

Results

To:	Paul Charteris	From:	Doug Gaunt
Organisation:	Saveboard (NZ) Ltd	Subject:	P21:2010 400 mm x 2.4m 10mm Saveboard RAB with Brackets
Location:	New Plymouth	Date:	13 September 2022
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Paul

Please find below your P21 bracing results for your three 400mm x 2.40m 10mm Saveboard RAB walls as tested with brackets.

1. BU wind = 26 (65 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 31 (76 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 nogs
- 10mm Saveboard RAB board one side,
- Saveboard Board fixed with 50x2.8mm Nails at 100mm centres to plates and studs, 50mm in from corner on plates, 75mm in from corner on stud
- GIB Handibrac brackets each end
- M12 hold down rods to bottom plate and brackets

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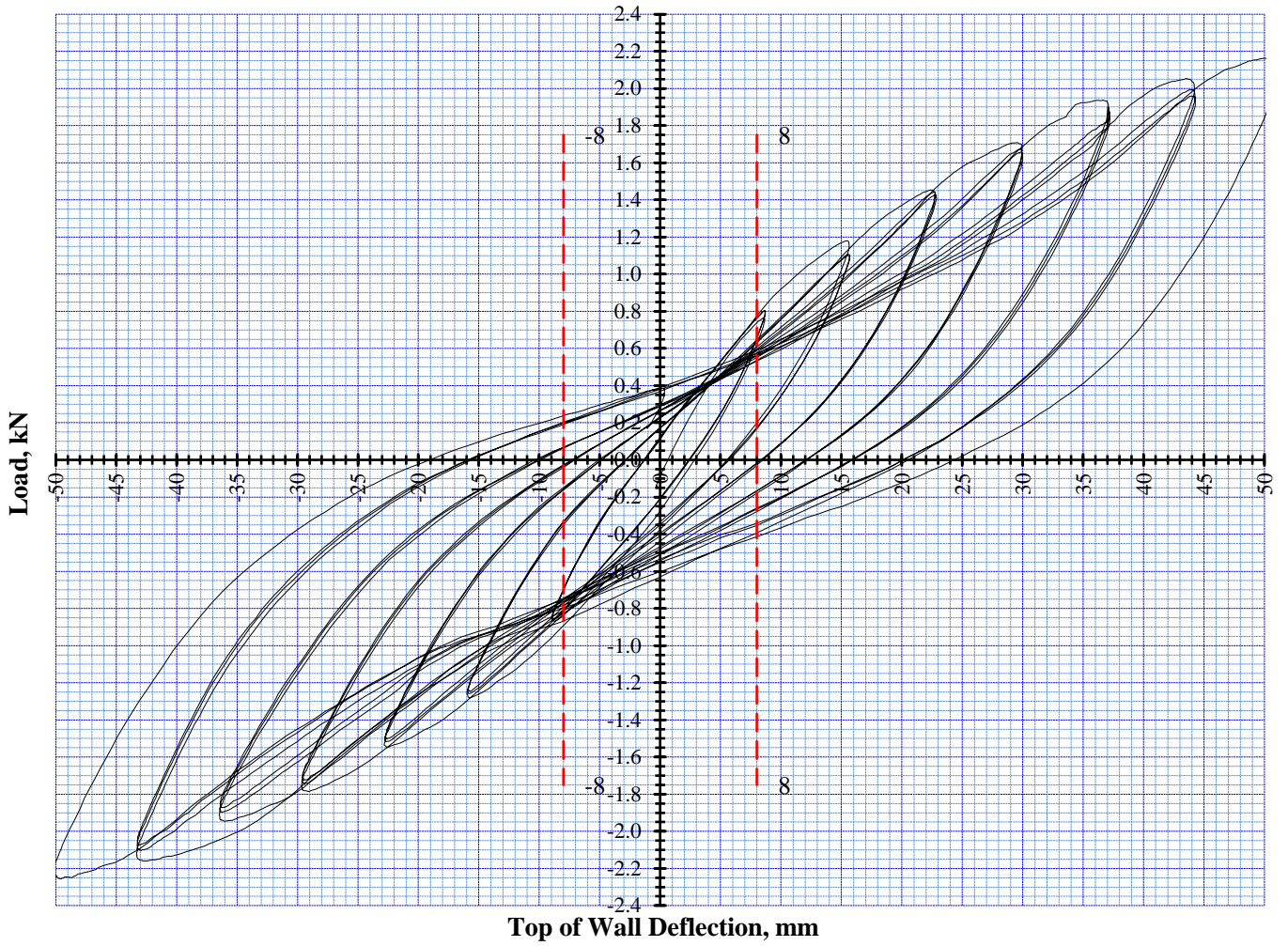


