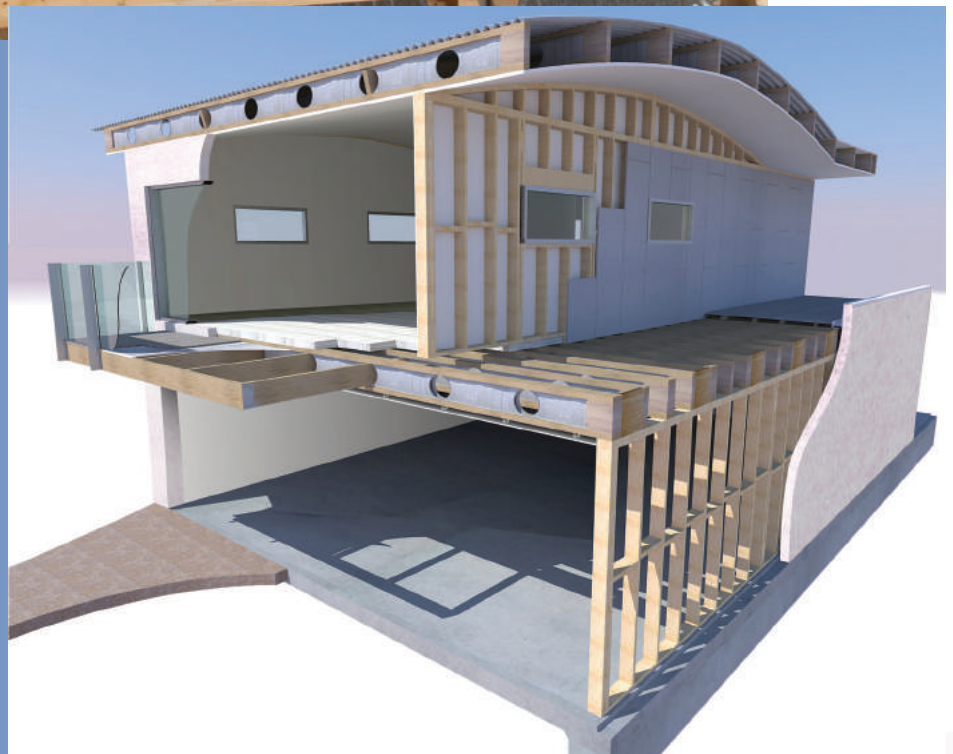


Tecbeam® Installation Guide

TECBEAM



General notes:

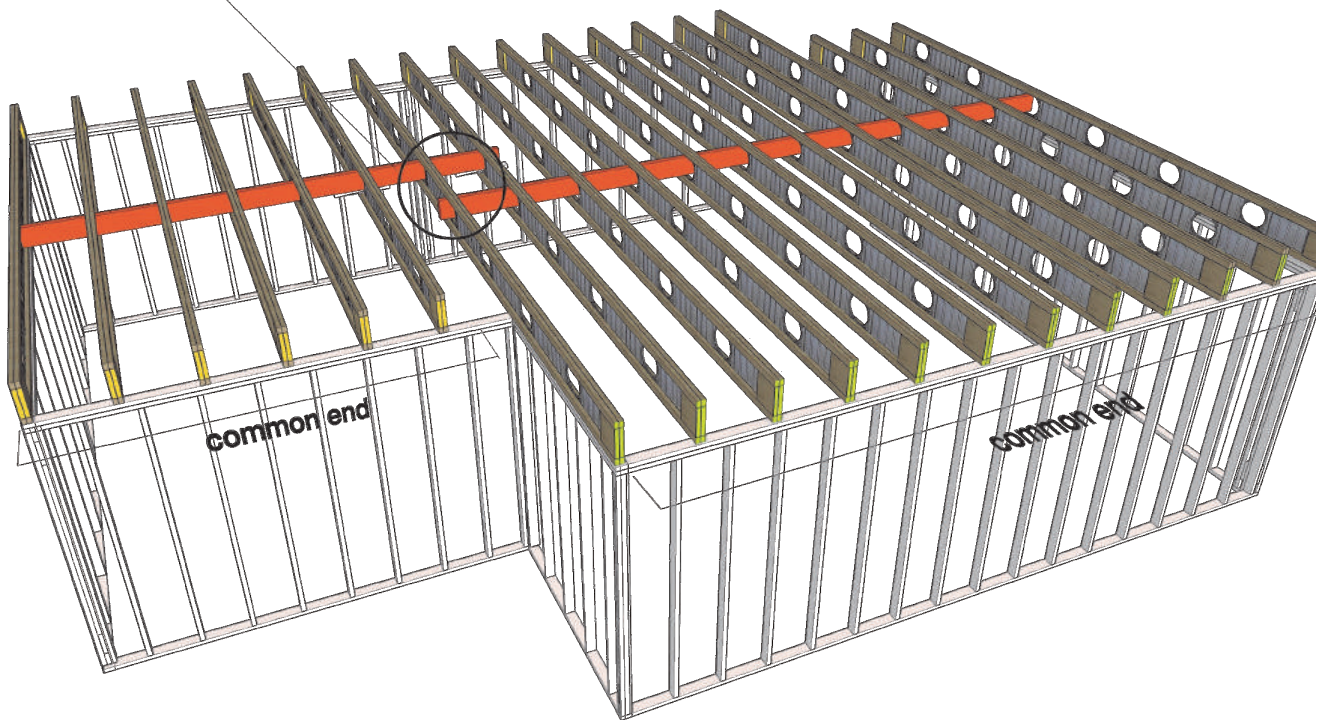
- Conventional framing practices can also apply to Tecbeam installations: however, to gain maximum benefit from using the Tecbeam system, builders are strongly advised to take advantage of its unique features by adopting the following guidelines.
- To meet the requirements of the Building Code of Australia (BCA), all works must comply with AS 1720.1 Timber structures - Design methods, and where applicable, with TECBEAM Installation Guidelines.
- For details not covered in this manual, please refer to either:
 - Tilling Timber Pty Ltd
 - TECBEAM Australasia P/L
 - or a registered structural engineer.

Web hole alignment - for installation of strongbacks and services

To achieve alignment of web holes, for the installation of strongbacks and services, Tecbeam joists have been colour marked at one end, called the COMMON END. Refer to the Floor Framing Plan for set out reference lines.

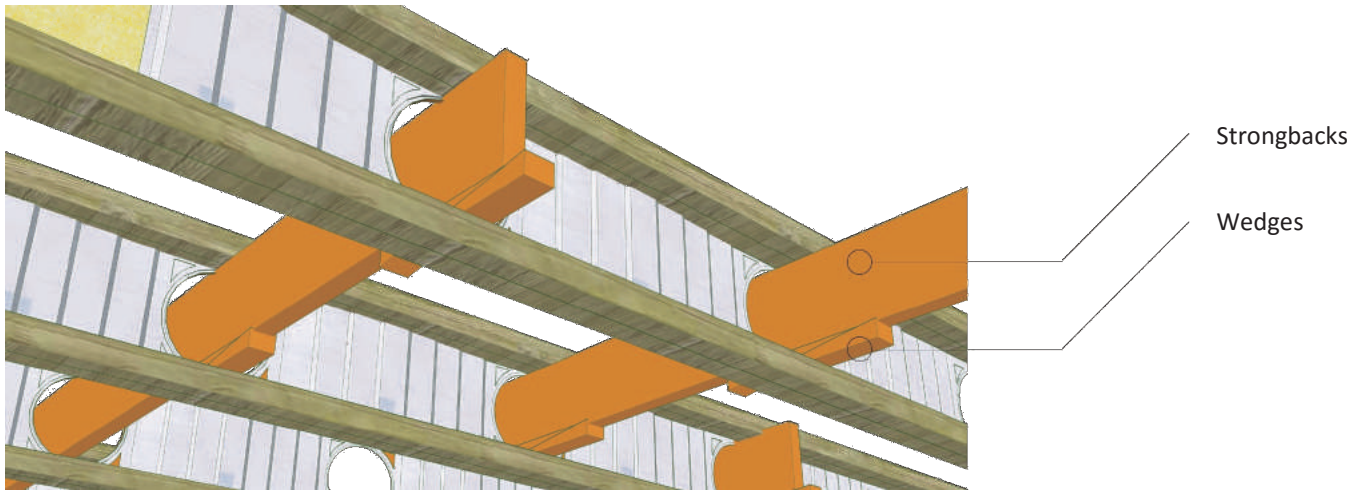
Strongbacks

Strongbacks • Strongbacks have been proven to:



- a) significantly reduce floor vibration
- b) load share a concentrated load
- c) are more effective than solid blocking
- d) act as internal support beams

Strongbacks (Cont'd)



