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Results

To:	Brad Smith	**From:**	Doug Gaunt
Organisation:	Kronospan Trading SRL	**Subject:**	P21:2010 9mm Kronspan OSB 10mm GIB standard 1200 Wall with Brackets
Location:	Northcote	**Date:**	28th February 2020
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Brad

Please find below the P21 bracing results for your three 1200mm x 2.40m 9mm Kronspan OSB, 10mm GIB standard walls tested with GIB Handibracs.

1. BU wind = 215 (179 BU/m) as limited by the ultimate load capacity.
2. BU Earthquake = 188 (157 BU/m) as limited by the ultimate load capacity.

Note: NZS3604 notes the bracing ratings for walls on timber floors be limited to 120BU/m and those on concrete floors be limited to 150BU/m.

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

Wall Construction

- 9mm Kronspan OSB one side
- 10mm GIB standard other side
- 90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
- OSB fixing - 50x2.87mm angular grove Paslode gun nails at 150mm centres to plates and end studs
- GIB fixed with Gibgrabber 32mm x 6g screws to Winstones pattern 50,50,50,75,75,150mm…
- GIB Handibracs each end
- M12 hold down bolts to Handibracs and bottom plate
- P21 supplementary restraints used.

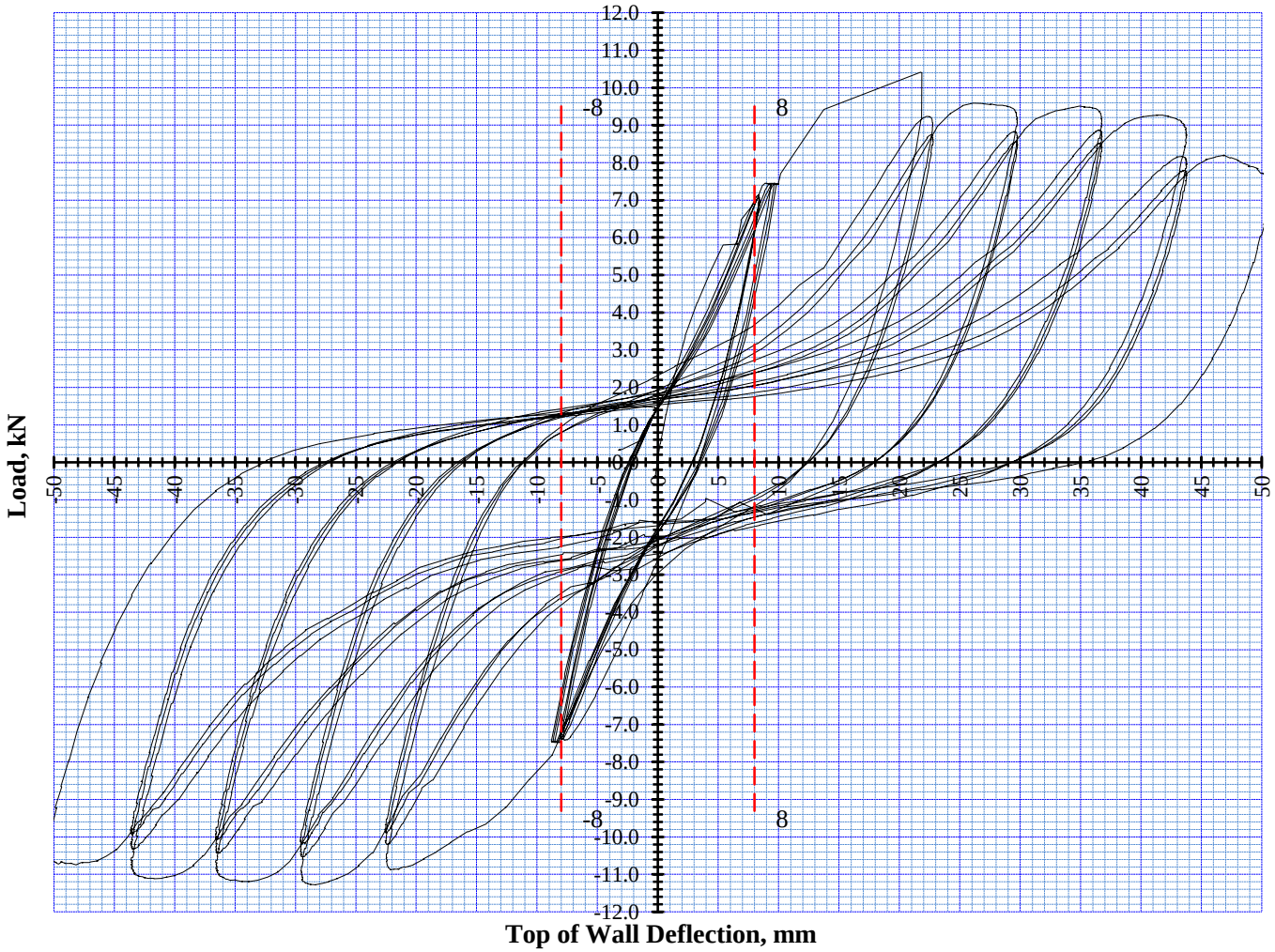

Figure 1: *Wall 281763*

Observations

- No obvious signs of failure to framing.
- Handibrac's bending
- No obvious signs of failure to OSB
- GIB starting to pulling away on bottom plate nails.

