



LiteSteel beam Part 5 Construction Details

Residential Construction Manual For LiteSteel® beam

LiteSteel Technologies

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5.1 Handling and Storage

LiteSteel beam sections are lighter than equivalent strength hot rolled steel beams and most timber beams, so they are more easily moved and installed on site without the use of cranes or other lifting equipment. This can result in both cost and time savings during construction.

The LSB sections should not be left exposed in the open for extended periods. They should be stored off the ground and on a slight slope to allow water to run off, and the ends of any open flanges should be covered to prevent the entry of water. Any exposed ends of the LSB in the final structure must be fully sealed to prevent water entry and collection inside the flanges.

Care should be taken during handling to prevent damage to the AZ+ Aluminium-Zinc alloy protective coating.

5.2 Cutting and Drilling

The LSB is easily cut on site using a cut-off saw or hand held circular saw with ferrous metal cutting saw blades. These blades offer superior performance and lifespan to abrasive wheels, and are able to cut through the LSB as easily as cutting through timber. Operators must ensure that all safety precautions appropriate to the use of such tools are strictly followed.

Holes may be drilled using carbide tipped hole saws (hole cutters) which are suitable for steel up to 4.0 mm thick. Hole saws are available for cutting holes up to 114 mm diameter. Other types of hole saws are available for cutting holes up to 150 mm diameter.

Note: Flanges must not be cut or notched without the approval of the design engineer. Holes in the web of floor joists and bearers are permitted only within the limitations specified in Section 5.7 of this publication. Any other holes in flanges or in the web are subject to the approval of the design engineer.

To maintain the integrity of the AZ+ Aluminium-Zinc alloy protective coating, holes and notches should be treated with a zinc-rich paint.



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5.3 Tek Screwing

Self-drilling self-tapping screws (Tek screws) are the most versatile fastener for connecting brackets and other components to the LSB on site. Reference should be made to the Buildex Product Catalogue and Selection Guide-2004 for the selection of the appropriate screw type and length, the appropriate corrosion protection and installation procedures.

When screwing to the top of the LSB flange, care must be taken to select the correct length screw. If the screw tip hits the second face of the flange before it is correctly seated, the thread in the upper face of the flange may be stripped. The Buildex Super Tek Series 500 screws have a longer drill point because they are designed to drill through thicker steel, and will easily penetrate both faces of the 45 × 15 mm flange of the LSB without stripping the thread.

Note: As a rule the correct length screw should have at least 3 threads protruding behind the metal you are fastening to.



5.4 Nailing

Nails can readily be used to connect flooring and other timber sections to LSB members up to 2.0 mm or 2.5 mm depending on the nail being used. The following Paslode nails have been successfully tested:

Nail Part No.	Gauge × Length mm × mm	Code	Nail Head	Nail Gun	Collation	Max. LSB Thickness mm
B20573V	2.87 × 50	SH	D-Head	Impulse CT Nailer	Strip	2.0
D31150	3.3 × 65	SHEG	Round	Duo-Fast CN350B Strip Nailer	Strip	2.5
D31200	3.3 × 55	CSHDAC	Round	Duo-Fast CN350B Strip Nailer	Strip	2.5
D40800	2.3 × 32	SHEG	Round	Duo-Fast KD665A Coil Nailer	Coil	2.0
D41050	2.5 × 32	CSHDAC	Round	Duo-Fast KD665A Coil Nailer	Coil	2.0
D42350	2.6 × 40	CSHDAC	Round	Duo-Fast KD665A Coil Nailer	Coil	2.0

Code abbreviations: HS Screw hardened
SHEG Screw hardened, electro galvanised
CSHDAC Conical point, screw hardened, dactrotised

Pneumatically driven nails may be used for nominal connections to LSB members up to 2.0 mm thick. Various brands of nails and nail guns can perform differently. For best results, selected nails and nail guns should be tested for size and penetration prior to construction. Air pressure should be in the range of 100-200 psi.