Figure 1: Wall 289671

Observations

- No obvious signs of damage

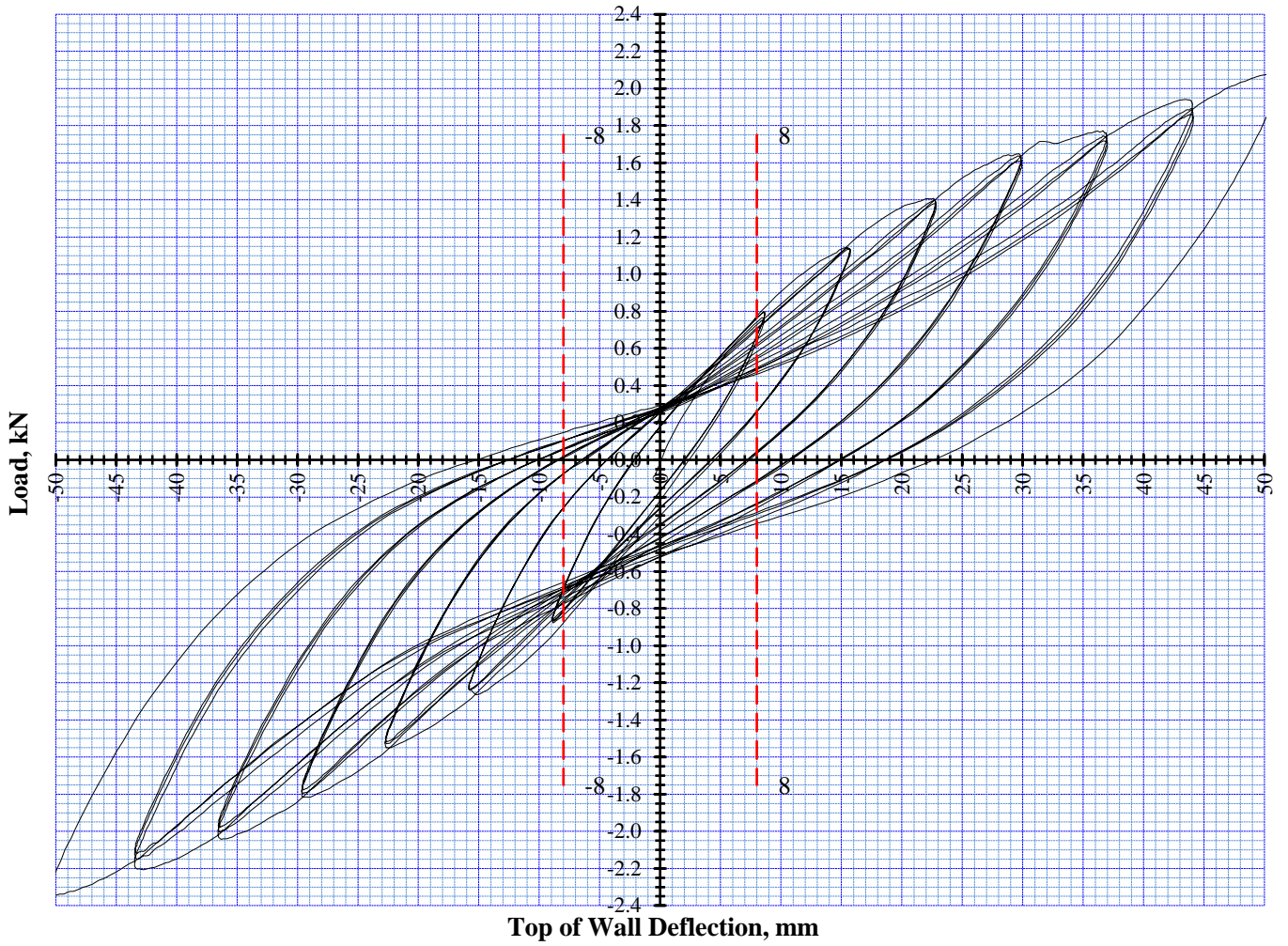
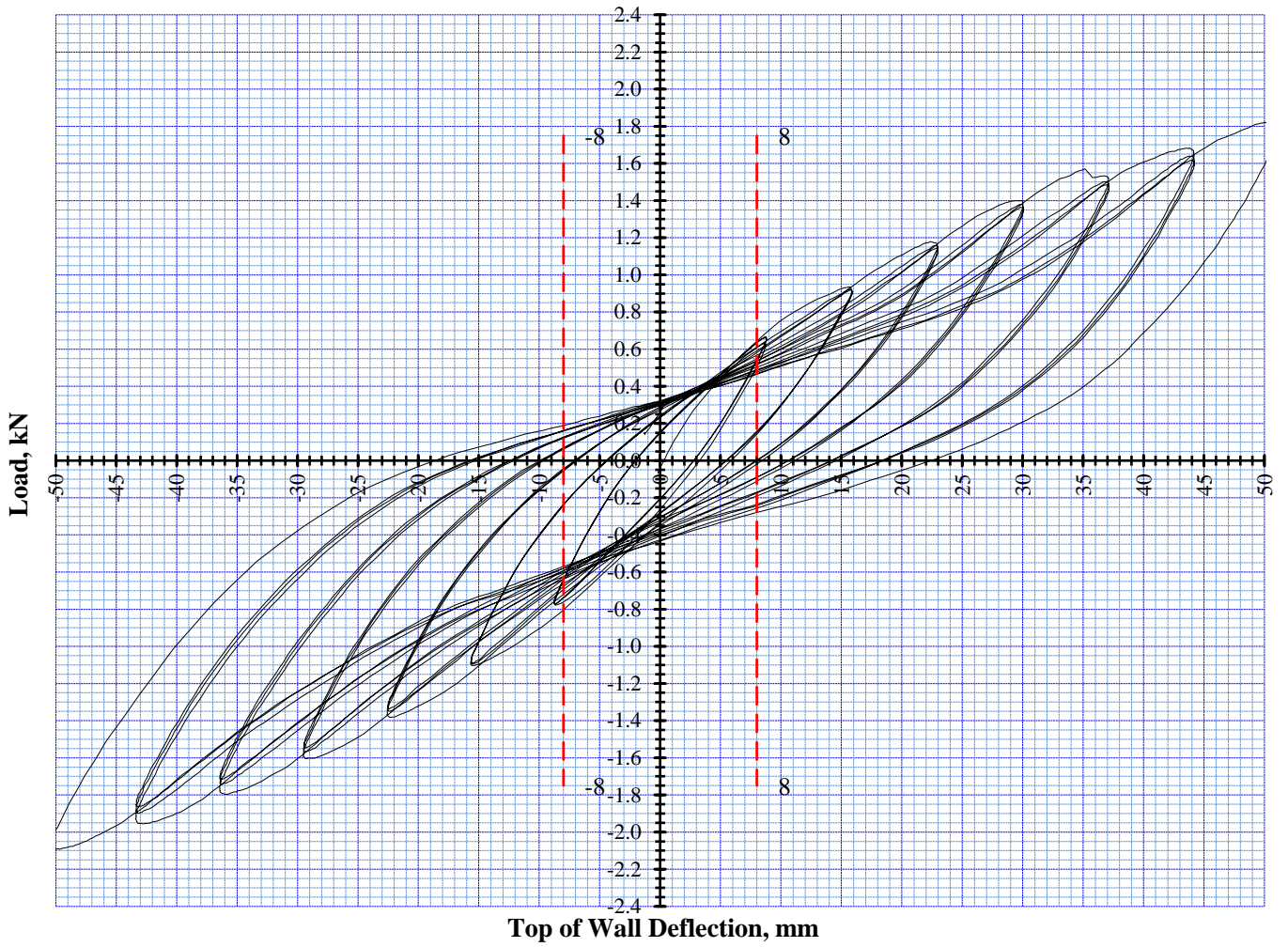