General

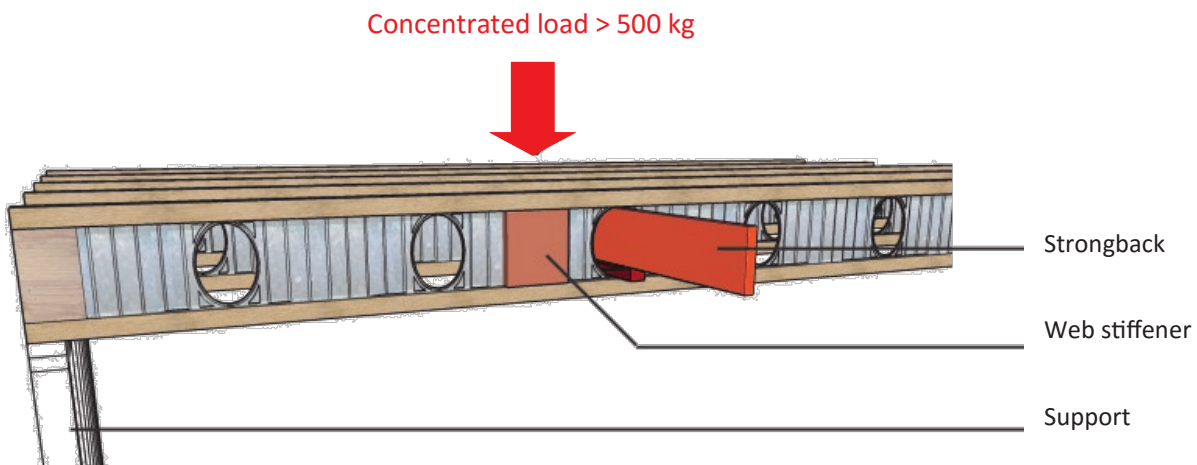
- Before Securing wedges, ensure strongbacks are below 15% Moisture content so as to avoid squeaky floors
- Minimum MGP10 grade
- If higher comfort levels from floor vibration are required, use MGP12, F17, LVL or increase the number of strongbacks

Recommended Sizes

- T25 series - 140 x 45
- T30 series - 190 x 45 or 200 x 42 LVL
- T36 series - 190 x 45 or 200 x 42 LVL
- T40 series - 190 x 45 or 200 x 42 LVL
- For higher loading, steel sections can be used as strongback or internal beams; refer to Tilling Timber Pty Ltd or a structural engineer
- For maximum efficiency, avoid cutting holes with a diameter greater than on third the depth of the strongback.
- For long joist span tables, plan the location of services and position strongbacks to avoid as much cutting as possible, so floor vibration is kept under control.

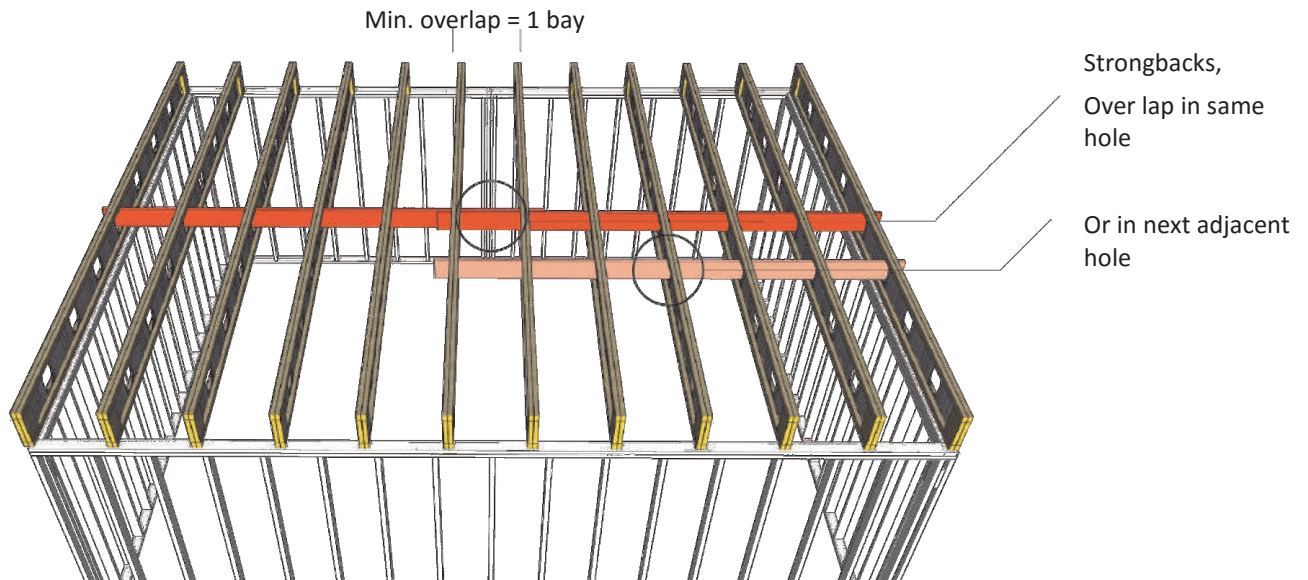
Installation

- Strongbacks must be secured tight with a pair of wedges at each joist; it is recommended wedges are glued and nailed. See [Wedges](#)
- Where a point load occurs, locate a strongback through the web hole closest to the point load and long enough to fix through at least two joists each side of the joist carrying the load.



Installation (continued)

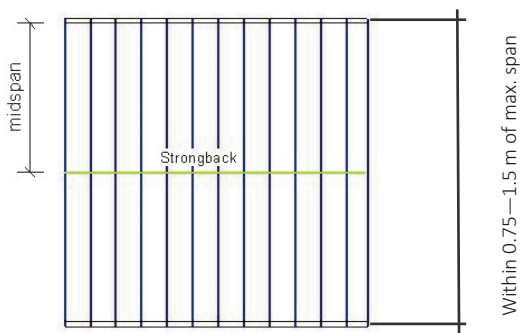
- Install strongbacks with a minimum lap of one (1) bay
- Laps in strongbacks may be installed in:
 - a) The same hole or
 - b) The next adjacent hole
- Min. strongbacks lengths: 2100 mm for 450 ctrs and 2400 mm for 600 ctrs



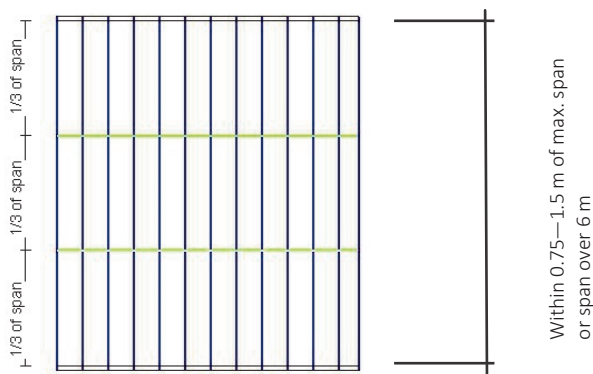
Specifications

For Vibration Control - Minimum recommendations

- Install one row of strongbacks mid span where the joists are within 0.75m to 1.5m of the tabulated span



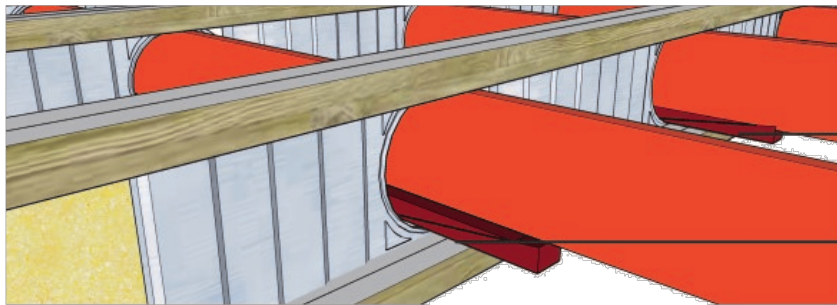
- Where the joist span is over 6m or within 0.75m of the tabulated span, install two rows of strongbacks, placed at approximately the one third points of the joist span



- For Continuous spans - add a Strongback in the shorter span even if it is less than the spans indicated above.

Wedges

- Wedges are used to secure the strongback to each joist. Loose or poorly fitted wedges may result in the floor squeaking.
- It is recommended that wedges are installed in pairs, hammered hard against the opposing wedge then glued & nailed.
- Must be dry with a moisture content <15% before fixing.



