



Prolam[®]

Engineered Laminated Timber

Prolam SmartJoists.

Design and Install Guide

JANUARY 2020 – Version 1

**Register free for
our beam calculator at**

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INFORMATION

General

Purpose

This guide will help correctly specify install Prolam SmartJoists (SmartJoists) also referred to as Prolam I-Joists for use as structural members.

Important Documents

This guide must be read in conjunction with the

- › Prolam SmartJoists pass™
- › Prolam Care and Maintenance
- › Prolam online calculator output
- › Prolam SmartJoist warranty.

Skills Required

This guide is suitable for use by licensed building practitioners (or deemed practitioners) licensed to the applicable licence class.

For more help

Technical assistance is available at

While all reasonable efforts have been made to ensure the accuracy of information provided, this design and install guide is intended for guidance only and may be subject to change.

For our warranty

Refer to



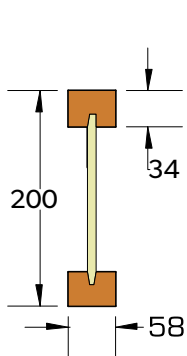
PROLAM SMARTJOISTS

Description

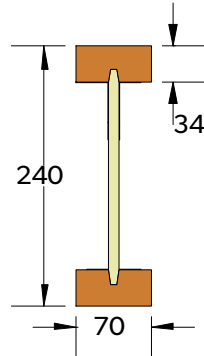
Prolam SmartJoists are manufactured from graded Douglas fir LVL 15 flanges and Oriented Strand Board (OSB) webs bonded together with an exterior, heat durable adhesive that complies with ASTM D5055. Prolam SmartJoists are supplied boron treated, in its final form, to H1.2.

SmartJoist sizes available in each state may vary from time to time. Check your local stockist before ordering.

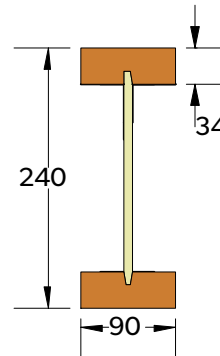
Web thickness 70 mm flange, 90mm flanges: 11.5



PJ20058



PJ24070



PJ24090

Certifications and approvals

Certificate of Registration of Preservative Treatment & Allocated Brand Timber Treatment Plant Registration Authority; 709 11 H1.2 (13/7/18), 614 11 H1.2 (5/7/18).



Prowood Assurance Statement

For use, scope and limitations, and performance assurance refer to Prolam SmartJoists pass™.



DESIGN

Design steps



Select Prolam SmartJoist size and span

To specify the correct size and span, use the Prolam online calculator. It delivers:

- › Prolam SmartJoist size and span options
- › installation requirements (spacings, allowable web penetrations, rafter cut details, fixings, painting)
- › our assurance statement (pass™)
- › care and maintenance requirements
- › our warranty.

Collectively this documentation is referred to as the Prolam Project Documentation.

Uses available through the online calculator are as follows:

- › rafter
- › floor joist.



Check for fire requirements

Determine whether NZ Building Code Clauses C3 and C6 apply. This will be determined by the position of the Prolam SmartJoist (proximity to relevant boundaries etc.).

Calculation of fire resistance must be performed by a suitably qualified fire engineer.



Confirm all design requirements are met and check buildability

Confirm the chosen Prolam SmartJoist configuration and support spacings meet all relevant design requirements, and check that the selections are compatible with the design.



Documentation

Ensure the building consent plans and specifications include

- › size and location of the Prolam SmartJoists
- › Prolam SmartJoist Project Documentation.

CONSTRUCTION

Pre-installation



Health and Safety

Take all necessary steps to ensure your safety and the safety of others:

- › ensure adequate ventilation or mechanical dust extraction when cutting or drilling
- › ensure the timber is well supported when cutting and nailing
- › use appropriate safety equipment, clothing and footwear
- › use all tools in accordance with relevant instruction manuals
- › plan and monitor a safe approach for working at height; select and use the right equipment
- › clear the work area of any obstructions before work starts
- › treated wood offcuts should be disposed to landfill.