Figure 2: Wall 289672



Top of Wall Deflection, mm

Figure 3: Wall 289673

P21:2010 BRACING RACKING TEST RESULT EVALUATION								
Wall Construction								
400mm, 10mm Saveboard RAB one side								
90x45 H1.2 SG8 framing, studs at 400mm centres, no nogs								
Board fixed with 50x2.8mm Nails at 100mm centres to plates and studs, 50mm in from corner on plates, 75mm in from corner on stud						Summary		
GIB Handibrac brackets						Earthquake	76 (U)	BU/m
M12 hold down bolts to brackets and bottom plate						Wind	65 (S)	BU/m
P21 Supplementary restraints used								
Date of test:-		12-Sep-22	Ship No.	3269		Tested by	John Lee	
Date of calc's:-		12-Sep-22	Job No.	TE22-016		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 ₈)	Defln, C	Load	def @ P	d at P/2	4th, R	
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN
289671	+	0.78	2.30	1.93	36.0	0.97	10.9	1.72
	-	0.84	1.20	1.94	36.0			1.79
289672	+	0.77	2.00	1.76	36.0	0.88	9.7	1.69
	-	0.84	2.10	2.04	36.0			1.99
289673	+	0.65	2.70	1.53	36.0	0.76	10.0	1.45
	-	0.76	2.00	1.79	36.0			1.73
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)
Averages		0.77	2.05	1.83	36.00	0.87	10.20	1.73
Coefficient of Variation %		8.23	21.95	9.08	0.00	9.55	5.00	9.19
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 3.53			
Ductility Modification factor					K4 = 0.88			
DLW = Selected deflection limit for wind forces				DLQ = Selected deflection limit for earthquake forces				
P21:2010 BR Calc's								
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service		
		(= 1.4 - C/X)	BU's	BU's	BU's	BU's		
289671	(BU)	1.00	31.0	35.3	38.7	27.4		
	(BU/m)		78	88	97	68		
289672	(BU)	1.00	32.5	35.1	38.0	27.2		
	(BU/m)		81	88	95	68		
289673	(BU)	1.00	28.1	30.8	33.2	23.8		
	(BU/m)		70	77	83	60		
<20% Result Check		289671	2% Ok result	7% Ok result	8% Ok result	7% Ok result		
		289672	9% Ok result	6% Ok result	5% Ok result	6% Ok result		
		289673	-13% Ok result	-15% Ok result	-16% Ok result	-15% 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 =		31	(P8 x K1) x (K2/0.55) =		34		
			76 BU/m	Limited by		Ultimate limit state		
Average Wind BR			Ultimate			Serviceability		
Wind (BU's)	20 * P =		37	(P8 x K1) x (K2/0.71) =		26		
			65 BU/m	Limited by		Serviceability limit state		

Figure 4: P21:2010 calculations for the 400mm x 2.4m, 10mm Saveboard RAB with brackets

Please feel free to contact me to discuss this information.

Doug Gaunt

