

Results

To: Edmond Gomes	From: Doug Gaunt
Organisation: IBS	Subject: 1200mm x 2.4m high 9mm OSB with Handibracs – P21 test results.
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Edmond

Please find below the results of your three 1200mm x 2.4m 9mm Egger OSB one side walls as tested with GIB Handibracs.

1. BU wind = 90 (75 BU/m) as limited by the ultimate load capacity.
2. BU Earthquake = 71 (59 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 SG10 H1.2 timber studs (600 centres), two rows of nogs
- 90x45 SG8 H1.2 timber top and bottom plates
- 9mm Egger OSB sheet one side fixed with 50x2.5 Jolt head Galv nails at 150mm centres to sheet perimeter and 300mm centres to interior of sheet.
- GIB Handibrac brackets to wall ends on bottom plate
- Tested with M12 hold down bolts to GIB Handibrac brackets and bottom plate.

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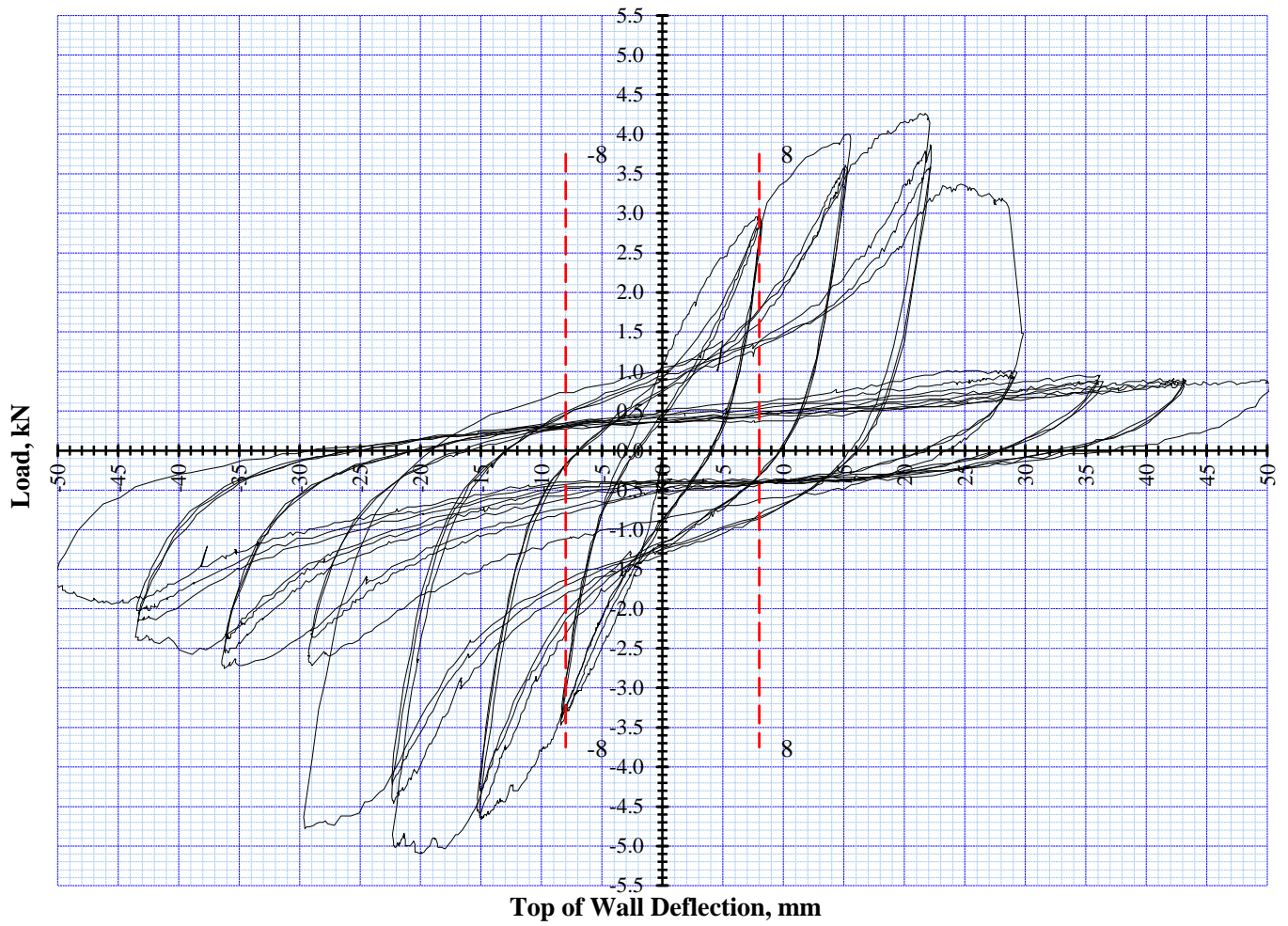