Do not allow loads (including workers) on SmartJoists until all blocking, hangers, rim joists, nailing and temporary bracing as specified have been installed. Serious accidents or injury can result from failure to follow this requirement.

For further information refer to:

- › WorkSafe July 2018. Small Construction Sites, The Absolutely Essential Health and Safety Toolkit.
- › WorkSafe December 2016. Health and Safety at Work, Quick Reference Guide.

These documents are available at



Handling & Storage

Delivery

Care must be taken during loading, unloading, and transporting in the yard and on-site to protect the Prolam SmartJoists from pre-installation damage.

Storage

Store Prolam SmartJoists flat on a hard, dry surface, on bearers (at a max 400 mm centres) which extend across the full width of the members.

Prolam SmartJoists stored near the ground will absorb moisture. To prevent this, place a layer of plastic underneath the bearers.

Do not expose Prolam SmartJoists to rapid change in moisture or temperature, such as may occur from temporary heating units.

When storage inside is not possible, remove any wrap, place timber spacers on top of the Prolam SmartJoists then rewrap or cover with a waterproof cover.

Moisture effects on Prolam SmartJoists

Prolam SmartJoists are manufactured from Douglas fir LVL 15 flanges and OSB webs. While supplied treated, they are supplied without any factory-applied sealer.

Wetting during pre or post-construction may lead to a temporary elevated moisture content and dimensional changes. Prolam SmartJoists will dry and re-equilibrate to the ambient humidity conditions, but some expansion or swelling may remain. Providing the time exposed to elevated moisture is less than 90 days, there will be no effect on structural performance. Structural performance cannot be assured if exposed for longer periods.

Where the Prolam SmartJoist is to be installed in moisture-laden environments, such as saunas, swimming pool and spa rooms, design and construction must ensure that the members are protected from exposure to moisture.

Installation



Key documents

Refer to building consent documentation details (structural and architectural), spacing set out, connections and fastener types for Prolam SmartJoist to building structure.

Where specific assemblies are not contained in the consent documentation, refer to:

- › engineering (specific design)
- › information from supplier of structural bracket.
- › Prowood technical resources
- › the Prolam Project Documentation
- › this document.



Installation requirements

Tools

Use standard carpentry equipment and tools. Ensure all tools are sharp, used in accordance with good trade practice, and manufacturer's specifications.

Position SmartJoists

Do not allow loads (including workers) on SmartJoists until all blocking, hangers, rim joists, nailing and temporary bracing as specified have been installed. Serious accidents or injury can result from failure to follow this requirement.

Brace each joist as it is installed. Joists must be nailed to supports, all hangers, blocking, and rim joists. Cross bridging at supports must be completely installed and properly nailed.

Brace the ends of cantilevers (overhangs) with closure panels, rim joist or cross bridging.

Lateral brace the top flange of each joist, to prevent sideways buckling or rollover which may occur under light construction loads, such as a worker and/or a layer of unnailed sheathing.

Fully installed permanent sheathing or temporary struts to the top flange of each joist will accomplish lateral bracing. Temporary struts must be nailed to a lateral restraint .

Permanent sheathing must be completely installed and properly nailed before additional loads can be placed on the system.

Repair of damage

The integrity and safe use of SmartJoists can be seriously impaired if they are damaged.

Flange damage becomes more critical the nearer it is to midspan or an interior support. Flange damage is less critical in close proximity to an end support. A joist with unacceptable flange damage cannot be repaired; rather a new joist must be added to take its place.



Web damage becomes more critical the nearer a support. Web damage is less critical near midspan. Web holes can be too big or too numerous to repair e.g. rectangular hole (length greater than 450 mm) located at midspan, a 150 mm round hole adjacent to a support .

The damaged joist does not have to be removed. Consult Prolam SmartJoist tables to find an acceptable new joist that is shallower than the damaged joist, so installation is easier. Consider double and triple joists. If the damaged joist is multi-span, the new joist only needs to go across the span(s) where the damage occurs.

A single damaged joist can sometimes be trimmed off adjacent undamaged joists (run a calculation using the online tool).

