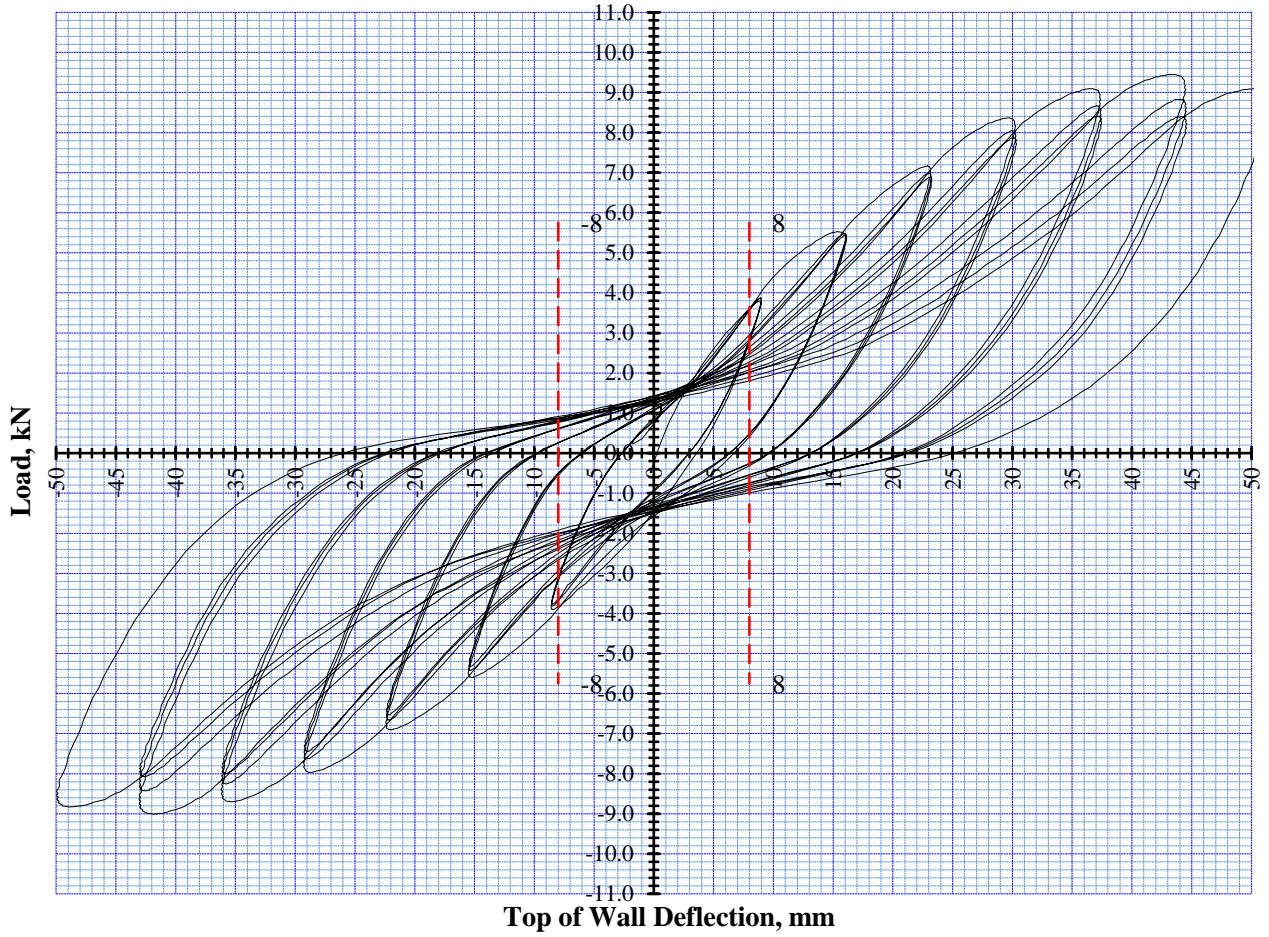
**Figure 1:** Wall 288518

**Observations**

- Board fracturing at corners and pulling of end studs at end of test.
- Brackets flexing



**Figure 2: Wall 288519**



**Figure 3: Wall 288520**

P21:2010 BRACING RACKING TEST RESULT EVALUATION									
Wall Construction									
1200mm, 9.5mm RAB Saveboard one side									
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs									
RAB Saveboard fixed with 32mm x 6g plasterboard screws									
to 50,50,50,75,75,150,150mm.... Spacing, 300mm centres on internal stud						Summary			
GIB Handibracs brackets used each end						Earthquake	118 (U)	BU/m	
M12 hold down bolts to bottom plate and brackets						Wind	105 (S)	BU/m	
P21 Supplementary restraints used									
Date of test:-		20-Dec-21	Ship No.		3228	Tested by			Jamie Agnew
Date of calc's:-		20-Dec-21	Job No.		TE21-040	Analysed by			Doug Gaunt
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.									
Serviceability Cycles			Ultimate Cycles			Wall dimensions			
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement		L(mm)	H(mm)		
		Loads	Residual	Maximum		1200	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	
288518	+	3.62	3.10	8.40	36.0	4.20	9.4	7.64	
	-	3.88	2.50	8.18	36.0			7.52	
288519	+	3.68	2.70	8.25	36.0	4.13	9.3	7.35	
	-	3.51	2.70	8.69	36.0			7.66	
288520	+	3.63	2.90	9.08	36.0	4.54	10.5	8.16	
	-	3.96	2.60	8.69	36.0			8.00	
		(P <sub>8</sub> )	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)	
Averages		3.71	2.75	8.55	36.00	4.29	9.73	7.72	
Coefficient of Variation %		4.21	7.20	3.60	0.00	4.21	5.59	3.58	
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 3.70				
Ductility Modification factor					K4 = 0.92				
DLW = Selected deflection limit for wind forces					DLQ = Selected deflection limit for earthquake forces				
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			
288518	(BU)	1.00	139.3	163.6	165.8	126.8			
	(BU/m)		116	136	138	106			
288519	(BU)	1.00	138.0	156.9	169.4	121.5			
	(BU/m)		115	131	141	101			
288520	(BU)	1.00	148.5	165.6	177.7	128.3			
	(BU/m)		124	138	148	107			
		288518	-3% Ok result	1% Ok result	-5% Ok result	1% Ok result			
<20% Result Check		288519	-4% Ok result	-5% Ok result	-1% Ok result	-5% Ok result			
		288520	7% Ok result	3% Ok result	6% Ok result	3% Ok result			
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.									
Average Earthquake BR			Ultimate				Serviceability		
EQ (BU's)		20 x K4 x Ry =	142	(P8 x K1) x (K2/0.55) =			162		
			118 BU/m	Limited by			Ultimate limit state		
Average Wind BR			Ultimate				Serviceability		
Wind (BU's)		20 * P =	171	(P8 x K1) x (K2/0.71) =			126		
			105 BU/m	Limited by			Serviceability limit state		

Figure 4: P21:2010 calculations for the 1200mm x 2.4m, 9.5mm RAB Saveboard with brackets

Please feel free to contact me to discuss this information.

Doug Gaunt