Timber wedges glued and nailed or screw fixed, centred about the web

Alternatively, wedges can be fixed on the top of the web

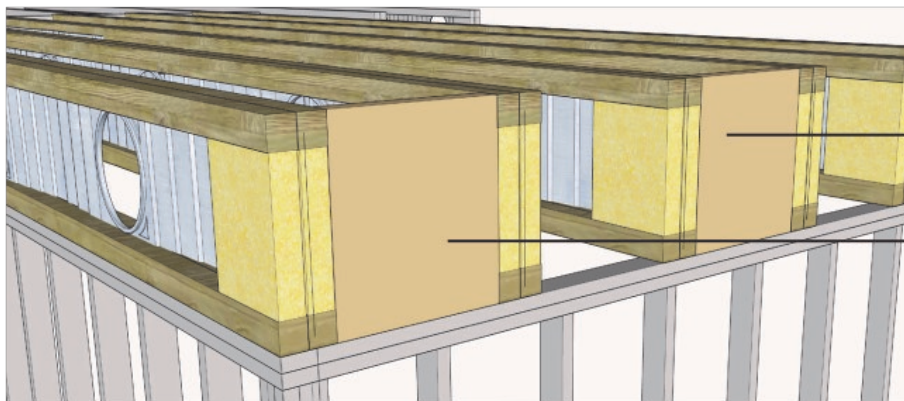
Blocking and bracing (in

the floor plane)

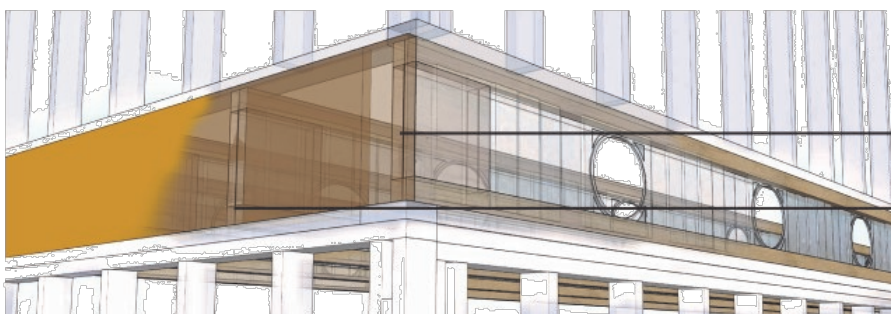
- Tecbeam joists do not require intermediate blocking where there is either full floor sheeting and ceiling lining, or strongbacks (Note: Strongbacks are more effective than solid blocking).
- Install blocking in the following locations:
 - a. At cantilevers along the support line and in alternate bays at the outer end if no trimmer is indicated,
 - b. Along all support lines - maximum spacing 1.8m,
 - c. In continuous spans - along intermediate supports,
 - d. Under partition walls running parallel to the joists

Plywood load spreaders (Rimboard)

Where joists are offset from loadbearing studs, Plywood load spreaders or SmartFrame Rimboard can be used instead of extra studs, wall plate blocking or a double top plate.



Blocking in alternate bays



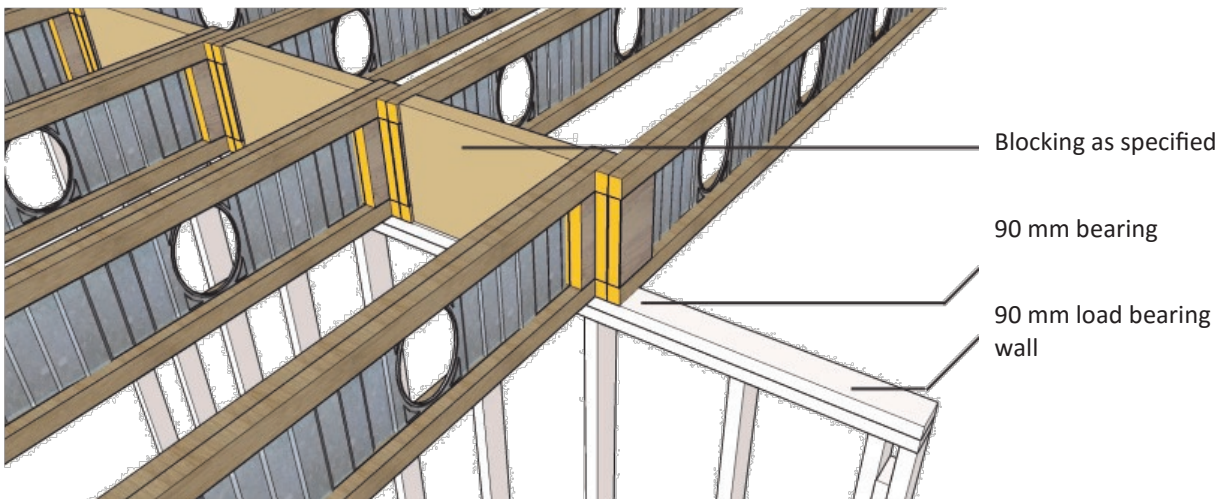
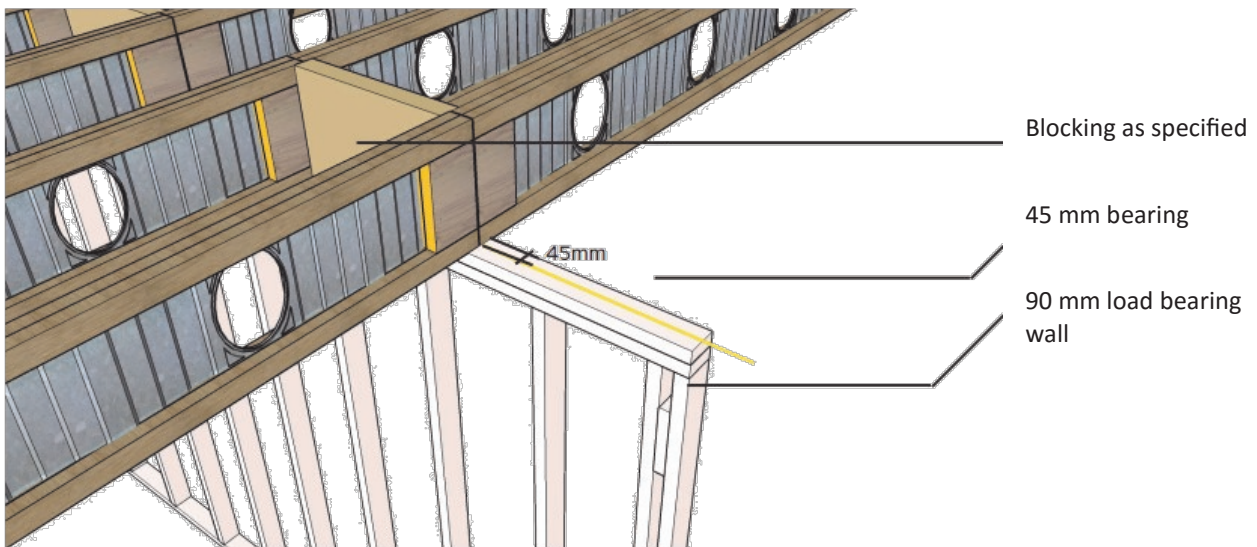
Rimboard nailed at the end of Tecbeams

Plywood load spreaders (or Rimboards)

- Load spreaders should be minimum 12mm F11 construction plywood or SmartFrame Rimboard , cut to the exact joist depth and fitted tight between the wall plate and flooring
- Install joists with a 20 mm setback from the outside face of the wall frame. Fix each offset joist with a minimum 8/40 x 2.8 mm nails.
- Load Spreaders should span at least three studs or minimum 1350 mm.
- Offset Joists carrying loads in addition to normal residential floor loads, may require extra fixings - refer to structural engineer. Plywood Load Spreaders also provide in-floor-plane bracing, eliminating end blocking, or cross strapping.
- When used as end bracing only, the 20 mm setback is not required; fix with a minimum of four nails per joist.