Figure 1: Wall 278025

Failure Mode

- OSB Board bending nails and sheet pulling off on end studs
- Some bending of Handibracs brackets
- No damage to bottom plates
- No damage to other framing

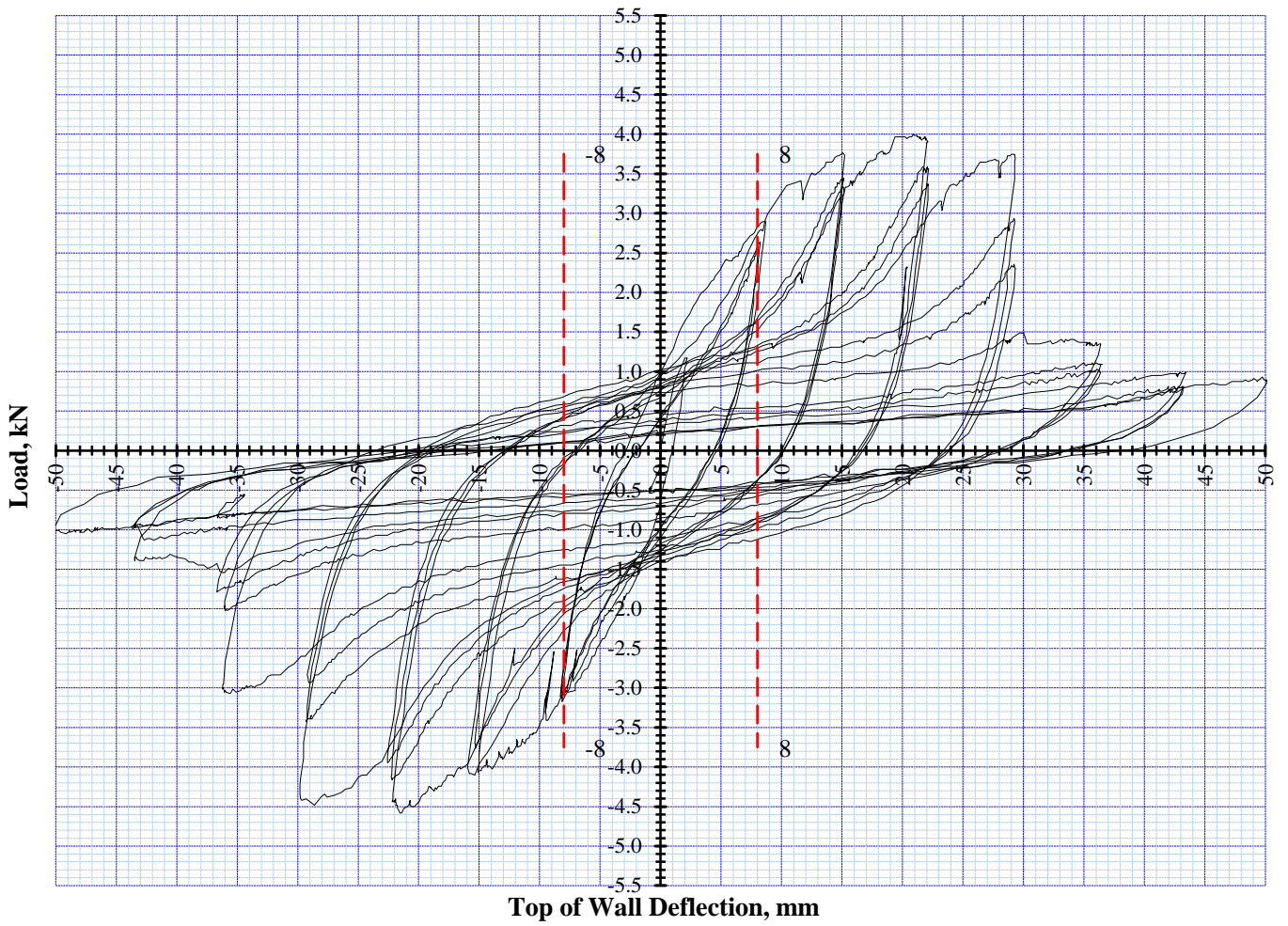
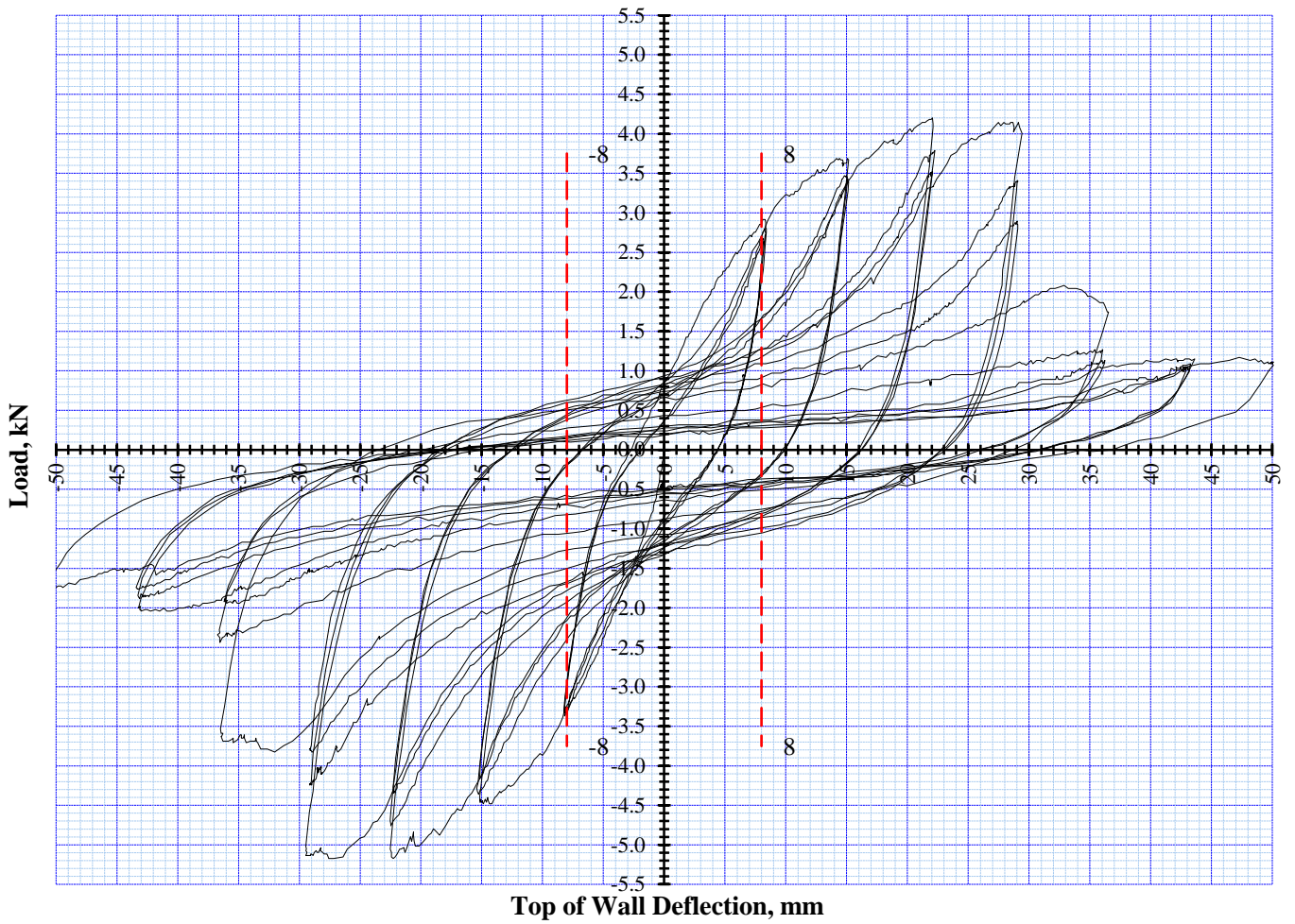