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5.5 Welding

LiteSteel beam sections are readily welded using any of the following welding processes and consumables:

Manual Metal Arc Welding (MMAW)

- E48XX electrodes

Gas Metal Arc Welding (GMAW)

- W50X wires

Flux Cored Arc Welding (FCAW)

- W50X wires

The protective AZ+ Aluminium-Zinc alloy protective coating does not have to be removed before welding. Tests have been conducted to confirm that welding through the Aluminium-Zinc alloy protective coating does not produce toxic fumes causing a safety hazard.

5.6 Blocking of Floor Joists

Like all floor joists, the LSB floor joists require blocking at all lines of supports, whether the supports are bearers or loadbearing walls. Blocking prevents roll over of joists, particularly for joists with a high ratio of depth to width, and serves two very important functions:

- To provide adequate restraint to the joists at the supports in accordance with the design assumptions.
- To transfer horizontal shear forces from the floor diaphragm on top of the joists to the supports below.

Design shear forces can be obtained from AS 1684.2 for non-cyclonic wind classifications, and from AS 1684.3 for cyclonic wind classifications. Blocking does not need to be provided to every joist, but as a minimum it should be provided to every outside pair of joists and at a maximum of 1800 mm centres along a loadbearing support. However, temporary restraint should be provided to the top of all floor joists during construction prior to installation of the flooring. Suggested methods of providing blocking to LSB floor joists are provided in Figure 5.1-1 to 5.1-5.

It is important that the blocking is installed before the floor platform is laid, before any construction loads are applied and before any work takes place on top of the floor joists.

Figure 5.1-1: Blocking of Floor Joists

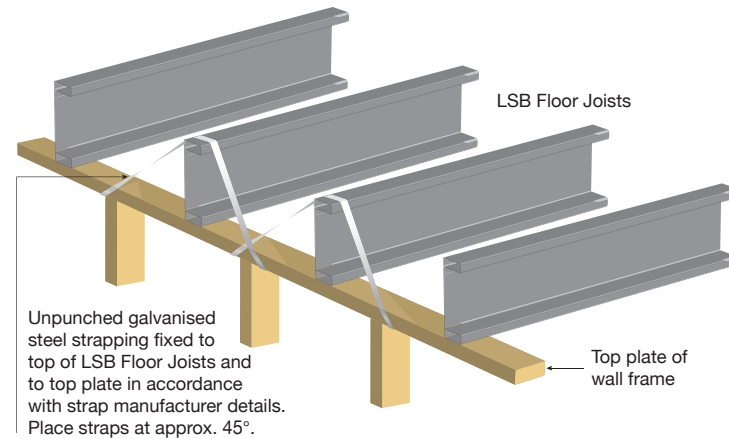
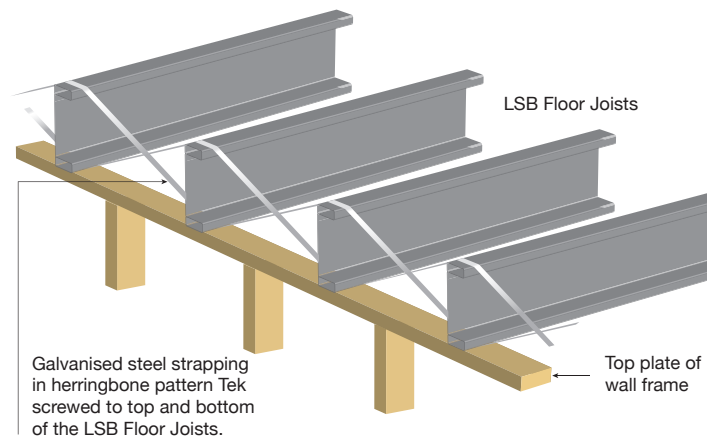


Figure 5.1-2: Blocking of Floor Joists



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Figure 5.1-3: Blocking of Floor Joists