Hole repairs generally require a reinforcement that covers the full depth of the web and extends at least 300 mm past each side of the hole.

Contact Prowood if any product damage is noted.

APPENDIX A

Details

Mid-floor overview

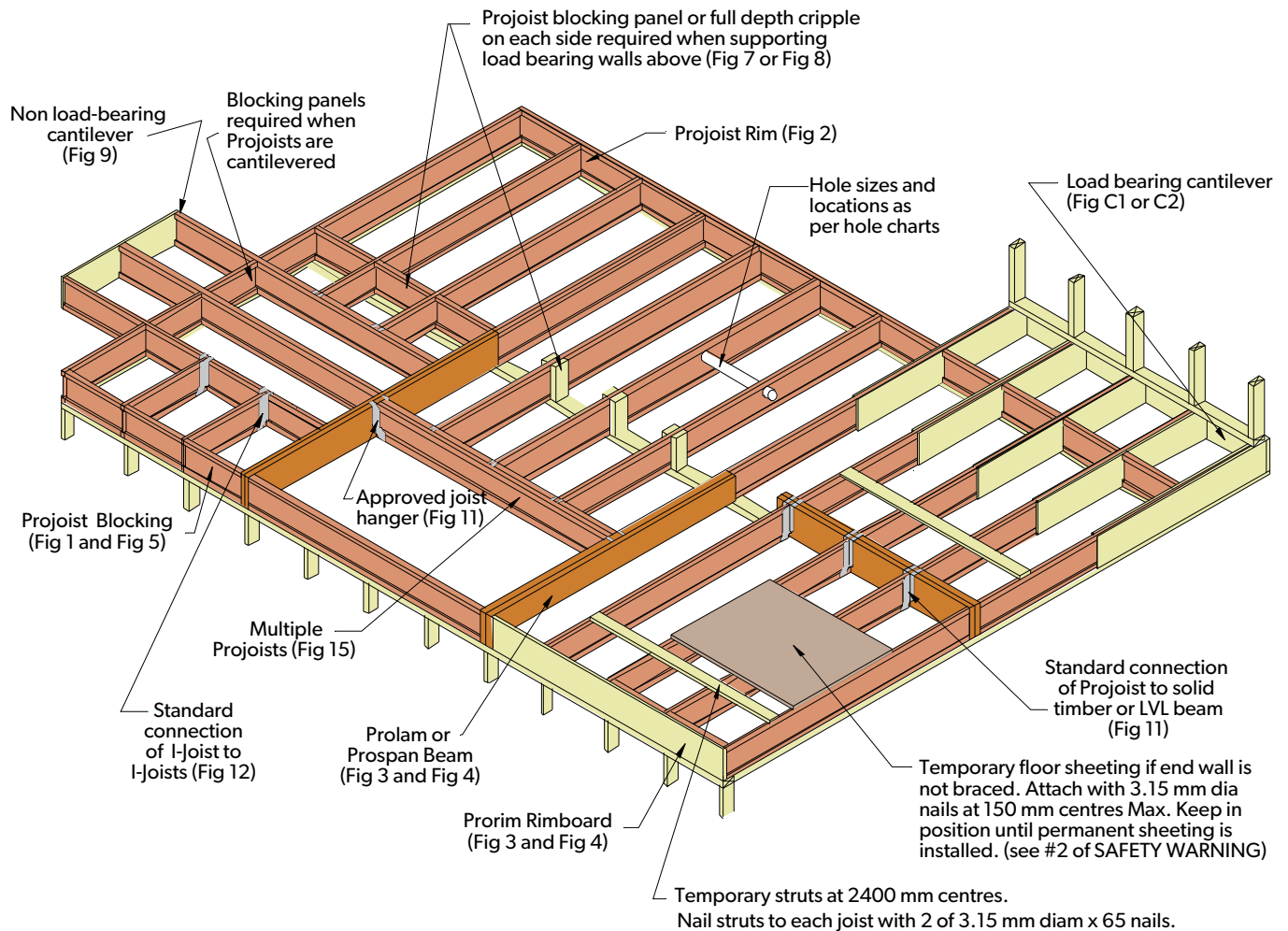


FIGURE 1: BLOCKING.