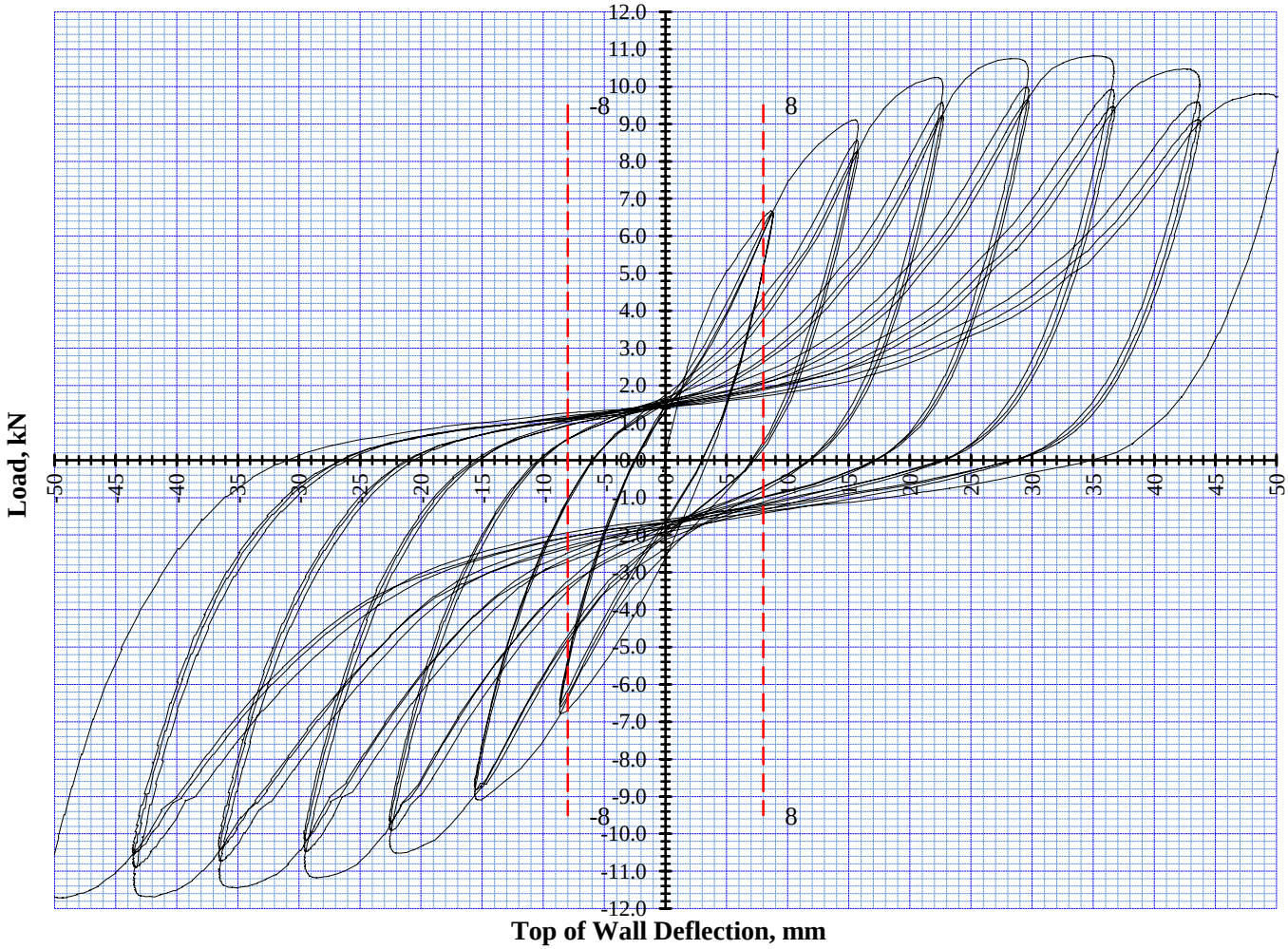

Figure 2: *Wall 281764*

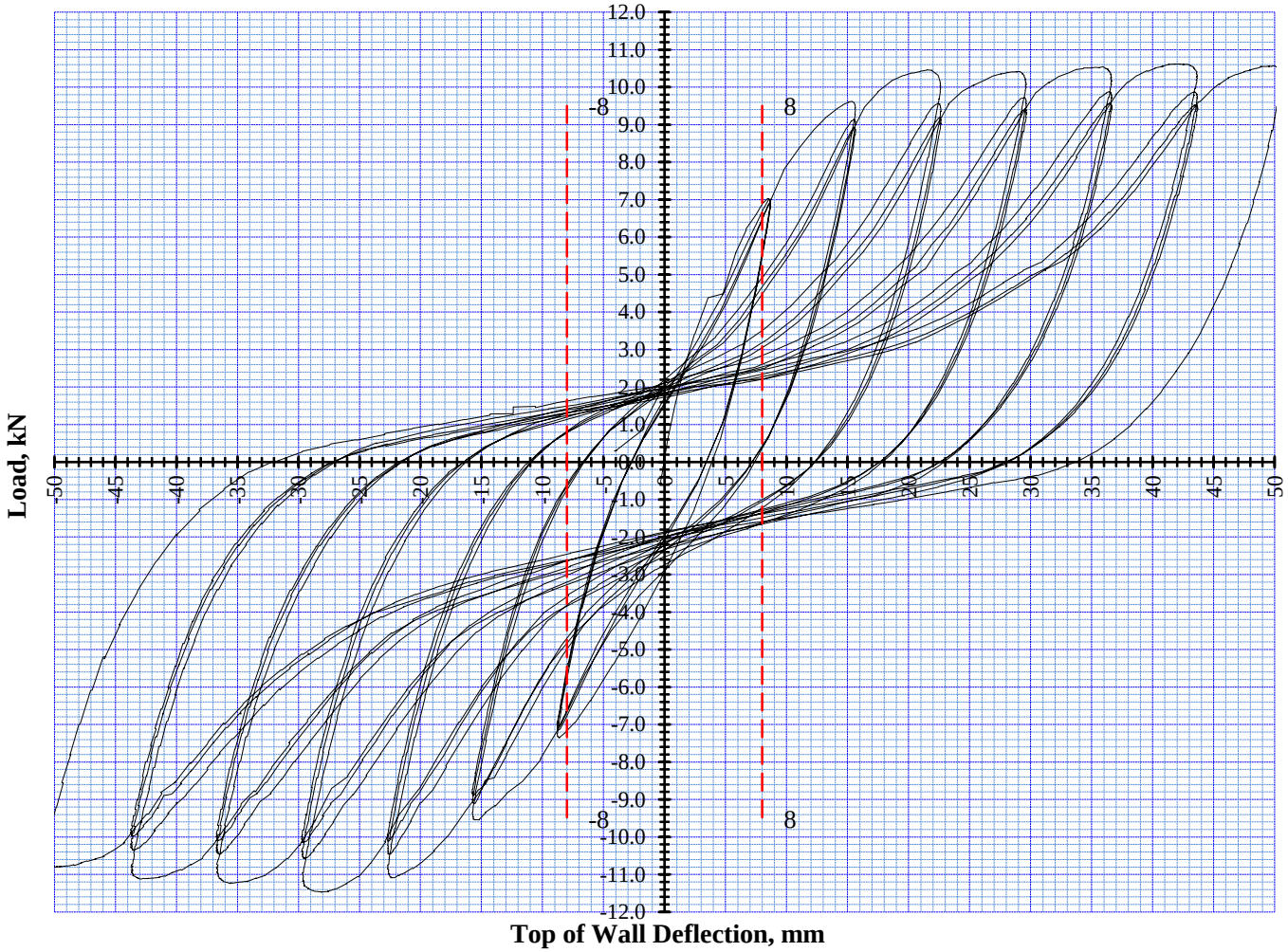

Figure 3: *Wall 281765*

P21:2010 BRACING RACKING TEST RESULT EVALUATION								
Wall Construction								
1200mm, 9mm Kronspan OSB one side, 10mm GIB standard other side								
90x45 H1.2 LVL8 framing, studs at 600mm centres, no nogs								
OSB fixing - 50x2.87mm angular grove Paslode gun nails at 150mm						**Summary**		
centres to plates and end studs. GIB fixed with						**Earthquake**	**157 (U)**	**BU/m**
32mmx 6g GIBgrabbers to Winstones pattern 50,50,50,75,75,150mm…						**Wind**	**179 (U)**	**BU/m**
GIB Handibracs each end, M12 hold down bolts to Handibracs and bottom plate								
P21 supplementary restraints used								
Date of test:-		**27-Feb-20**	Ship No.	**3072**		Tested by	Jamie Agnew	
Date of calc's:-		**27-Feb-20**	Job No.	**TE19-028**		Analysed by	Doug Gaunt	