Bearing support

- Recommended minimum bearing length: 45 mm
- Alternately, Tecbeam joists can be staggered at internal load bearing walls for full 90 mm bearing

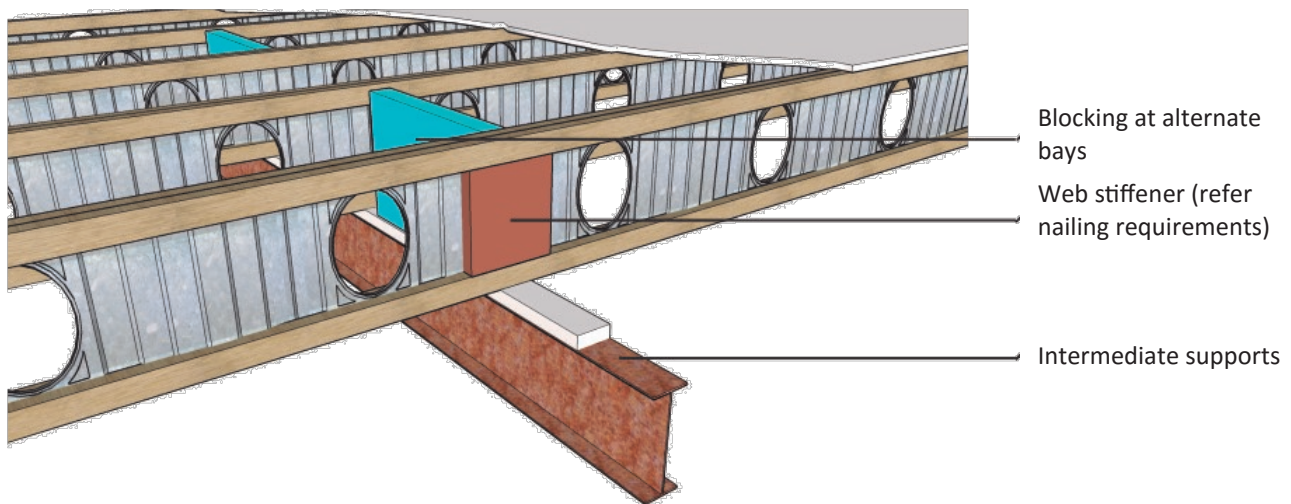
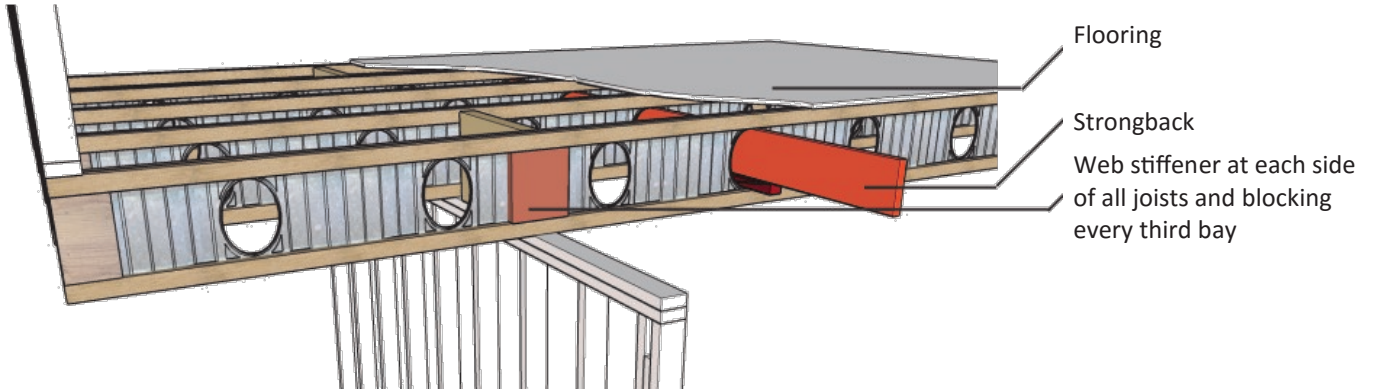


Web stiffeners

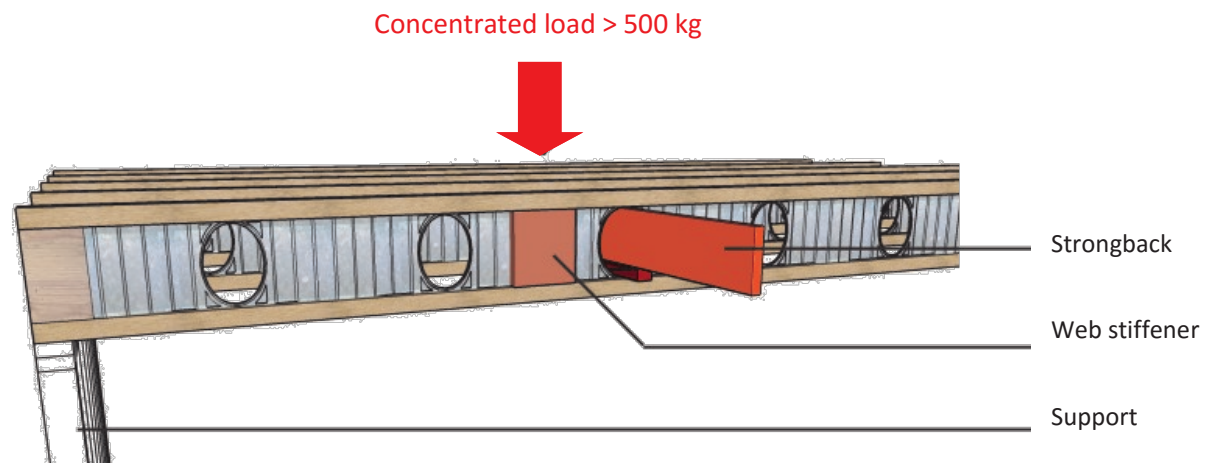
- Are required to transfer shear loads into or out of the steel web
- Are used to brace the web in high load cases
- Minimum Size: 70 x 35 seasoned timber, tight fitting between timber flanges on each side of the web and nailed together
- Minimum nailing:
 - T25 - 65 x 2.7 mm
 - T30 - 65 x 2.7 mm
 - T36 - 75 x 3.1 mm
 - T40 - 75 x 3.1 mm

Minimum Requirements:

- Web stiffeners are required at:
 - a) The ends of all joists
 - b) Support line for cantilevers
 - c) Supporting walls, beams or posts in continuous spans



- d) Under point loads exceeding 500kg



e) perimeter walls

- Under perimeter load bearing walls, a single Tecbeam joist fitted with extra web stiffeners replaces two solid timber joists
- Recommended web stiffener spacing
 - Metal Roof - 1350 mm ctrs
 - Tiled Roof - up to 10m span 900mm ctrs
 - Heavier Loads - 600mm ctrs



Note: If a web hole occurs over the support, add a pair of web stiffeners as close to the support as possible but covering the steel web sufficiently to fix the minimum nailing required through the web.

Internal walls (Non-load bearing)

- Crossing floor joists - For a single wall within the middle half of the joist span and also within 300 mm of the tabulated span, one of the following measures is required:
 - Add an extra joist every 1800 mm ctrs or
 - Reduce joist spacing, e.g. 600 mm to 450 mm ctrs, 450 mm to 350 mm ctrs, or
 - Upgrade to next joist size
- Note: for additional walls crossing the joists, check with Tilling Timber Pty Ltd, TECBEAM Australasia or a structural engineer
- Parallel to floor joists - where a wall covers over 65% of the joist span, check the following:
 - Joists @ 600 ctrs - if the span is within 500mm of the tabulated span, add an extra joist under the wall
 - Joists @ 450 ctrs - if the span is within 900mm of the tabulated span, add an extra joist under the wall
- Notes:
 1. Install a strongback at midspan 2100mm long to even out deflections
 2. Support walls located between joists with either short strongbacks or solid blocking @ 1800mm ctrs

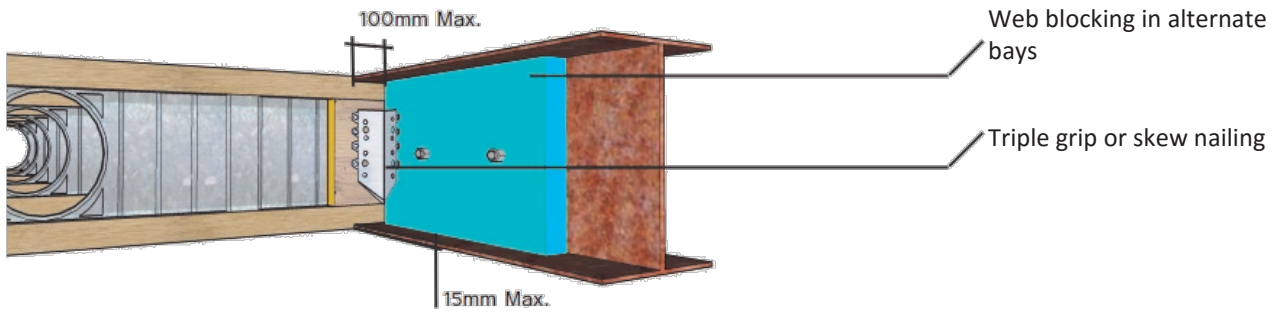
Trimming, notching or docking

- Trimming, notching or docking is permissible only at end supports
- The “Common End” has a pair of either 140 mm or 190 mm wide web stiffeners fitted with the steel web setback 70 mm or 90 mm respectively. This feature allows for the timber only trimming, notching, or docking

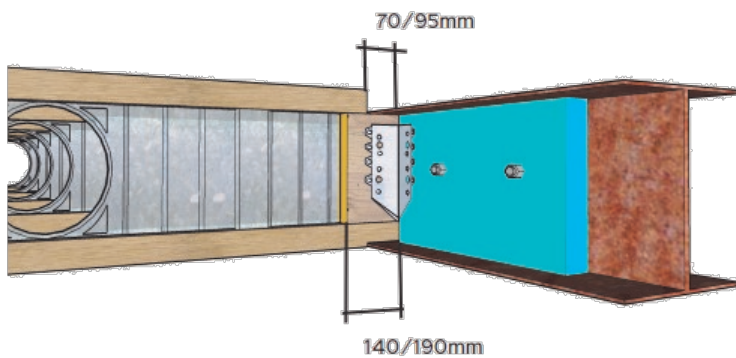
Restrictions on Notching:

- Bottom Flanges - Tecbeam joist bottom flanges can be notched up to 15 mm and no longer than 100 mm. If greater notching is required, refer to Tilling Timber Pty Ltd , Tecbeam Australasia, or a structural engineer.