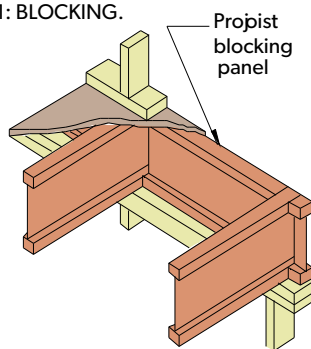
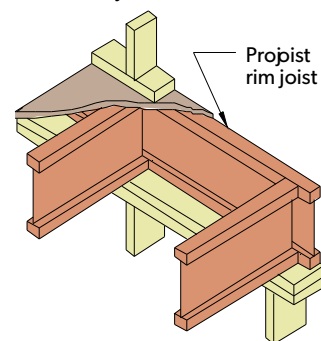


FIGURE 2: PROJOIST RIM.



NOTE: Top plate width must be greater than width of flange rim joist + 30 mm (min bearing length)

FIGURE 3: PROLAM RIMBOARD.

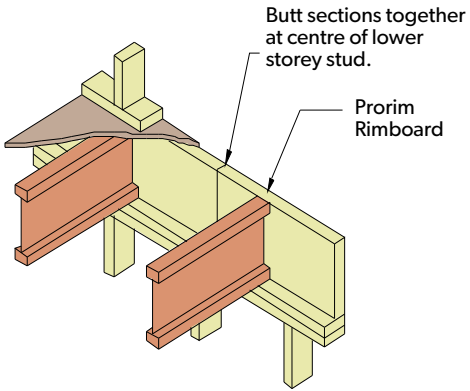
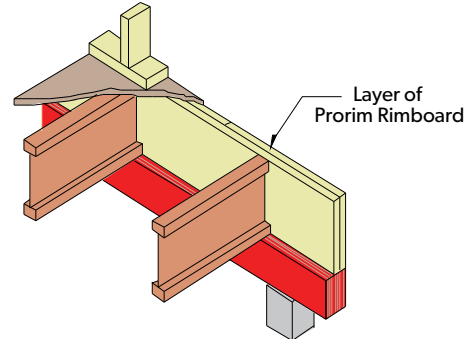


FIGURE 3: PROLAM RIMBOARD.



Note:
To achieve the necessary racking resistance through the floor diaphragm, it is important that the nailing provisions of the floor sheeting to the joists as described in AS 1684 (AS 1869 for particle board) be adopted to nail the floor sheeting to the

FIGURE 4: PROLAM RIMBOARD.

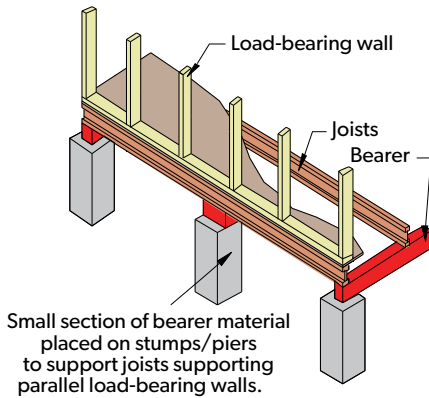


FIGURE 5: BLOCKING.

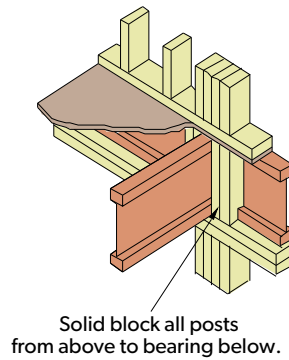


FIGURE 6: DOUBLE JOISTS.

