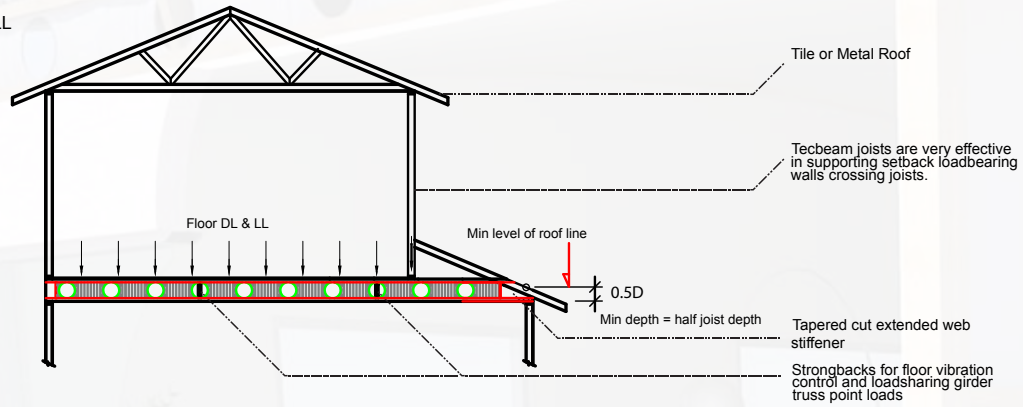
DESIGN GUIDELINES:

DG06. DESIGN RECOMMENDATIONS

6.1 FIRST FLOOR ROOF LINE FOR SET-BACK UPPER WALLS

In order to gain maximum benefit from a Tecbeam floor, and make cost savings, the joist layout should allow spanning to the outside walls. The designer will need to keep the first floor roof line above the outside wall plate, by at least half the joist depth.

TECBEAM JOISTS SPANNING
TO OUTSIDE SUPPORTING WALL
(Also refer to 6.1, 6.2 & 6.4)



6.2 STRONGBACKS TO CONTROL VIBRATION

Strong backs, or secondary beams, are an effective method of controlling floor vibration. The greater the strongback stiffness the more solid the floor will feel, even at the maximum tabulated spans.

Residential light-weight floors

For residential floors fitted with lightweight sheet or strip flooring and a single layer of plaster board ceiling, it is recommended to specify at least one row of strongbacks near mid span, where joist spans are within 750 to1500 mm of their tabulated spans. Where joists are within 750mm of their tabulated spans, two rows of strongbacks are recommended, placed near the one-third points of the span.

NOTE: For higher comfort levels in long spans, an increase in the secondary beam stiffness is required. This can be achieved by either: adding an extra row of strongbacks, or substituting the normal MGP10 grade strongbacks with LVL13 or a small steel section of higher Elx.

Heavier Residential and Commercial floors

Where the floor construction is heavier, such as floors with acoustic and FRL ceilings, and/or where a concrete topping or aerated concrete floor panels are installed, the added mass lowers the natural frequency of the floor and may result in noticeable vibration. For joist spans within 750 to1500 mm of their tabulated spans, it is recommended to specify at least one row of strongbacks in LVL13 or MGP12, near the mid span. Where joists are within 750 mm of their tabulated spans, two rows of strongbacks are recommended in LVL13 or MGP12, placed near the one-third points of the span

6.3 MAXIMUM JOIST SPANS

Designers can confidently specify Tecbeam joists up to the maximum spans as listed in the span tables. Specifying strongbacks in accordance with the manufacturer's recommendations ensures comfort levels exceed the Australian Standards*, even at the maximum spans. If a more solid floor is required, ensure additional strongbacks are installed during the construction phase.

* 2.0 mm deflection for a 1.0 kN point load

6.4 FLOOR FRAMING DESIGNS

To minimize the use of steel beams

The high shear and bending strength and low creep factor in Tecbeam joists can be utilized to support upper level load bearing walls, and concentrated loads, replacing the traditional method of placing steel beams and columns under load bearing walls.

