



Portal System by Prolam for Residential Construction

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Specifier Guide

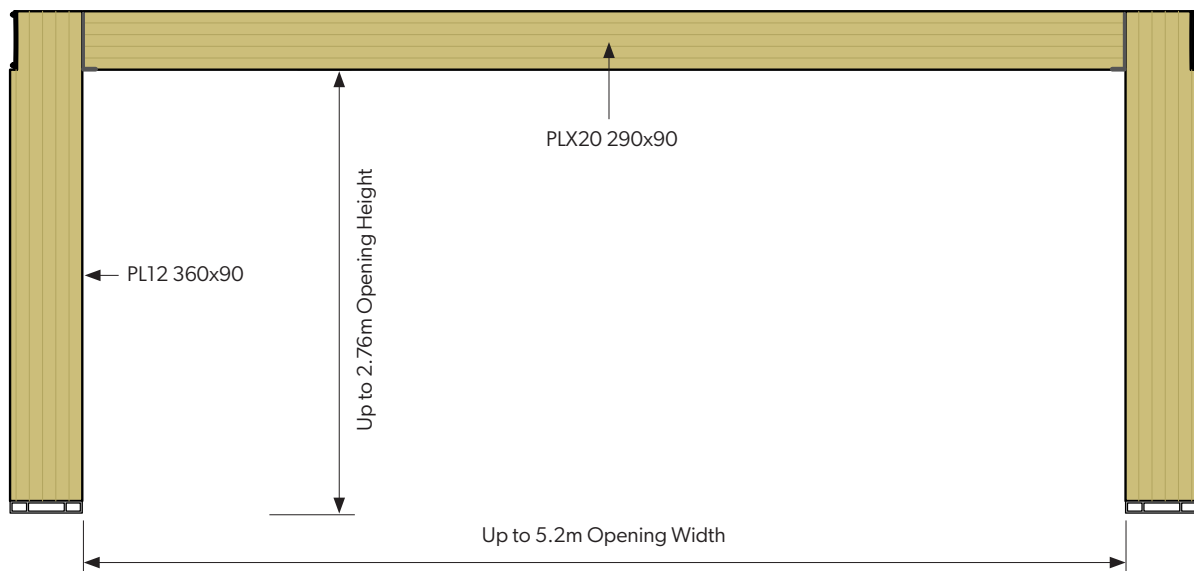
Key Benefits

- Fast and simple to assemble on site using standard tools.
- Trusses and frames can be connected directly to the portal using brackets, nails and screws.
- Timber lintel and leg that can be cut to length to suit your project.
- Portal provides bracing units to resist Wind and Earthquake loads (Tested to the BRANZ P21 test methodology)
- The system has a ductility of 3.0 and is compatible for NZS3604 type internal construction.

The PLX20 Portal System is an innovative timber bracing system for NZS3604 style residential buildings where bracing is required over large internal openings, such as a garage door or a window and there isn't enough space to provide bracing using traditional braced wall systems.

The system has been developed to be adjustable in length and height (cut to length on site), installed using standard carpentry tools, and provide fixing with typical NZS3604 style connections rather than having to pack out a steel portal for fixing.

PLX20 Portal Elevation Drawing



Bracing Design

The PLX20 Portal System has been independently tested using the BRANZ P21 test methodology for use for NZS3604 style residential buildings.

The PLX20 Portal System has a ductility of $\mu = 3.0$, making it compatible with NZS3604 bracing systems.

The PLX20 Portal System can be used for both timber and concrete subfloors in accordance with NZS3604 (refer to Detail 2).

Bracing values may be used for lintel spans up to 5.2m.

PLPF200 Bracing Capacity						
Nominal Stud Height (m)	Max. Opening Height (m)	Max. Opening Width (m)	Max. Portal Height (m)	Max. Total Portal Width (m)	Wind Bracing (BUs)	Earthquake Bracing (BUs)
2.4	2.26	5.2	2.55	5.92	160	195
2.7	2.46	5.2	2.75	5.92	150	185
3.0	2.76	5.2	3.05	5.92	145	175

Notes: Refer product table for specification codes

1. The Portal height is taken from floor level to top of column. For different columns heights the values above may be interpolated.
2. The same bracing units apply to shorter lintel spans.

PLX Portal System Product Codes

PLX Portal System Product Codes			
Nominal Stud Height (m)	2.4	2.7	3.0
Max. Opening Height (m)	2.26	2.46	2.76
Max. Portal Height (m)	2.55	2.75	3.05
2.40 to 2.70	PLPF200H1-2.4X2.7	PLPF200H1-2.7X2.7	PLPF200H1-3.0X2.7
2.70 to 3.00	PLPF200H1-2.4X3.0	PLPF200H1-2.7X3.0	PLPF200H1-3.0X3.0
3.00 to 3.30	PLPF200H1-2.4X3.3	PLPF200H1-2.7X3.3	PLPF200H1-3.0X3.3
3.30 to 3.60	PLPF200H1-2.4X3.6	PLPF200H1-2.7X3.6	PLPF200H1-3.0X3.6
3.60 to 3.90	PLPF200H1-2.4X3.9	PLPF200H1-2.7X3.9	PLPF200H1-3.0X3.9
3.90 to 4.20	PLPF200H1-2.4X4.2	PLPF200H1-2.7X4.2	PLPF200H1-3.0X4.2
4.20 to 4.50	PLPF200H1-2.4X4.5	PLPF200H1-2.7X4.5	PLPF200H1-3.0X4.5
4.50 to 4.80	PLPF200H1-2.4X4.8	PLPF200H1-2.7X4.8	PLPF200H1-3.0X4.8
4.80 to 5.10	PLPF200H1-2.4X5.1	PLPF200H1-2.7X5.1	PLPF200H1-3.0X5.1
5.10 to 5.20	PLPF200H1-2.4X5.4	PLPF200H1-2.7X5.4	PLPF200H1-3.0X5.4

Notes: For PLPF200 allow 360mm each side of opening for portal legs (total portal width = opening width + 0.72m)
 Height may be altered (legs shortened) as required to give reduced opening and total portal heights
 (total portal height = opening height + 0.29m).