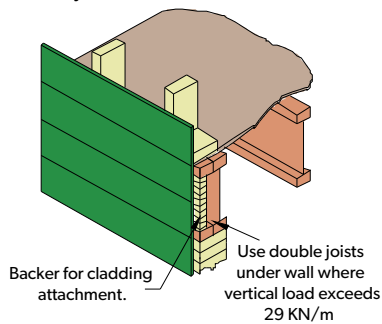
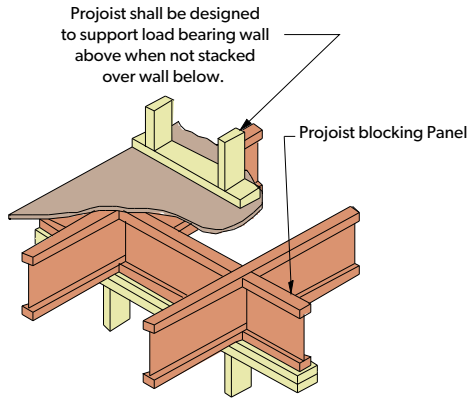


FIGURE 7: INTERIOR LOAD BEARING AND BRACING WALLS.



NOTE: Detail F7 with blocking panel is required for bracing walls.

FIGURE 8: WALL SUPPORT.

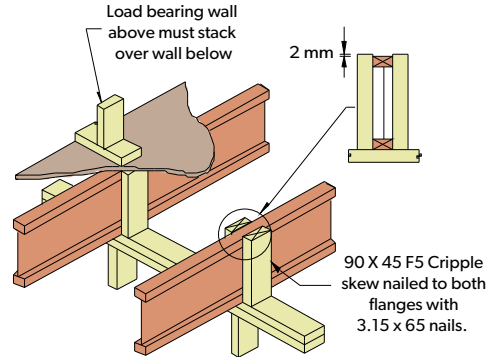
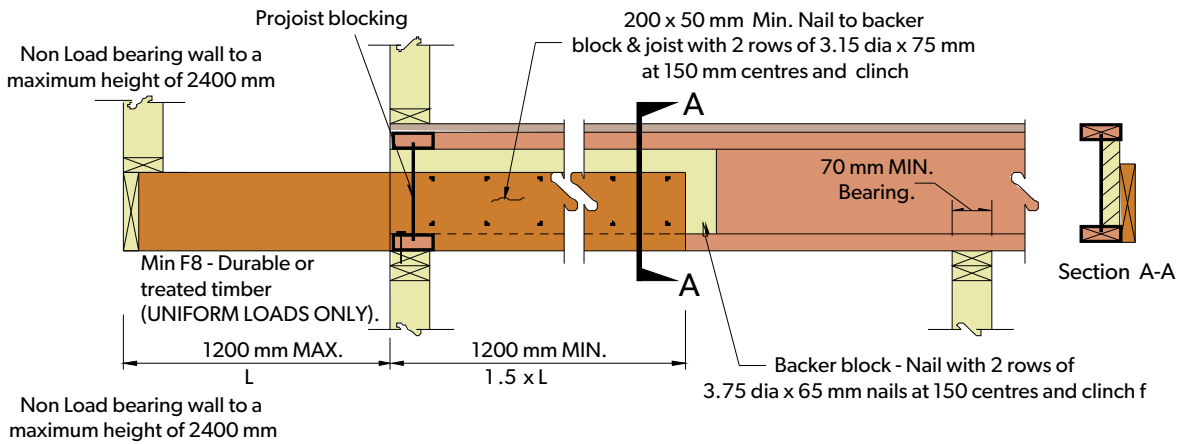
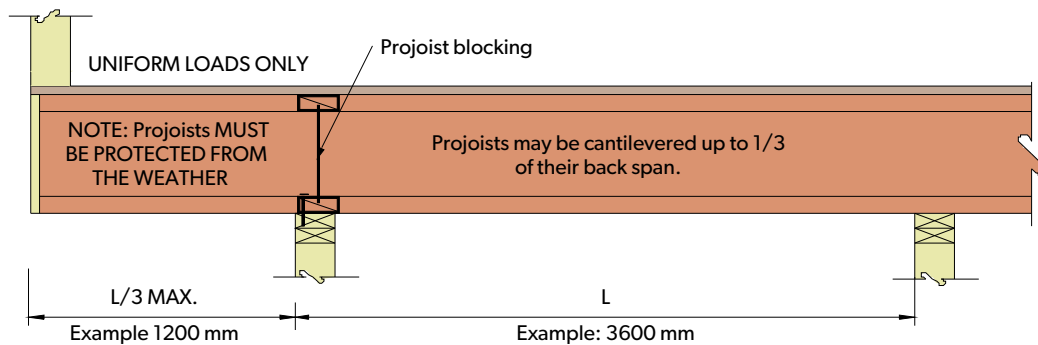


FIGURE 9: NON LOAD-BEARING CANTILEVER DETAILS (BALCONIES).