Layout detail

- Look for the *shortest spans between support lines*, try to keep joists in one direction (to simplify the flooring installation), this however can change if better economy is achieved by spanning some areas in the other direction.

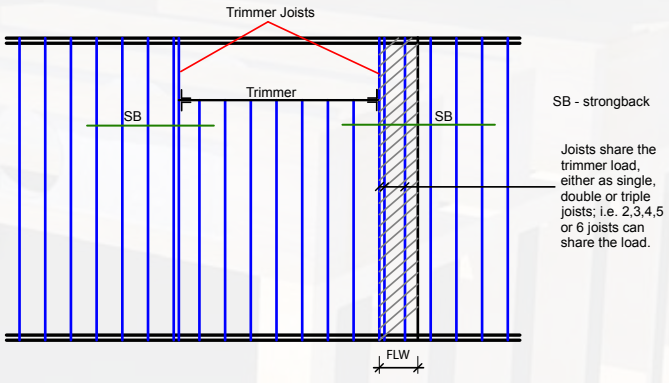
- Aim to layout joists with the *set-back load bearing walls* (carrying the higher load) *crossing the joists*. Add a strongback near a roof girder truss point load to avoid a double joist; the load spreading action simplifies the joist design and evens-out deflections.
- Where possible, use Tecbeam joists under *parallel load bearing walls* to enable use of the holes for installing services. To minimize the number of parallel joists, install at least two *strongbacks* to load share with the adjacent joists, and where possible, *extend to the lower outside wall* (up to 1.5m).
- Where Tecbeam joists are parallel to an outside wall, *balconies* can be conveniently added by cantilevering solid timber or steel joists through the web holes. Provide a back span of at least twice the cantilever span; check the edge Tecbeam joist for the balcony reaction load.
- On external walls, where joists and studs are not in line, instead of double top plates or wall frame blocking, specify a *plywood load spreader* or rim board, of the same depth as the joists, these also act as bracing in the plane of the floor, and replaces solid blocking or cross bracing.

  See illustration below:

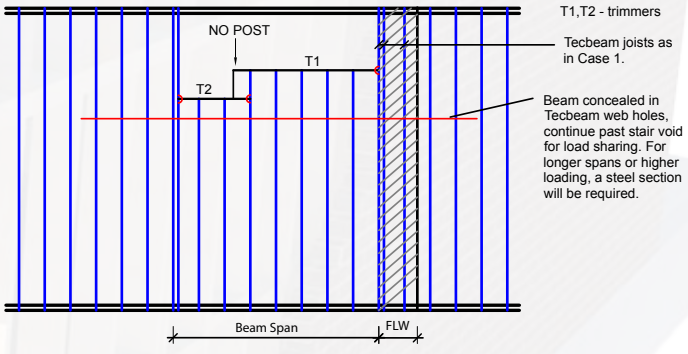
Framing stair voids

A combination of Tecbeam joists and strongbacks acting as load sharing beams simplifies the design and construction of floors around stair landing areas. Strongbacks, positioned behind the stair trimmer, share the trimmer floor loads over a minimum of three Tecbeam joists; this can eliminate the requirement for a solid support beam, and enables services to continue through the web holes.

See illustration for how a cornerpost can be eliminated.



Case 1. Loadsharing at Trimmer Joist



Case 2. No corner post

6.5 CONNECTION TO STEEL BEAMS

For steel beam depths within 50mm of the joist depth, a simple method is to notch the Tecbeam joist ends so the joist bears on the beam flange. To gain maximum benefit from this method, the steel beams sizes selected should be similar in depth to the joists in order to minimize the notching required.

Recommend for: T25 joists – 250PFC or 250UB, and
T30 joists – 300PFC or 310UB
T35 joists – 360UB or similar

Refer to the installation Guidelines for details.

Where Tecbeam joists are more than 50 mm deeper than the steel beam, timber packing fixed to the steel web is recommended, joist hangers can be installed to complete the connection. Note if joists are fixed on one side only, restraint against beam rotation should be checked.