Restrictions on Notching (Cont'd)



- Top Flanges - Can be notched to the full depth of the flange and half the width of the stiffener.

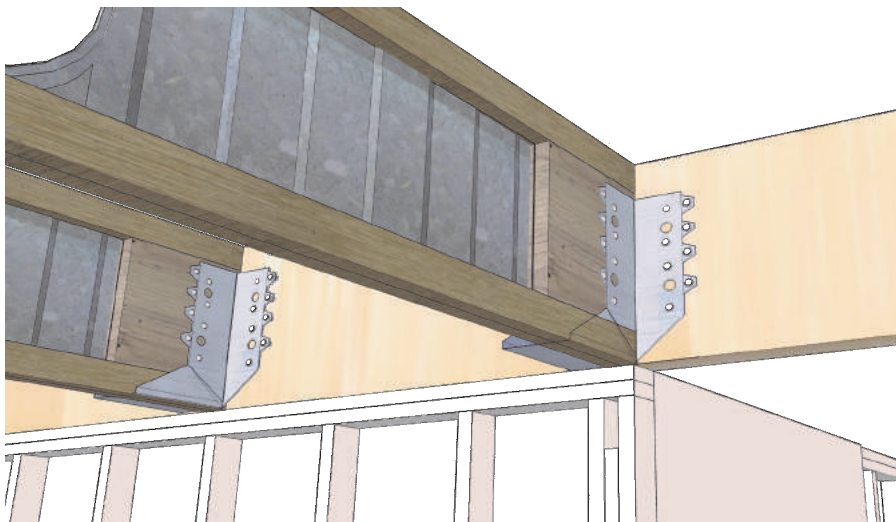


Connection and fixing details

- Generally, standard timber framing connectors and framing methods are suitable with Tecbeam joists.
- For higher load capacity applications, heavy duty connectors maybe necessary (refer to a structural engineer)

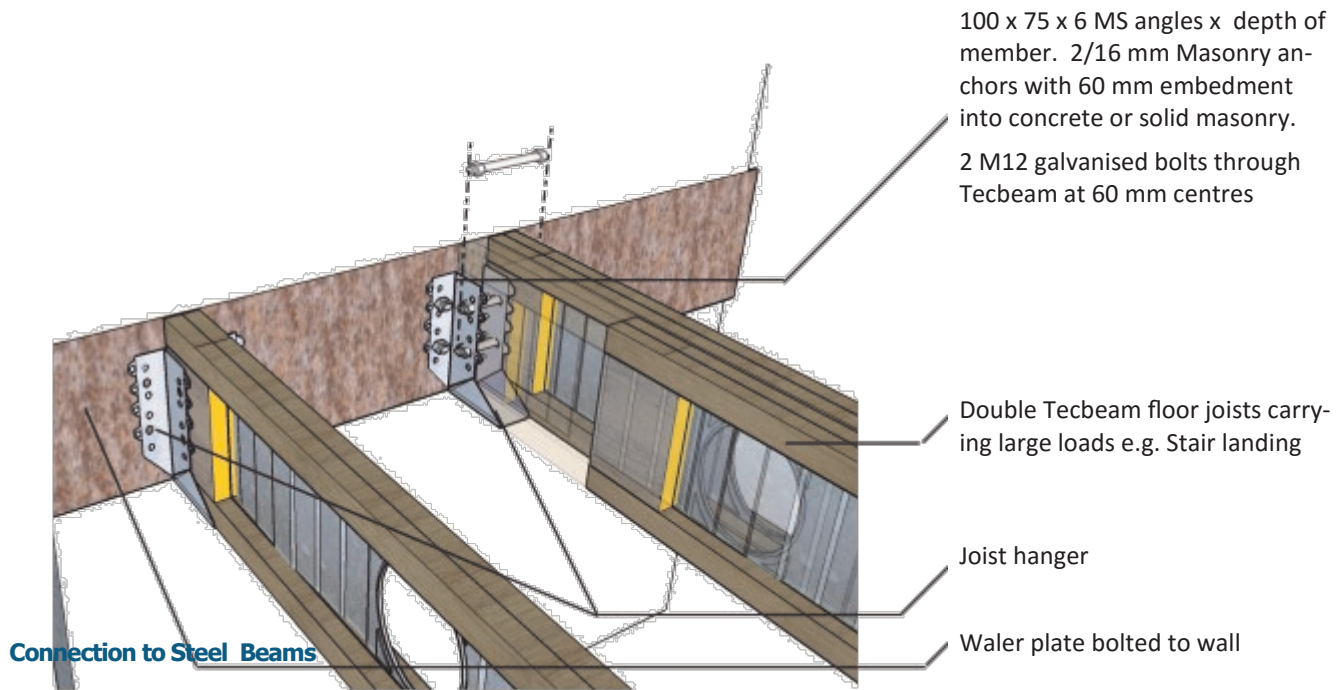
Connection to Timber Beams

- Under normal floor loads, Standard Joist hangers are used to connect Tecbeam joists to timber beams.



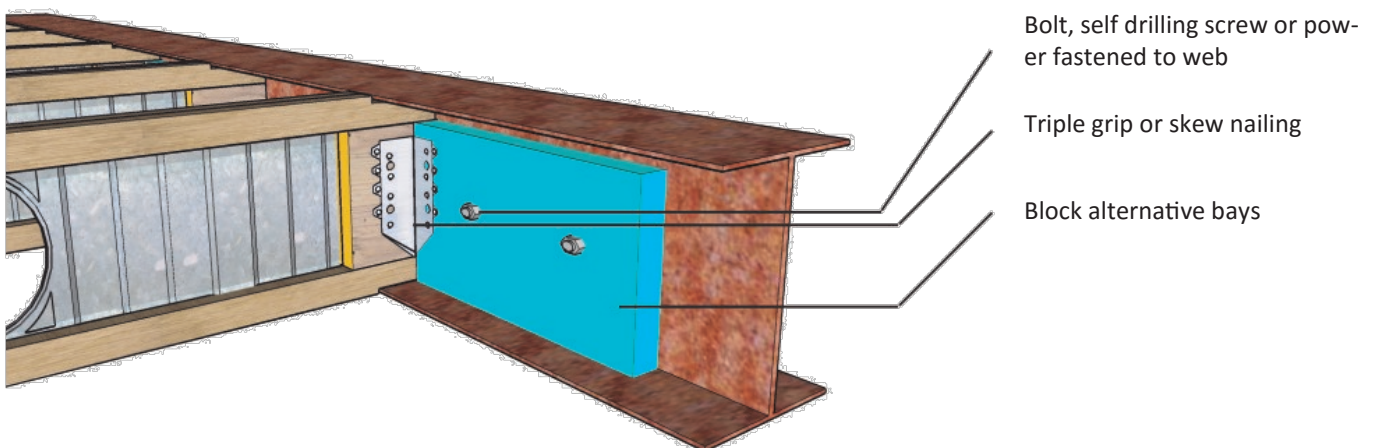
- Where TECBEAM joists carry higher loads e.g. double joist at stair void, a combination of a joist hanger on one joist and a steel angle bracket fixed with 2M12 bolts on the other joist can be used. See detail below and refer to Tecbeam Standard Details.