Figure 2: Wall 278026




Top of Wall Deflection, mm

Figure 3: Wall 278027

P21:2010 BRACING RACKING TEST RESULT EVALUATION								
Wall Construction								
1200mm, 9mm Egger OSB, Nailed using 50x2.5mm Jolt head nails								
Fixed vertically, nailed at 150 centres to sheet perimeter and 300mm to sheet interior								
90x45 Red Stag SG10 Studs at 600mm centres - Two rows of nogs						Summary		
90x45 Red Stag SG8 Plates						Earthquake	59 (U)	BU/m
GIB HandiBrac Hold down bracks each end with M12 rods to Reaction Be						Wind	75 (U)	BU/m
Date of test:-	2-Aug-17		Ship No.	2960		Tested by Doug Gaunt		
Date of calc's:-	2-Aug-17		Job No.	TE17-007		Analysed by Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2010 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	X mm	y=(mm)	Maximum	1200	2400	
		(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
278025	+	2.94	4.00	4.25	22.0	2.13	3.8	3.17
	-	3.35	2.20	5.00	22.0			4.03
278026	+	3.32	4.50	3.95	22.0	1.98	3.7	2.92
	-	3.10	2.00	4.44	22.0			3.65
278027	+	2.87	4.40	4.20	22.0	2.10	4.2	3.32
	-	3.32	2.20	5.12	22.0			4.20
Averages		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(R _y)
Averages		3.15	3.22	4.49	22.00	2.07	3.90	3.55
Coefficient of Variation %		6.12	34.07	9.50	0.00	3.18	5.54	12.90
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 5.64		
Ductility Modification factor						K4 = 1.00		
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		
278025	(BU)	1.00	72.0	137.2	92.5	106.3		
	(BU/m)		60	114	77	89		
278026	(BU)	0.99	65.7	139.2	83.9	107.8		
	(BU/m)		55	116	70	90		
278027	(BU)	0.99	75.2	133.4	93.2	103.3		
	(BU/m)		63	111	78	86		
		278025	2% Ok result	1% Ok result	4% Ok result	1% Ok result		
<20% Result Check		278026	-12% Ok result	3% Ok result	-11% Ok result	3% Ok result		
		278027	8% Ok result	-4% Ok result	5% Ok result	-4% 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 R _y =	71	(P8 x K1) x (K2/0.55) =			137	
			59 BU/m	Limited by			Ultimate limit state	
Average Wind BR			Ultimate	Serviceability				
Wind (BU's)		20 * P =	90	(P8 x K1) x (K2/0.71) =			106	
			75 BU/m	Limited by			Ultimate limit state	

Figure 4: P21:2010 calculations for 1200mm x 2.4m, 9mm OSB, Handibracs

Please feel free to contact me to discuss this information.



Doug Gaunt