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011					*Scion, Private Bag 3020 Rotorua.*			
		Serviceability Cycles		Ultimate Cycles				
		Cycle to H/300 or DLQ or DLW		Cycle to Displacement			Wall dimensions	
		8.0	X mm	y=(mm)			L(mm)	H(mm)
Lab Number	Direction	Loads	Residual	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
281763	**+**	**6.80**	**2.80**	**9.48**	**36.0**	4.74	**5.0**	**8.20**
	-	**7.30**	**2.00**	**11.10**	**36.0**			**9.80**
281764	**+**	**6.50**	**3.00**	**10.77**	**36.0**	5.39	**5.8**	**9.05**
	-	**6.65**	**2.50**	**11.40**	**36.0**			**10.20**
281765	**+**	**6.90**	**3.40**	**10.52**	**36.0**	5.26	**5.6**	**9.36**
	-	**7.15**	**2.70**	**11.20**	**36.0**			**9.77**
		(P_8)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)
Averages		6.88	2.73	10.75	36.00	5.13	5.47	9.40
Coefficient of Variation %		3.99	15.76	5.90	0.00	5.45	6.22	6.87
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	6.59	
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**
281763	(BU)	1.00	180.0	307.6	205.8	238.3
	(BU/m)		150	256	172	199
281764	(BU)	1.00	192.5	286.9	221.7	222.3
	(BU/m)		160	239	185	185
281765	(BU)	1.00	191.3	306.5	217.2	237.5
	(BU/m)		159	255	181	198
		281763	*-7% Ok result*	*4% Ok result*	*-7% Ok result*	*4% Ok result*
<20% Result Check		*281764*	*4% Ok result*	*-7% Ok result*	*5% Ok result*	*-7% Ok result*
		281765	*3% Ok result*	*3% Ok result*	*2% 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 =	**188**	(P8 x K1) x (K2/0.55) =		**300**
	157	**BU/m**		**Limited by**	**Ultimate limit state**
Average Wind BR		**Ultimate**			**Serviceability**
Wind (BU's)	20 * P =	**215**	(P8 x K1) x (K2/0.71) =		**233**
	179	**BU/m**		**Limited by**	**Ultimate limit state**

Figure 4: *P21:2010 calculations for 1200mm x 2.40m, OSB + GIB walls with brackets*

Please feel free to contact me to discuss this information.

Doug Gaunt