Span Tables for Roof Loads

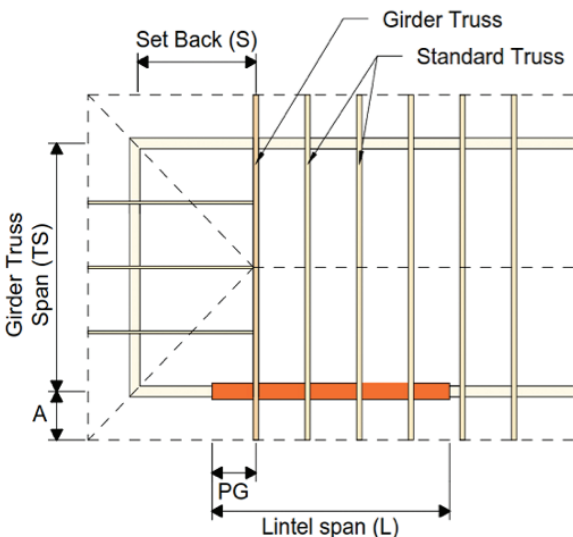
Lintel Supporting Truss Roof and Ceiling - 40kg/m ²							
Truss Span (m)	4	5	6	7	8	9	10
Wind Zone	Opening Width (m)						
Low and Medium	6.5	6.2	6.0	5.8	5.6	5.5	5.3
High and Very High	5.5	5.3	5.1	5.0	4.8	4.7	4.6
Extra-High	5.3	5.1	4.9	4.7	4.6	4.5	4.4

Lintel Supporting Girder Truss - 40kg/m ²								
Wind Zone	Girder Truss Span (m)	4	5	6	7	8	9	10
	Set Back (m)	Opening Width (m)						
Low and Medium	2	6.4	6.1	5.9	5.7	5.6	5.4	4.9
	3	6.4	6.1	5.9	5.7	5.4	4.7	4.2
	4	6.4	6.1	5.8	5.6	4.7	4.0	3.5
High and Very High	2	5.5	5.2	5.1	4.9	4.7	4.6	4.5
	3	5.5	5.2	5.0	4.9	4.7	4.6	4.2
	4	5.4	5.1	4.9	4.8	4.6	4.0	3.5
Extra-High	2	5.2	5.0	4.8	4.7	4.5	4.4	4.1
	3	5.2	5.0	4.8	4.6	4.5	3.9	3.4
	4	5.1	4.9	4.7	4.5	3.8	3.2	2.7

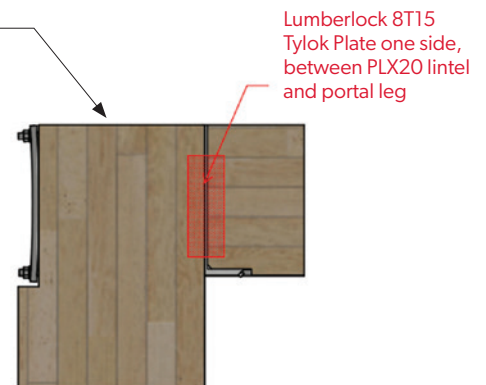
Lumberlok 8T15 Tylok Plate Required
 Prolam Bracing Portal Frames are 2.4 to 5.2m

Notes:

1. Ground snow loads up to 0.9kPa.
2. Maximum 750mm eaves width.
3. Up to 25 degrees roof pitch.
4. Girder Truss can be positioned anywhere along the length of the Lintel.
5. Please contact the Prolam Engineer for more information on Span Tables.