Connection to Timber Beams (Cont'd)



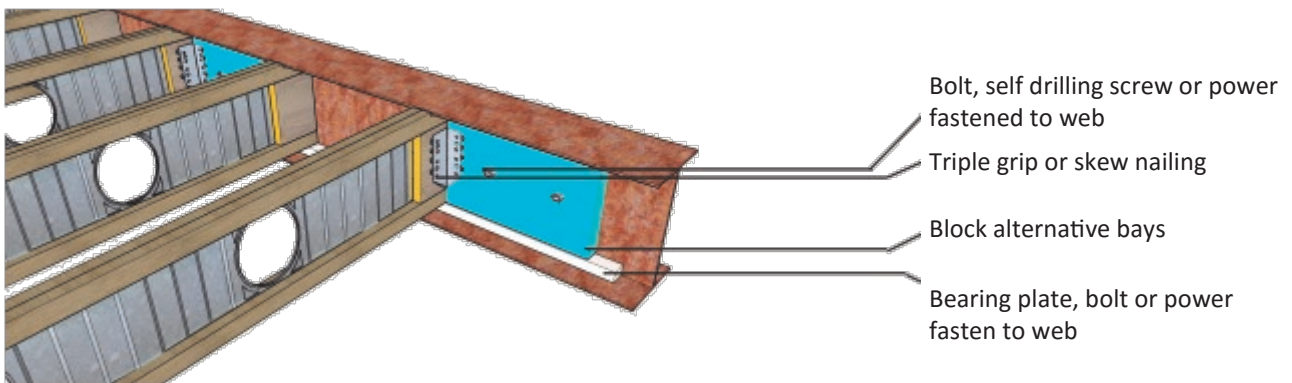
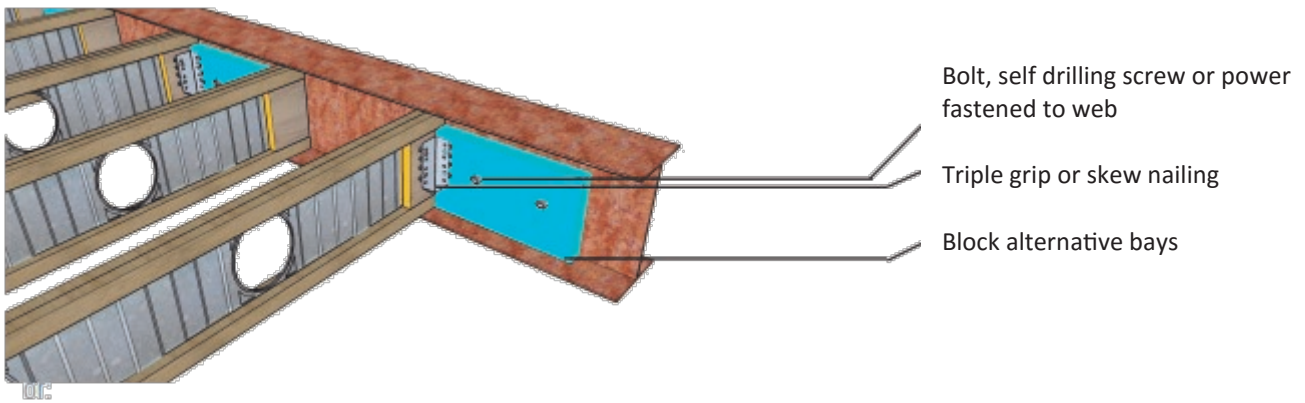
A. Notching - install against the beam web and bearing on the flange.

- A.1. Steel beams with a height similar to Tecbeam joists -minimises any notching required
 1. Notch the joist inside the steel beam (refer notching limitations) with the joists bearing on the bottom flange of the steel beam
 2. Install solid timber blocking in alternate bays
 3. Fix blocking securely to the web of the steel beam by bolting, self drilling screws or power fasteners

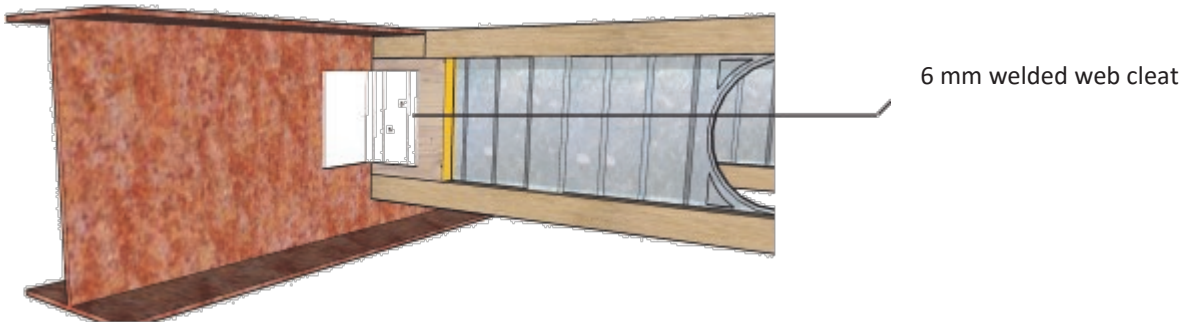


- A.2. Larger Steel beams
 1. Refer detail below
 2. Fixings similar to A.1.

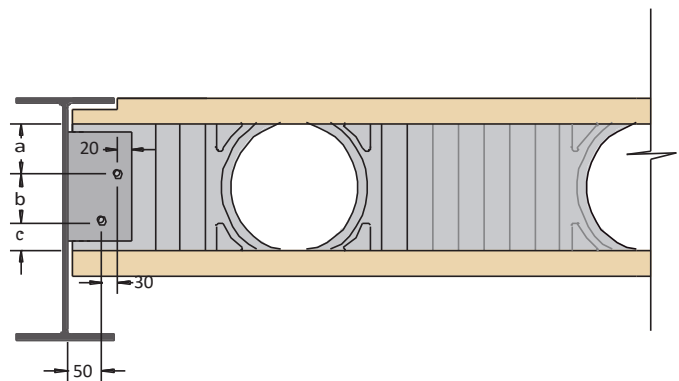
Connection to Steel Beams (cont'd)



- B. Beam Cleats - use where it is not practical to bear on the flange.
 1. Weld steel cleats, or fix angles to the beam web and install bolts through the joist web stiffener as shown.
 2. Bolts indicated are for normal floor loads only



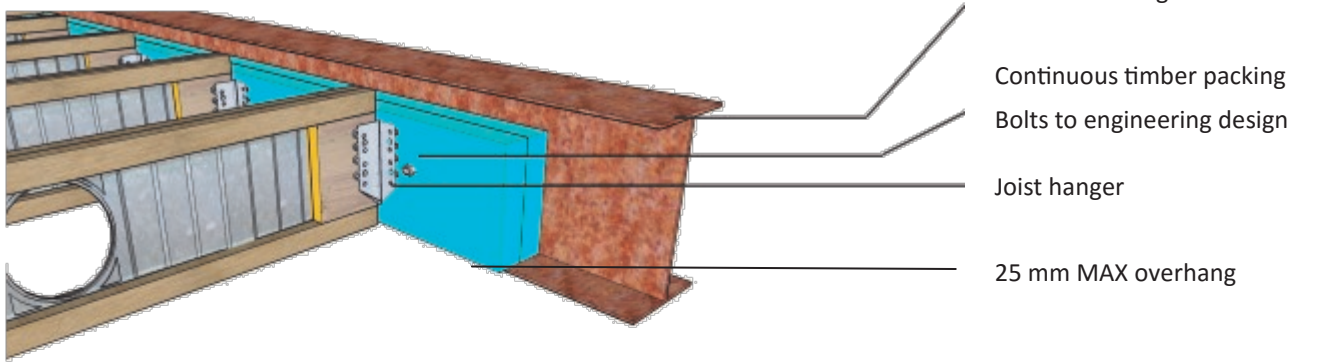
Tecbeam Joist series	Bolts number and size	Minimum spacing (mm)		
		a	b	c
T25	2 M10	70	50	25
T30	2 M12	70	50	25
T36	2 M16	85	80	30
T40	2 M16	90	90	30



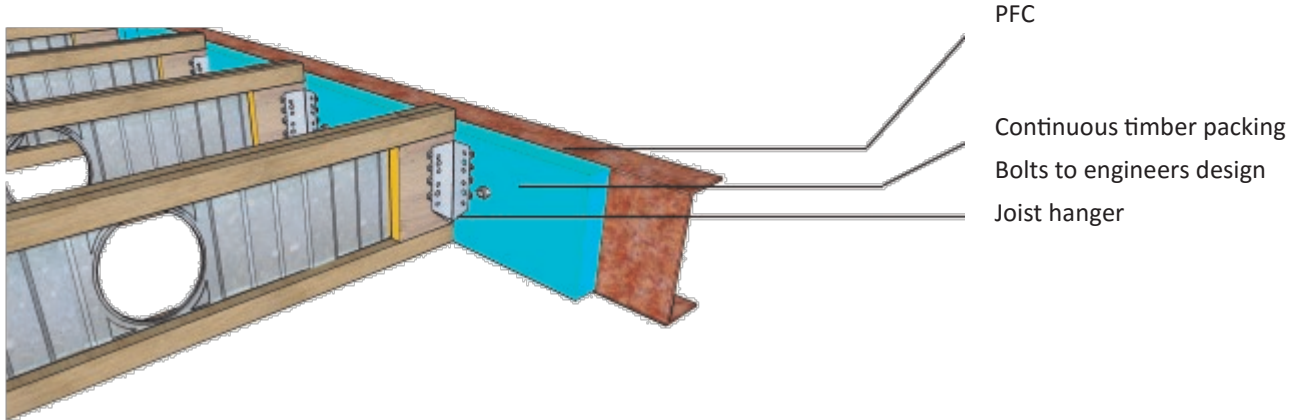
- C. Continuous solid timber packing
 1. Pack the steel beam with continuous solid timber
 2. Bolt packing to steel beam web to engineer's specifications and fix joist hangers
 3. Ensure the steel beam is braced against rotation caused by the offset loading