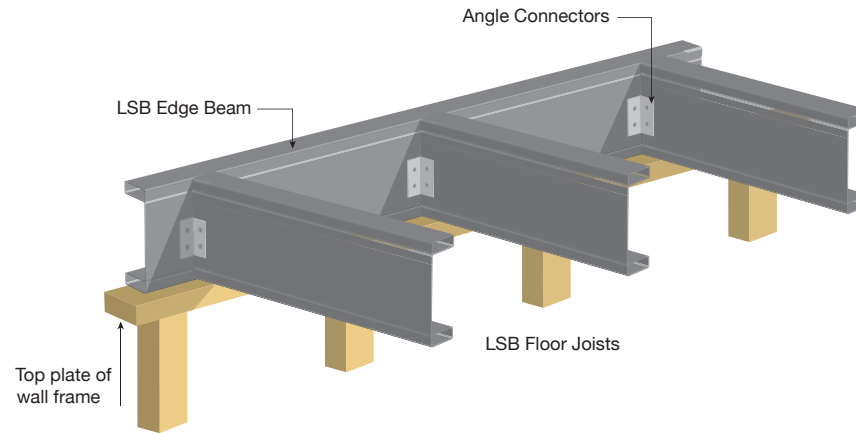
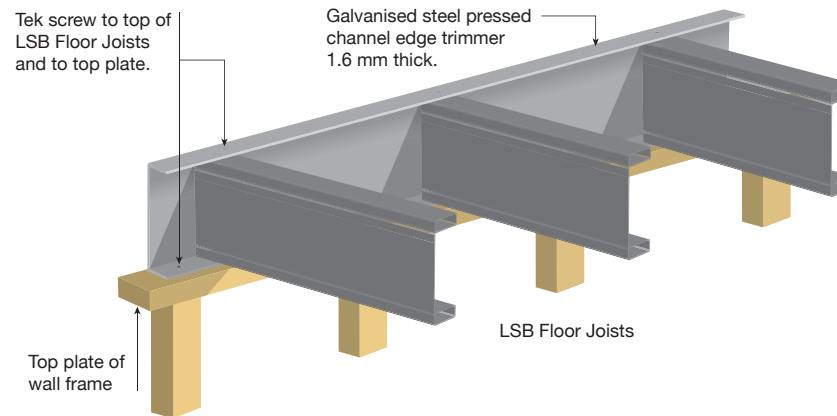


Figure 5.1-4: Blocking of Floor Joist



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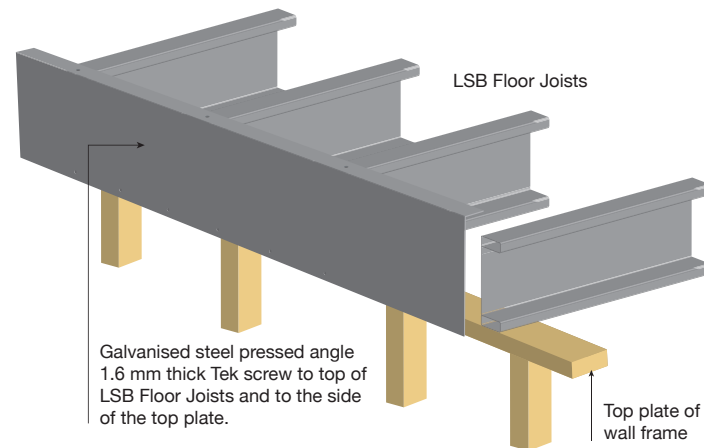
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Figure 5.1-5: Blocking of Floor Joists



5.7 Holes in the Web

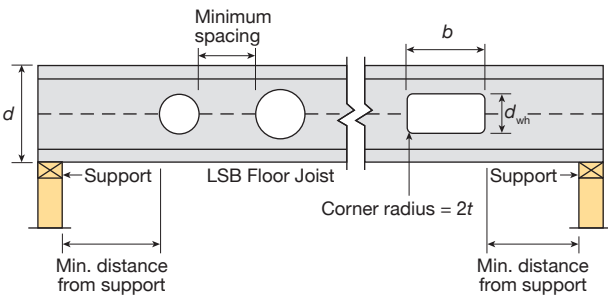
Wherever possible, holes in the web of the LSB, other than bolt holes, should be avoided. However, there will be occasions when openings are necessary to allow plumbing or services to pass through. This is acceptable provided the hole sizes and locations are within the limits specified in the North American Specification for the Design of Cold-Formed Steel Structural Members (AISI 2001).