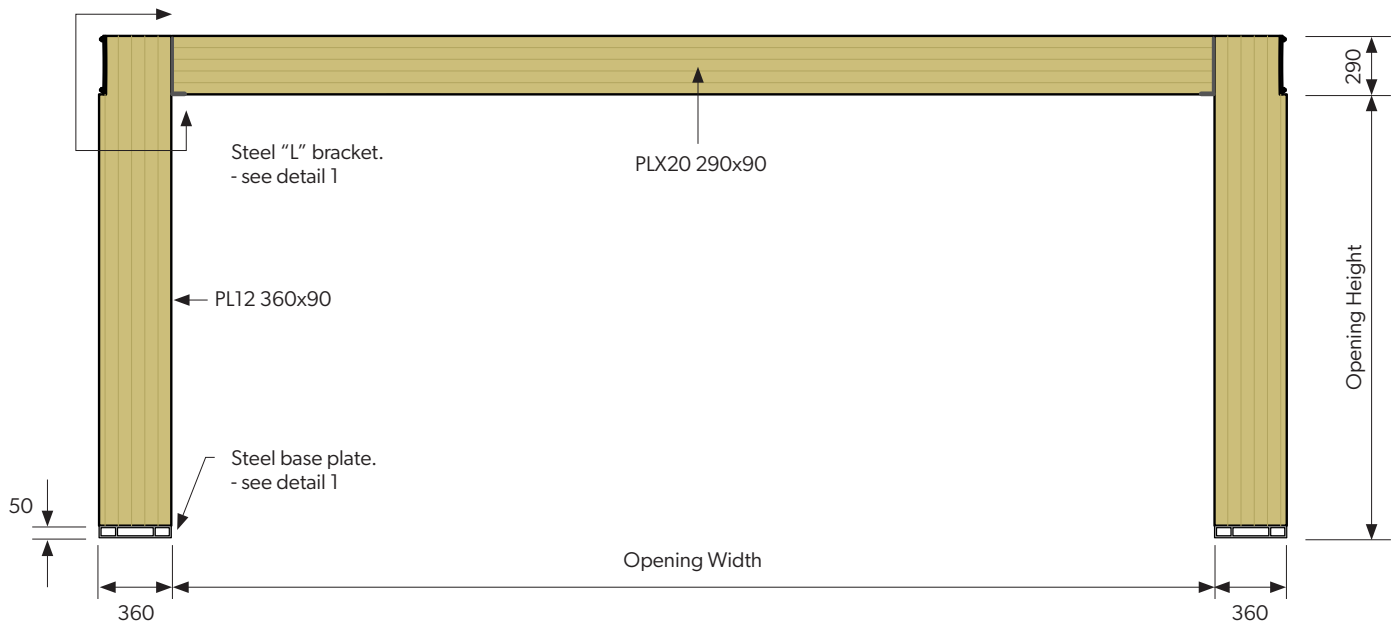


Spring plate and conical washer to be flattened to timber as torque indication



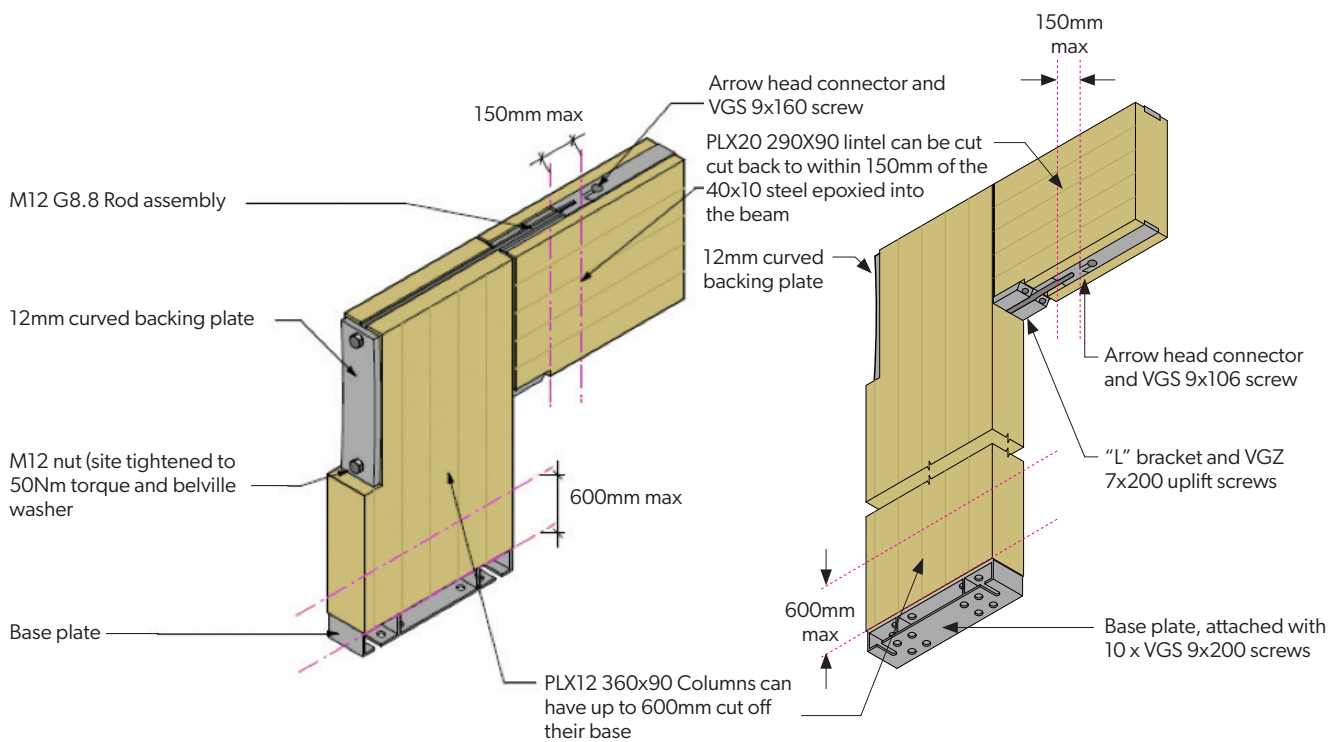
PLPF-5
2023-06-19

PLX20 Portal Elevation Drawing



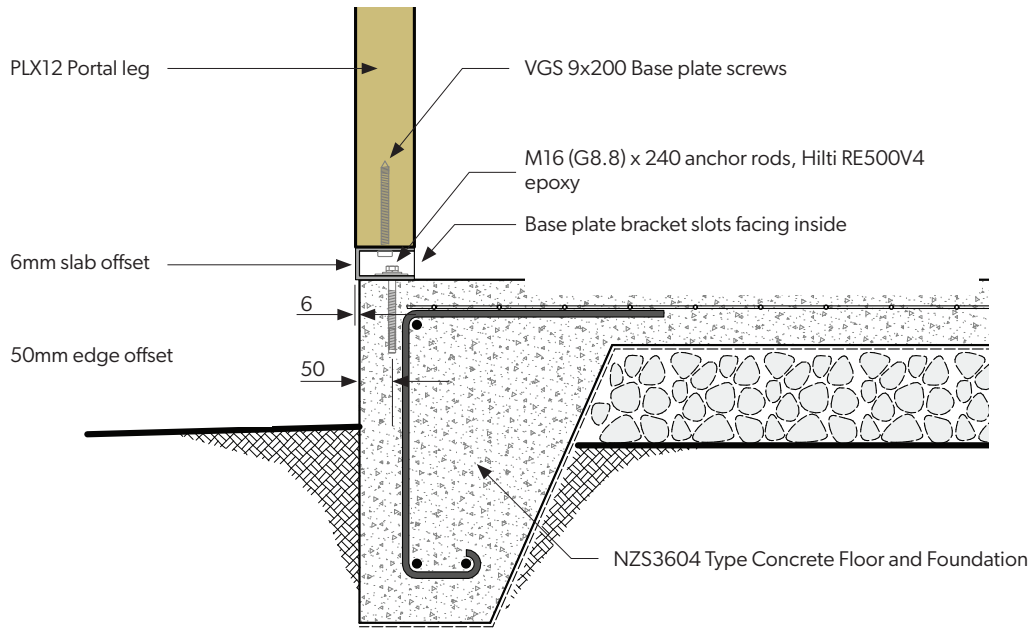
PLPF-1
2023-06-19

Knee and Base Plate Detail



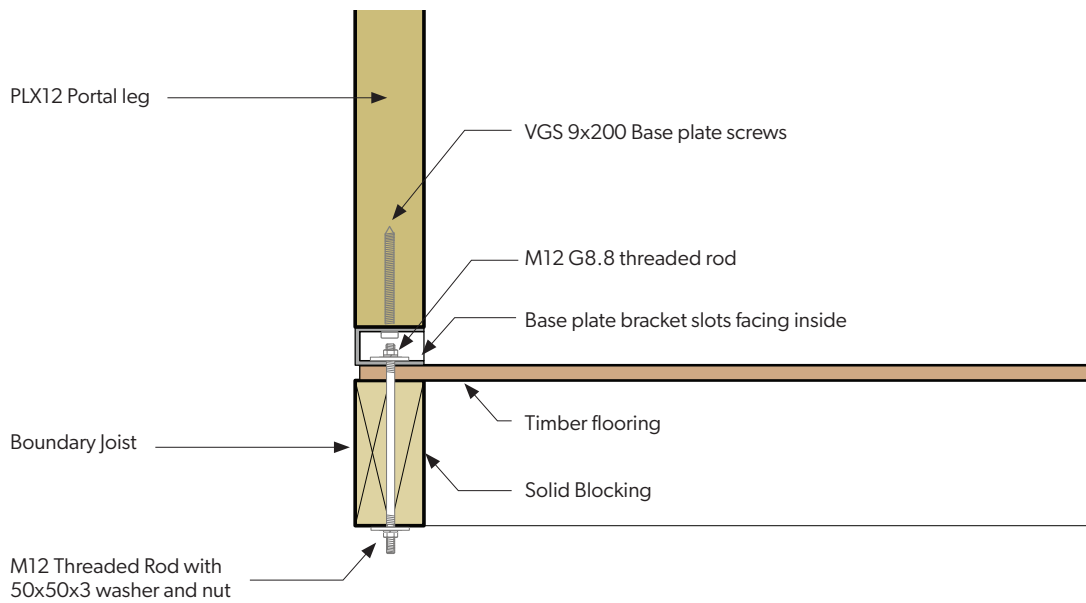
PLPF-2
2023-06-19

Concrete Floor Connections



PLPF-3
2023-06-19

Timber Floor Connections



PLPF-4
2023-06-19

Structural Properties

Structural Properties		Characteristic Strength (MPa)		Elastic Moduli (GPa)
		Bending $f'b$	Shear in beam $f's$	MoE short duration
Beam	PLX20 290x90	45	3.7	21.0
Column	PL12 360x90	25	3.7	11.5

- Notes:
1. PLX20 is intended for use as a beam and not a tension or compression member.
 2. PLX20 pre camber is L/800.
 3. Bending strength and MoE have been determined from testing. Other properties are based on SG6 timber.
 4. PL12 Columns have the same properties as PL12 Glulam as per NZS AS1720.1.
 5. Use ϕ factor of 0.8 for design.
 6. Provisional $K2/J2$ factor of deflection = 1.5
 7. Joint group = JD5.

Compliance Statement

The PLX20 Portal System has been specifically designed and independently tested in New Zealand to provide a structural bracing solution for residential buildings within the scope of NZS3604. The PLX20 Portal System has been tested in accordance with the BRANZ P21 (2010) bracing test and evaluation procedure, which is cited by NZS3604, paragraph 8.3.1.2.

When the PLX20 Portal System is installed as per these installation details it will meet the requirements of the New Zealand Building Code with respect to:

Clause B1 Structure: Performance B1.3.1, B1.3.2 and B1.3.3 and B1.3.4

Clause B2 Durability: Performance B2.3.1 of not less than 50 years, internal use only.

Once the PLX20 Portal system has been installed and prior to lining, the Building Consent Authority should inspect the portal during pre lining inspections.

For use other than with NZS3604 type structures, Specific Engineering design will be required.