C. Continuous solid timber packing (Cont'd)

T Beam



or (PFC):

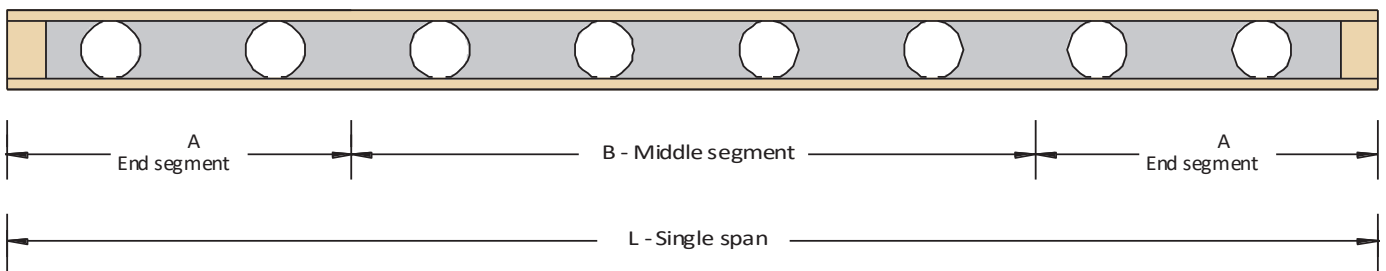


- Continuous solid timber packing

Extra web holes

If extra web holes are required, the following are guidelines for permissible on-site modifications:

- Conditions:
 1. For uniform **RESIDENTIAL** floor loads only*
 2. Maximum Dead Load 0.7 KPa (including internal partitions)
 3. Maximum Live Load 2.0 KPa
 4. No load bearing walls (LBWs) on the span
 5. Cutting flanges is **NOT** allowed
 6. Flange size overall 90 x 45 (for flanges 70 x 45, the rectangular hole length is reduced, refer to Tilling Timber Pty Ltd, Tecbeam Australasia P/L, or a structural engineer)
 7. Cut holes neatly, square and rectangular holes to have rounded corners (Pre-drill minimum: 10 mm dia.)

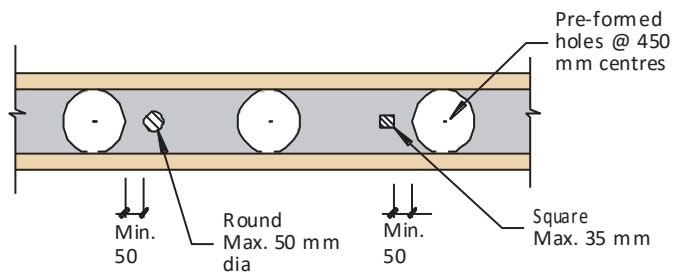


Where:

- Single span "L" is the TECBEAM tabulated span for 1.5 & 2.0 kPa loading
- Middle segment "B" is 0.5 x half MAX. span L

Extra web holes (Cont'd)

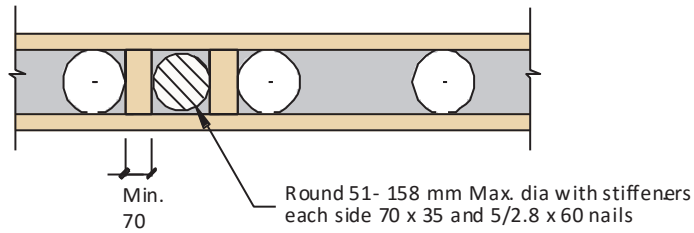
- End segments "A" are $\leq 0.5 \times B$
- If the actual beam length is less than "B", there is no segment "A"



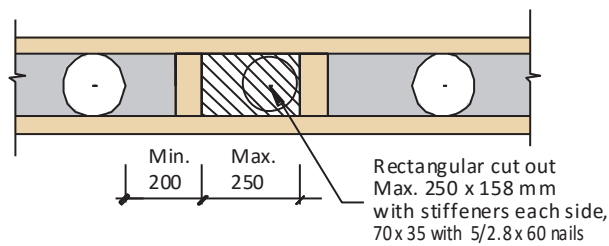
Tecbeam T250 series

Segment A&B

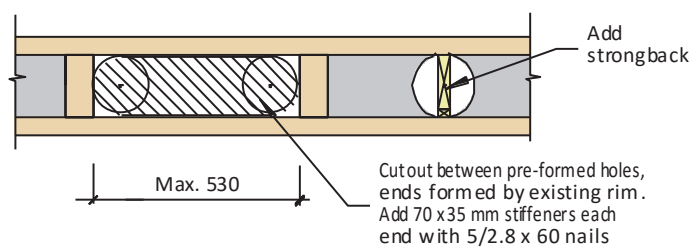
No stiffening



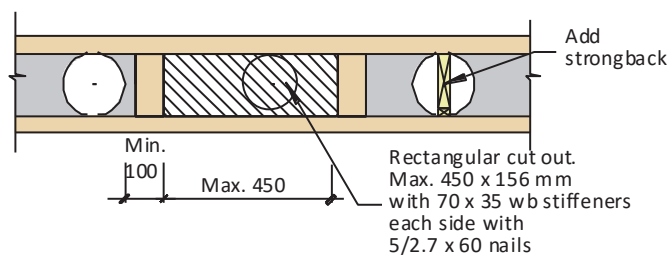
Segment A&B



Segment A

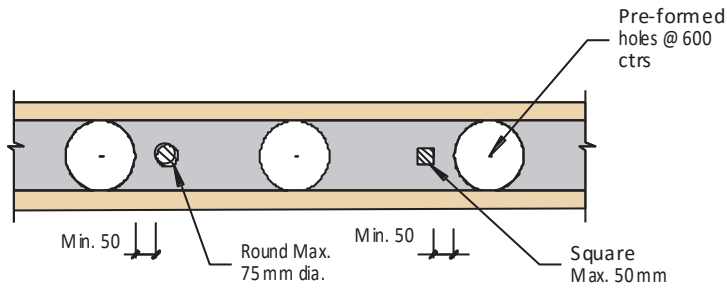


Segment B



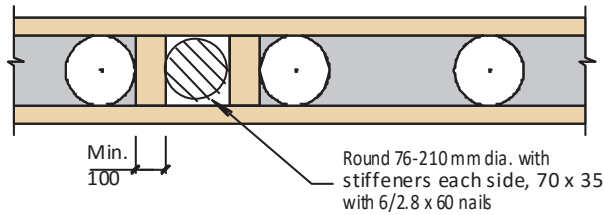
Segment B

Extra web holes (Cont'd)

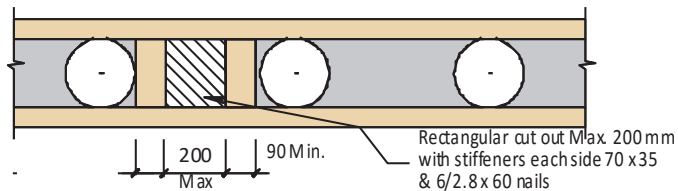


Tecbeam T300 series

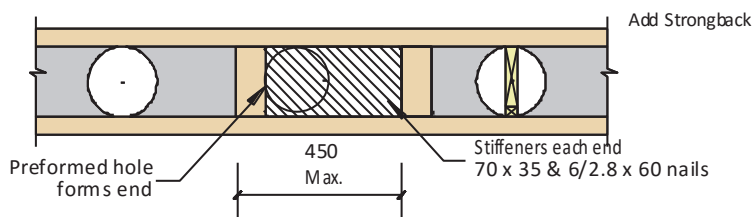
Segment A&B
No stiffening



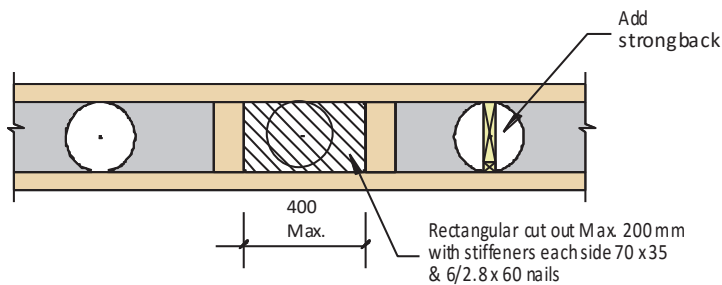
Segment A&B



Segment A



Segment B



Segment B

For T36 and T40 series, setback LBWs, continuous spans, and higher floor loading, refer to Tilling Timber Pty Ltd , Tecbeam Australasia or a structural engineer.