Example cantilever spans and minimum back spans for this detail are shown in the table on the next page



DETAIL C1 OR C2: FOR CANTILEVERS SUPPORTING LOAD BEARING WALLS.



CANTILEVERED BALCONIES as per detail F9

Loadings: Permanent Loading G: self weight + 40 kg/m² + 0.6 kPa of live load permanently applied, live load Q: 2.0 kPa or 1.8 kN point live load , 1.5 kN/m acting at end of cantilever

Balcony Cantilevers - Maximum cantilever and minimum back span (m)

Joist spacing (mm)	300		400		450		600	
Cantilever material	Cantilever	Back span	Cantilever	Back span	Cantilever	Back span	Cantilever	Back span
H3.2 Prospan LV 15 L								
140 x 42	1.0	1.5	1.0	1.5	1.0	1.5	0.9	1.4
190 x 42	1.2	1.8	1.1	1.7	1.1	1.7	1.1	1.7
240 x 42	1.7	2.6	1.6	2.4	1.6	2.4	1.5	2.3
290 x 42	2.1	3.2	2.0	3.0	2.0	3.0	1.9	2.9

FIGURE 10: BACKER & FILLER BLOCK.

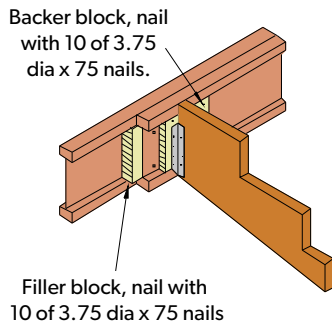


FIGURE 11: WEB STIFFNER BLOCKS.

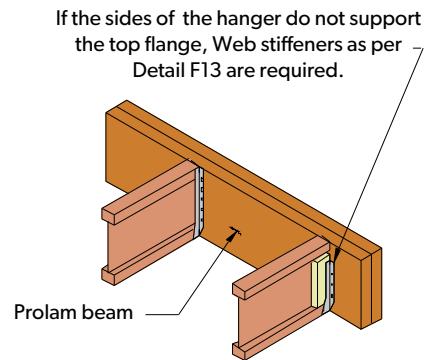
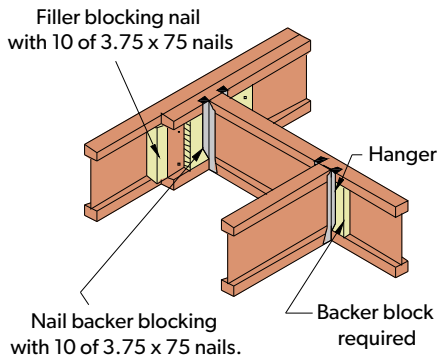


FIGURE 12: BACKER & STIFFENER BLOCKS.



FILLER BLOCKS AND WEB STIFFENERS

SmartJoist code	Recommended filler block	Web stiffener material	
		stiffener	nails
PJ20058	120x35	15x60 mm ply	4-3.15x65
PJ24070	150x58 LVL	2/15x60 mm ply	4-3.15x65
PJ24090	2/140x45	2/19x60 mm ply	5-3.15x65
PJ30090	2/190x45	2/19x60 mm ply	5-3.15x65
PJ36090	2/240x45	2/19x60 mm ply	5-3.15x65
SJ40090	2/240x45	2/ ply	5-3.15x65

FIGURE 13: WEB FILLERS AND STIFFENERS

NOTES :

1. Use plywood sheathing for web stiffener with face grain parallel to long axis of the stiffener.
2. Filler blocks noted are for the general requirements of the details within this design guide.
3. Leave 3 mm gap between top of filler blocks and bottom of top flange.