Inspection Schedule


1. Foundation connection. Ensure the hold down bolts are tight and the anchor bolts are well secured into the timber or concrete.
2. Knee Connection. Ensure the M12 G8.8 nuts on the outside of the portal knee are tightened to 50Nm or both the 12mm washer plate and M12 Bellevue washers are squished flat.
3. Uplift screws. Ensure the two 45 degree uplift VGZ screws are installed at each end of the lintel.

Producer Statement

Potius Building Systems Ltd have been engaged by Prowood to develop and prepare the PLX20 Portal system.

P21 testing has been performed at the Scion test facilities and engineering design has been carried out in accordance with widely accepted engineering principals of AS/NZS1170, NZS3604 & NZS/AS1720 using the structural properties shown below.

On behalf of Potius Building Systems Ltd (Producer statement to be reviewed by June 2028)

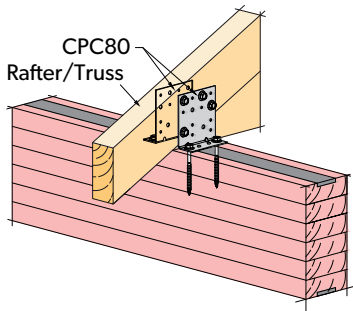


Andy Van Houtte
CMEngNZ, CPeng 250791

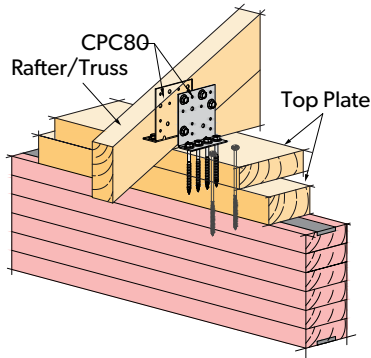


PLX20 Uplift Fixings

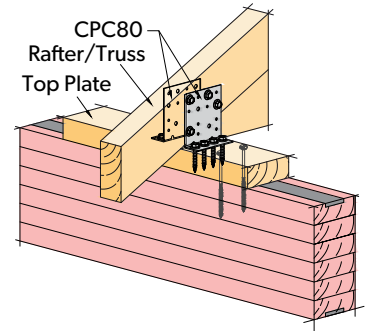
A1



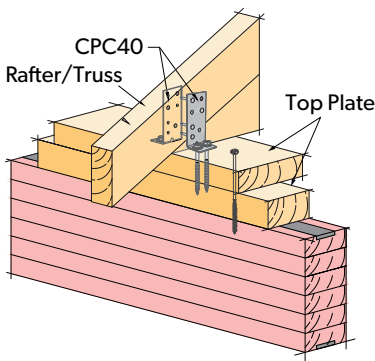
B1



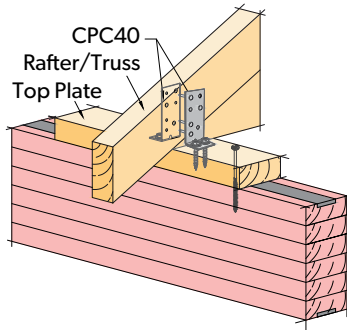
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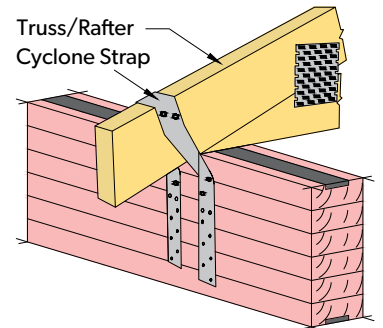
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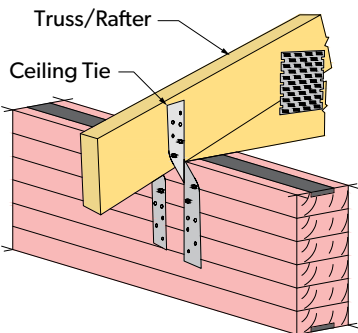
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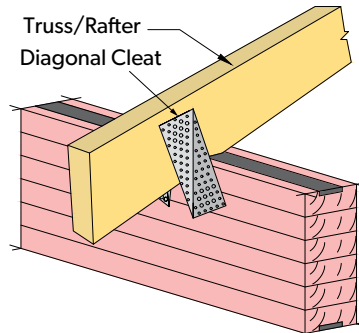
G1



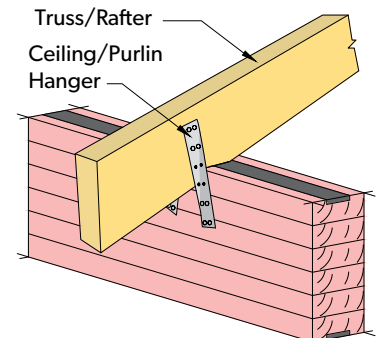
H1



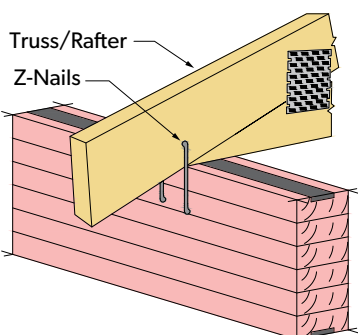
I1



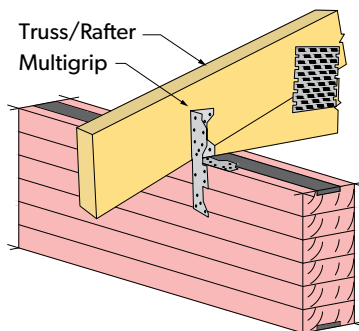
J1



K1



L1



	Characteristic Strength	ULS Capacity
A1	16 kN/Pair	11.2 kN/Pair
B1 & B2	16 kN/Pair	11.2 kN/Pair
C1 & C2	8 kN/Pair	5.6 kN/Pair
G1	12 kN	9.6 kN
H1	10.5 kN/Pair	8.4 kN/Pair
I1	20 kN/Pair	16 kN/Pair
J1	-	5 kN/Pair
K1	3.2 kN/Pair	2.5 kN/Pair
L1	4 kN/Pair	3.2 kN/Pair