Multiple member lamination

Multiple laminations of Tecbeams can be achieved in a variety of methods. The complexity of the connection method is dependent upon whether the applied load is equally applied to each individual Tecbeam making up the multiple member or whether the load is applied to one member only, and needs to be transferred to the connected members making up the combination.

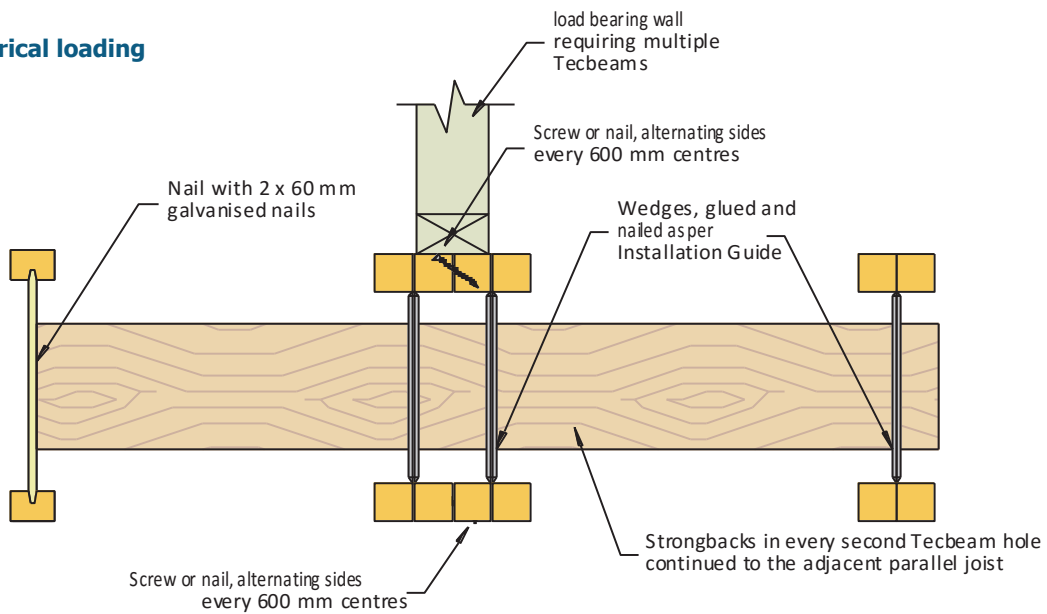
A Composite beam made up of two (2) or more Tecbeams that has the load applied on one side only is subject to significant addition

loads including torsional effects caused by the eccentricity. The system of joining multiple members in this application, which requires load transfer for one laminate to another, should be designed by a structural engineer.

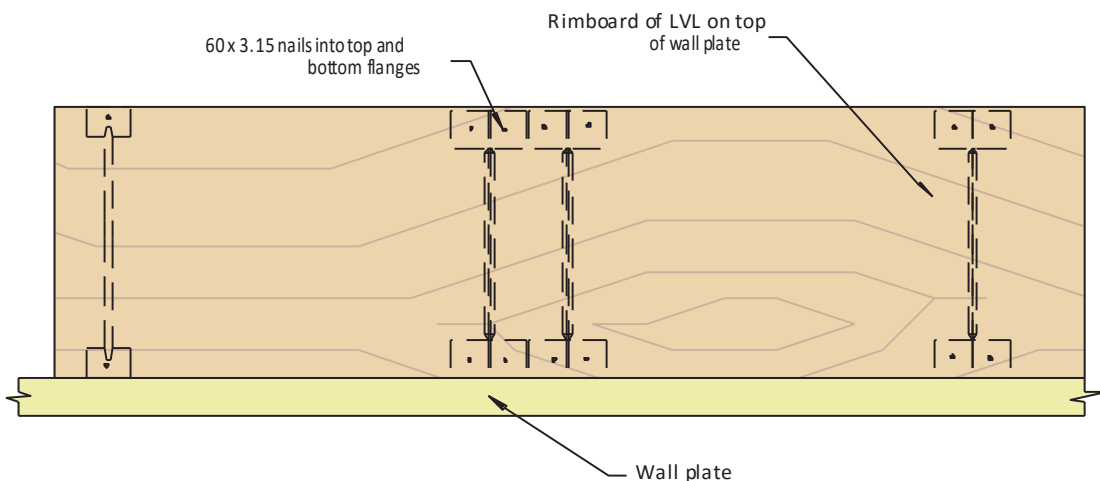
Contact the Tilling Timber Pty Ltd Design Centre at smartdata@tilling.com.au or the SmartData customer helpline on 1300 668 690 for further advice on the design of multimember Tecbeams

Example of multi-member Tecbeam connections

Light Symmetrical loading



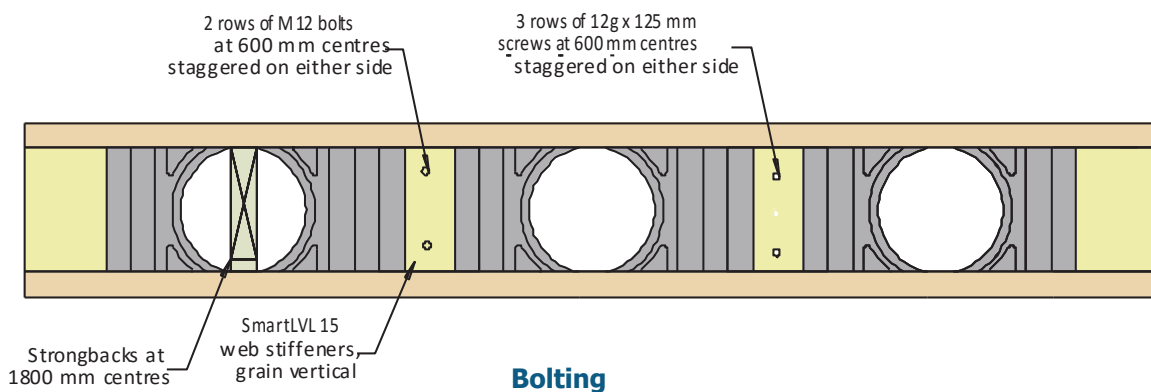
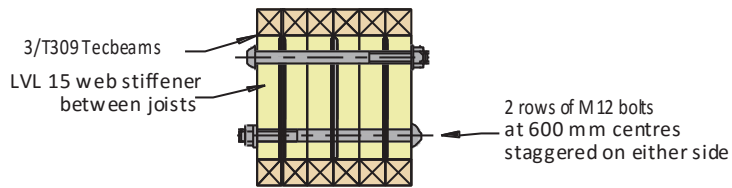
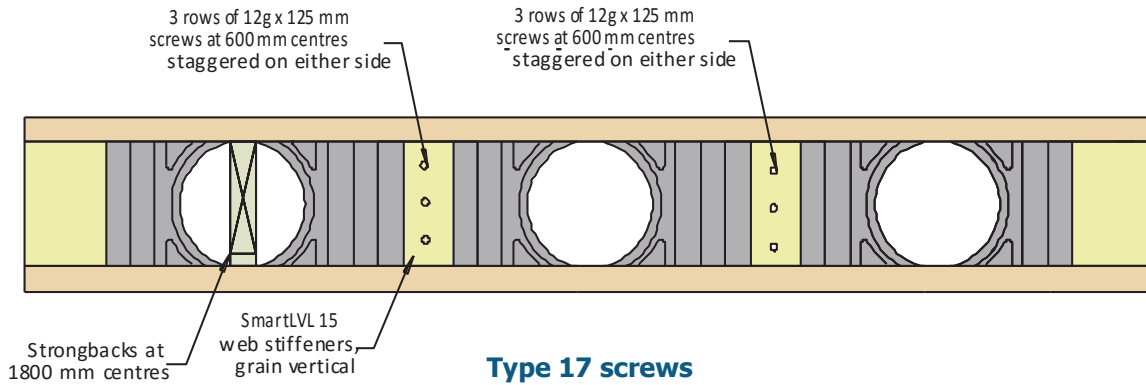
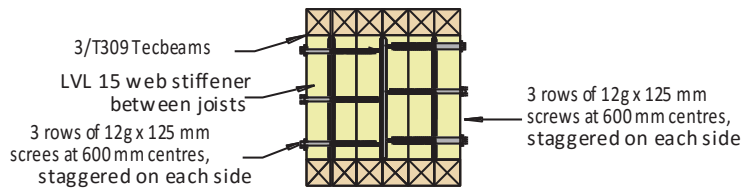
Section through joists



Elevation at supports

Multiple member lamination

Non—Symmetrical loading



Notes:

1. The above diagrams are examples ONLY, and may not be suitable for some applications
2. Contact the Tilling Timber Pty Ltd Design Centre at smartdata@tilling.com.au or the SmartData customer helpline on 1300 668 690 for further advice on the design of multimember Tecbeams