Holes less than or equal to 15 mm are permitted anywhere in the web in any LSB member, although they are preferred at the web mid-height.

Table 5.1 provides specific limitations for hole sizes and spacing for floor joists and bearers. Because of the higher level of shear forces in bearers, the permissible hole sizes are reduced and provision has been made for circular holes only.

Holes in other structural members must be designed by a structural engineer.

Table 5.1: Requirements for Holes in the Web of Floor Joists and Bearers



LSB Depth	Max. Circular Hole Diameter		Max. Rectangular Hole Dimensions	Min. Distance from Support to Edge of Hole	Min. Clear Spacing between Holes
	Bearers	Floor Joists	Floor Joist		
<i>d</i> mm	mm		Depth (<i>d_{wh}</i>) × Width (<i>b</i>) mm × mm	mm	mm
300	135	150	65 × 115	375	450
250	85	135	65 × 115	315	450
200	50	105	65 × 115	250	450
150	25	75	65 × 100	190	450

- Notes:**
1. Holes centred at mid-depth of the web.
 2. Non-circular holes corner radii greater than or equal to $2t$ (where t is the web thickness).

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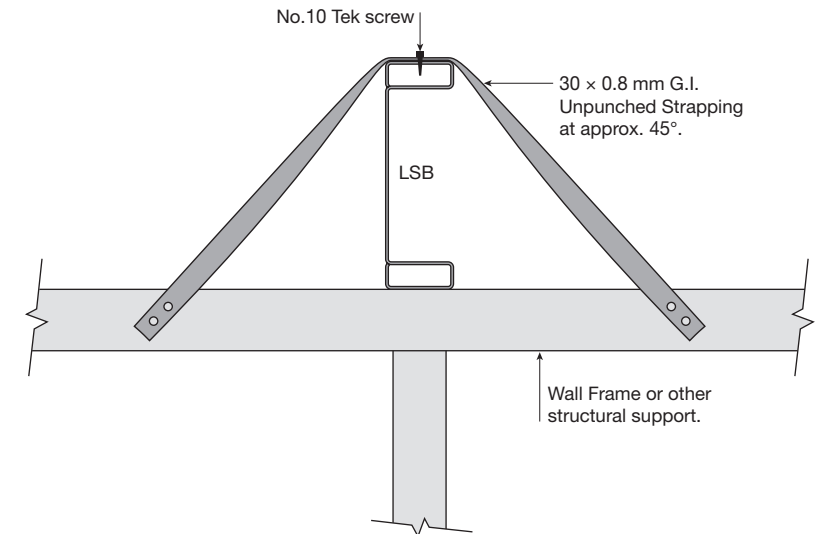
5.8 Web Stiffeners

At locations of high concentrated loads such as at supports, particularly internal supports of continuous beams, the tables presented in this publication assume the LSB member is connected through the web. These situations are noted in the tables. This is done to overcome the reduction in allowable span of the member due to the high bearing forces at these locations. However, it is possible to bear the LSB directly on the support with the use of web stiffeners, provided the member and stiffening is designed by a structural engineer.

5.9 Providing Lateral Restraint

The span tables in this publication are based on the assumption that, at all supports, the LSB members are restrained against lateral displacement of both flanges and twisting about the longitudinal axis. Some connections are capable of providing this restraint, but others are not. Where connections do not provide the appropriate restraint, the simplest method of providing such restraint is to use steel strapping as shown in Figure 5.2.

Figure 5.2: Lateral Restraint using Strapping





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