Refer PLX20 fixings details (drawings PLX-1 to PLX-2) for connection specifications

Design and install Guide

Construct the PLX20 Portal system in the following sequence.

Assembly Overview

"L" brackets to be installed with 3mm nails to column before any other parts

Ensure these faces are flush to each other, release nut tension if adjustment is required

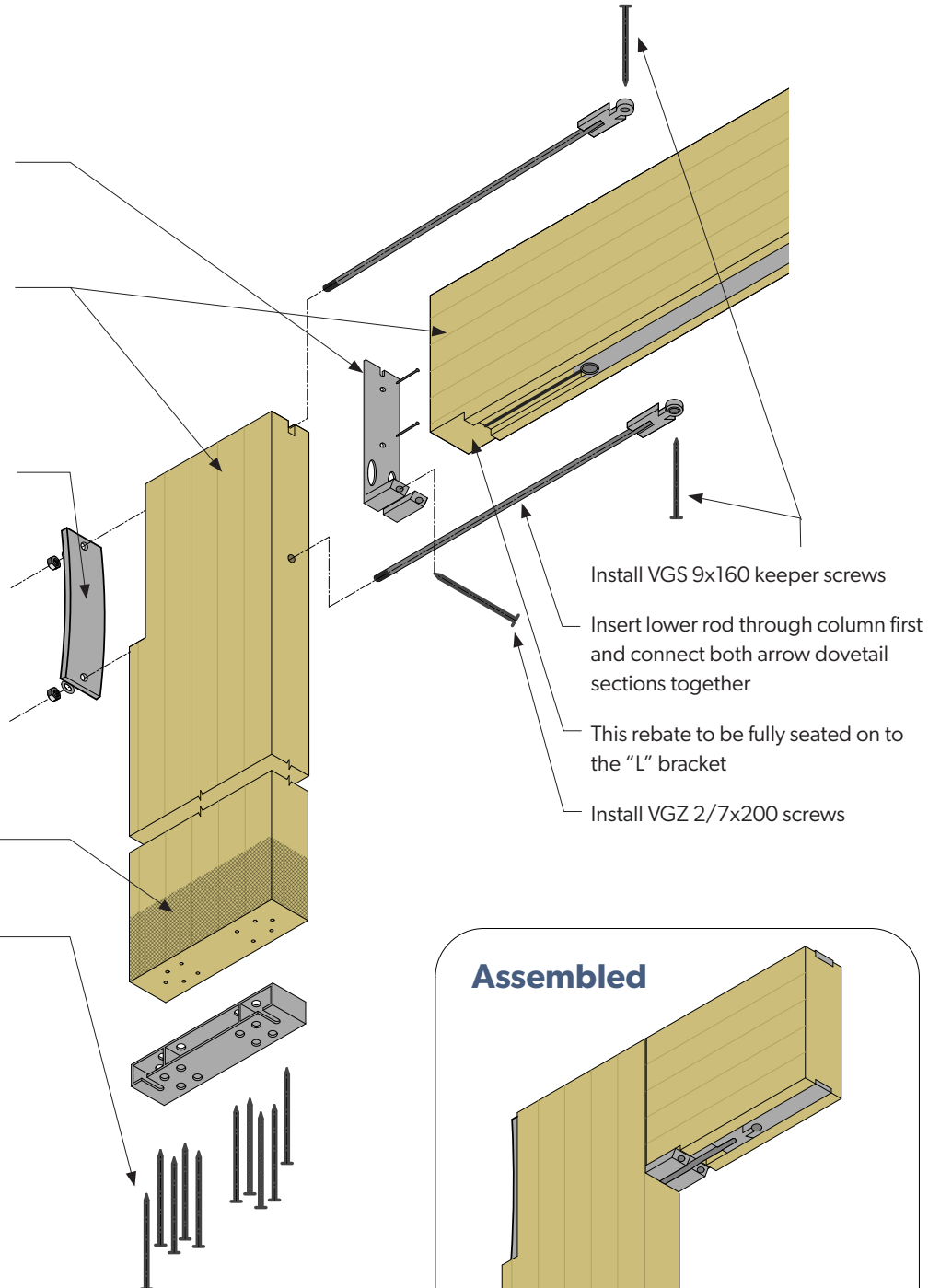
Slide sprung plate over threaded rods ensuring that the centre of the plate touches column first, not the ends