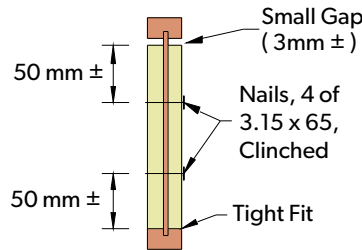
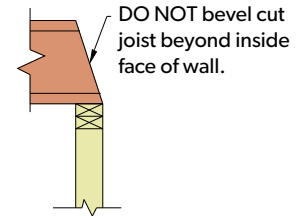


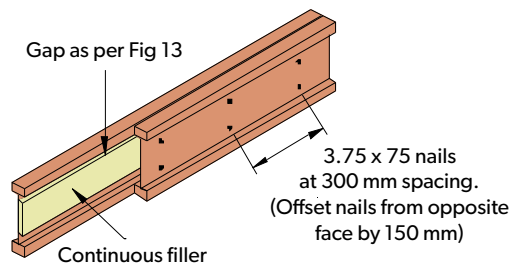
FIGURE 14: RAKEING CUT.



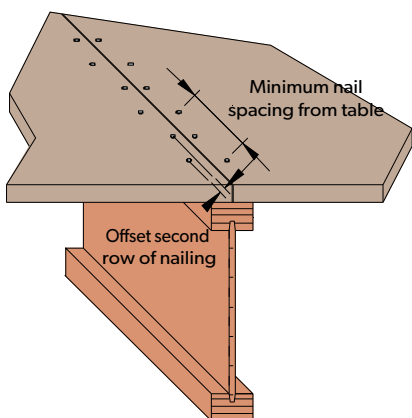
NOTE: Projoist blocking or timber X - bracing required at bearing for lateral support.

1. Support back of web during nailing to prevent damage to web/flange connection
2. Filler block is required full length of joist
3. Nail Joists together with two rows of 3.75 Φ x 75 nails on each side of double joist at 300 mm centres (Clinch if possible). A total of 4 nails per 300 mm is required. If nails can be clichéd, only 2 nails per 300 mm is required.

FIGURE 15: FILLER FOR DOUBLE JOISTS.



FASTENER SPACING



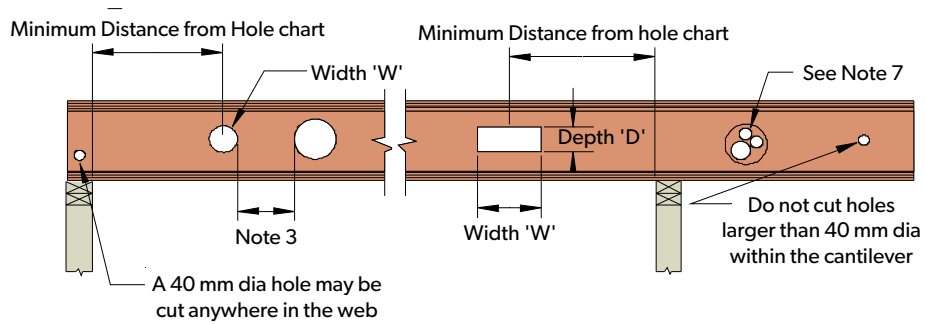
Minimum single row nail spacing into Projoist flanges

nail size	Projoist flange width				
	40 mm	44 mm	51 mm flange	58-70 mm	90 mm flange
2.8 x 65	70	65	50	50	50
3.15 x 65	100	90	75	75	75
3.15 x 75	100	90	75	75	75
3.75 x 75	130	115	100	100	100
4.5 x 100	NA ¹	NA ¹	NA ¹	NA ¹	100

NOTES:

1. Nailing of bottom plate at 100 mm centres through floor sheathing and into top flange is permitted.
2. Minimum nail spacing is shown above, maximum nail spacing is 300 mm centres.
3. Tighter effective nail spacing may be obtained by offsetting nail rows a minimum of 12 mm and maintaining a 10 mm minimum edge distance.

PROJOIST HOLE CHARTS



Note: The most accurate method to design the allowable web penetration size and distance from support for Projoists is to use the Prolam Online software. The table below will give conservative results in some instances.