Tighten nuts until both belleville washers and sprung plate are flattened

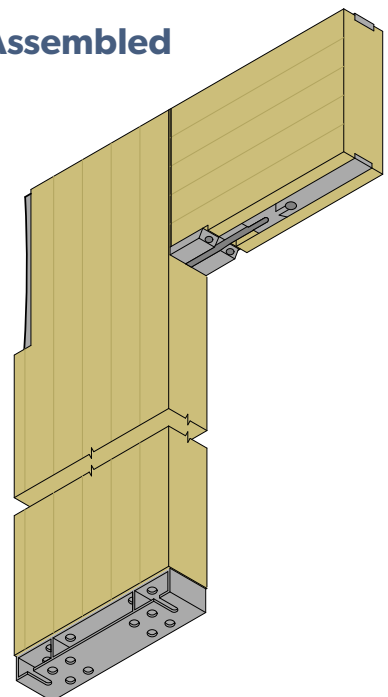
Install belleville washers so that inside of cone faces spring plate

Refer to detail A on page 12 for cutting limits

Install the base bracket with 10 VGS 9x200 screws



Assembled

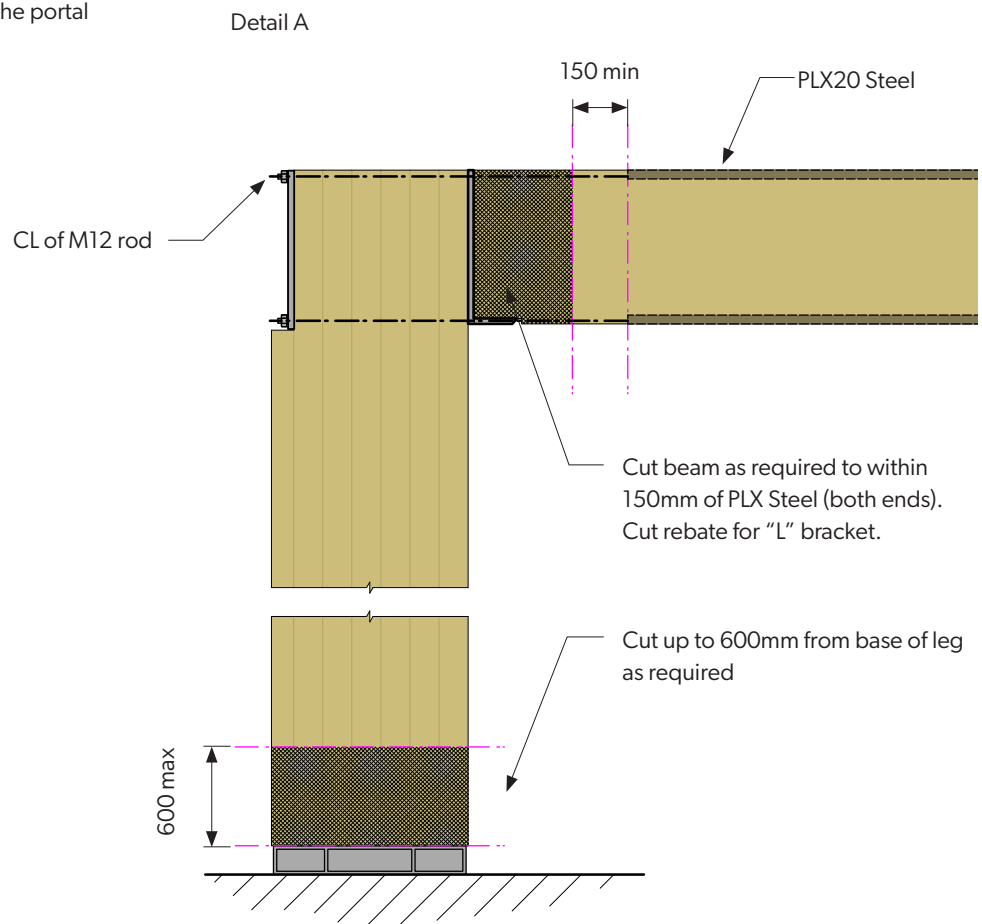


1. Determine the inside dimensions of the portal opening height and width.

2. Cut the lintel equally at each end to the desired length, to a maximum of 150mm from the lintel 40x10 steel. Allow for the 5mm steel "L" bracket. Don't cut the steel in the PLX20 lintel!



3. Cut the portal legs (from the bottom of the column, not the top) to the desired length. Allow for the height of the portal leg bracket (50mm).



-
4. Install the base plate brackets using 10 VSG 9x200 screws per base plate (6mm pilot hole), slot orientation towards the inside of the building to achieve 50mm hold down fastener edge distance (For concrete slabs).



-
5. Install the hold down bolts for concrete, or M12 threaded rods for timber sub floors.

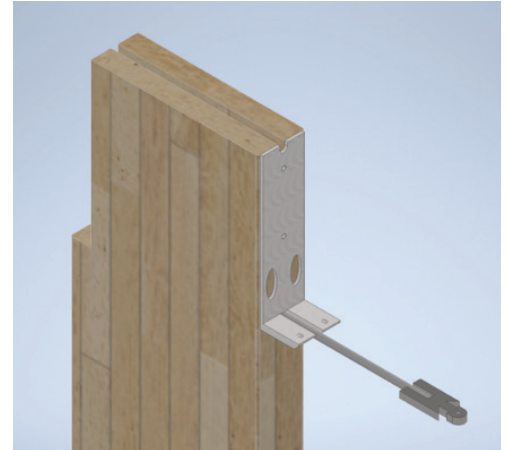
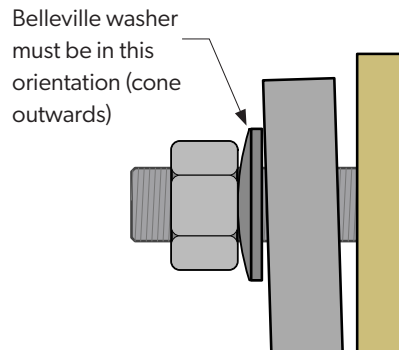
Refer PLPF-3 and PLPF-4 on page 7 for fixing details

Option 1. Stand up portal legs first then install PLX20 lintel.

-
6. Stand the portal legs up, brace, then tighten the hold down bolts. Using the 50x50x3 washers.



-
7. In both portal legs, install the bottom M12 threaded rod assembly, through the 12mm backing plate (curved ends facing out) and using the Belleville washers between the nut and 12mm backing plate, and nail the L bracket on the lintel side of the portal leg into place.



-
8. Drop the PLX20 Lintel (pre camber facing up) into place.



-
9. Add the top M12 Threaded rod assembly.

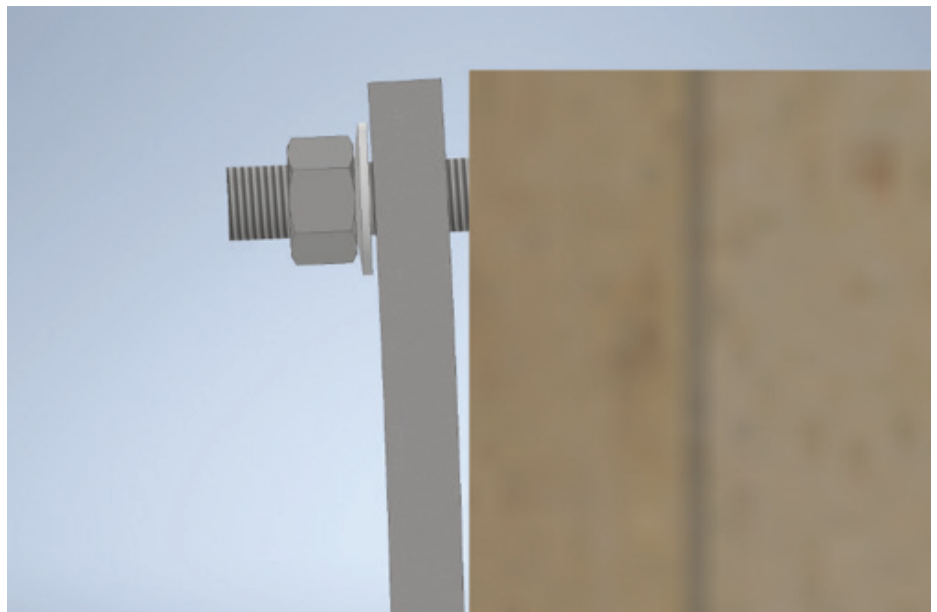


10. Screw the top and bottom arrow head connectors into the PLX20 lintel using VGS 9x160 screws.



11. Square and level the portal structure.

12. Install backing plate with curve facing out, install Belleville washers (cone facing out) and tighten to 50Nm torque to flatten both the Belleville washer and the plate against the timber leg.

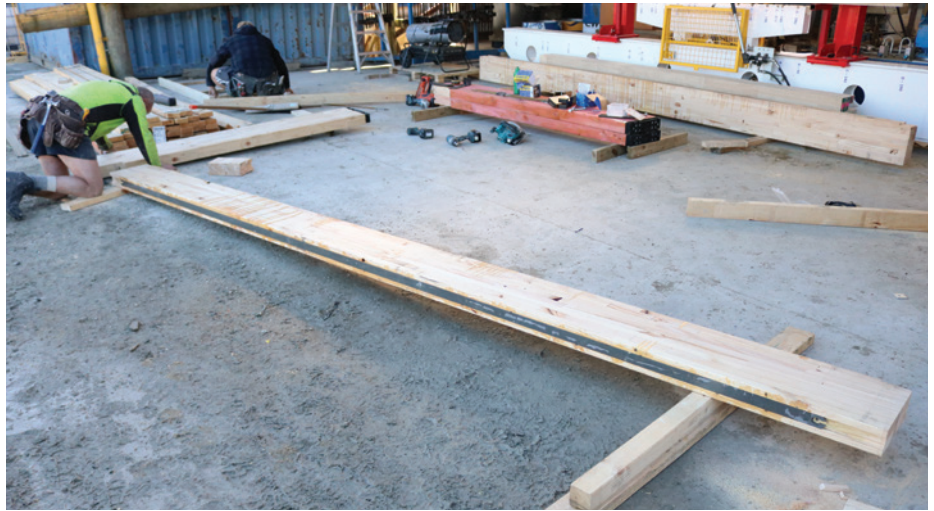


13. Add the VGZ 7 x 200 uplift screws @ 45degrees through the L bracket into the Lintel then into the leg.



Option 2. Build portal on the ground and stand up into place. (Starting from number 5 above).

1. Lay the portal legs and PLX20 lintel (pre camber facing up) in place on the ground in position.



2. In both portal legs, install the bottom M12 threaded rod assembly, through the 12mm backing plate (curved ends facing out) and using the Belleville washers between the nut and 12mm backing plate, and nail the L bracket on the beam side of the column into place.



3. Screw the top and bottom arrow head connectors into the PLX20 beam using VGS 9x160 screws.



-
4. Tighten the M12 bolts to 50Nm Torque and flatten the Belleville washer and 12mm backing plate flat against the portal leg.



-
5. Stand the entire portal into place, level, brace and tighten the hold down bolts using 50x50x3mm washers.



-
6. Square the lintel and portal legs then add the VGZ 7 x 200 uplift screws @ 45degrees through the L bracket into the lintel then into the portal leg.



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