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1.1 General

The LiteSteel beam (LSB) is an excellent choice for floor joists and bearers in mezzanine floors. It combines high strength with light weight, giving it the ability to achieve long spans while still being easy to handle and erect on site.

This publication provides the complete solution for mezzanine floors, providing span tables for LSB floor joists and bearers, tables for square hollow section (SHS) column selection, and all connection details. All applicable design criteria are presented so that engineers can easily ascertain if the tables are appropriate for the floor being designed.

1.2 Scope

This publication is limited to the use of the LSB floor joists and bearers and DualGrade SHS columns supporting floor loads for the following types of activity or occupancy as defined in Table 3.1 of AS/NZS 1170.1:

- Offices for general use (Type B)
- General storage up to 2.1 m storage height (Type E)
- General storage up to 3.0 m storage height (Type E)

The tables in this publication may also be applicable to other classes of floor activity or occupancy where the design criteria, loads and other parameters applicable to the floor being designed are within the limitations given for the tables.

The tables are only applicable to floors subject to the design actions given in Section 3.

1.3 Terminology and Definitions

The terminology and definitions given in this section are used throughout this publication. The use of LSB members in typical industrial and commercial floors (mezzanine floors) are illustrated in Figure 1.1.

Bearer
A sub-floor member supporting the floor joists.

Continuous Span
The span of a member with supports at both ends and at one or more intermediate points.

Column
A vertical member designed to carry axial loads in compression, supporting the floor above ground level.

Floor Load Width (*FLW*)
The contributory width of floor, measured horizontally, that imparts floor load to a member.

Floor Joist
A member that directly supports the flooring.

Flooring or decking
Boards or sheets overlying floor joists intended to support floor loads.

Imposed Action
A variable action resulting from the intended use or occupancy of the structure.

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Limit States
States beyond which the structure no longer satisfies the design criteria.

Non-Loadbearing Wall
An internal partition wall not supporting roofs or floors.

Permanent Action
An action that is likely to act continuously and for which variations in magnitude with time are small compared to the mean value.

Serviceability Limit States
States that correspond to conditions beyond which specified service criteria for a structure or structural element are no longer met. (The criteria are based on the intended use and may include limits on deformation, vibratory response, degradation or other physical aspects.)

Single Span
The span of a member supported at both ends with no intermediate supports.

Spacing
The centre-to-centre distance between parallel structural members.

Span
The centre-to-centre distance between supports to structural members.

Ultimate Limit States
States associated with collapse, or with other similar forms of structural failure.
(This generally corresponds to the maximum load-carrying resistance of a structure.)

1.4 Limit States Design

All values presented in the Tables are calculated in accordance with the Limit States Design requirements of AS/NZS 1170, AS 4100, AS/NZS 4600 and other applicable standards.

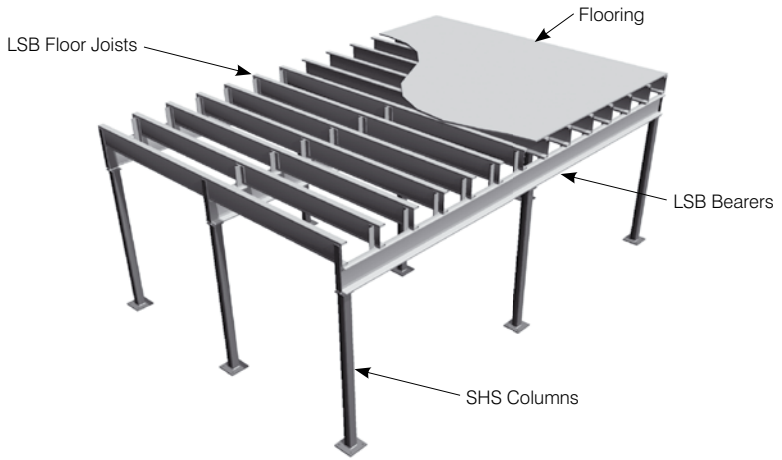

Figure 1.1 Typical LSB Floor Members

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1.5 Units

The units in the tables are consistent with those in the SI (metric) system. The base units used in the tables are:

Property	Units	Symbol
Force	Newton	N
Length	Metre	m
Mass	Kilogram	kg
Stress	Megapascal	MPa

Except for some minor exceptions, all values in the Tables are rounded to three (3) significant figures.

1.6 Table Format and Usage

The tables are divided into three groups:

- Part 6: Office Floors (3.0 kPa)
- Part 7: Storage Floors (5.0 kPa)
- Part 8: Storage Floors (7.2 kPa)

Span tables are provided for LSB floor joists and bearers, and for square hollow section (SHS) columns. Detailed design assumptions, design actions and serviceability criteria are also provided with the tables.

1.7 References

1.7.1 Referenced Standards

"AS 1110.1" refers to AS 1110.1: 2000 ISO metric hexagon bolts and screws – Product grade A and B Part 1: Bolts.

"AS 1111.1" refers to AS 1111.1: 2000 ISO metric hexagon bolts and screws – Product grade C Part 1: Bolts.

"AS 1112.1" refers to AS 1112.1: 2000 ISO metric hexagon nuts Part 1: Style 1 – Product grades A and B.

"AS 1112.2" refers to AS 1112.2: 2000 ISO metric hexagon nuts Part 2: Style 2 – Product grades A and B.

"AS 1112.3" refers to AS 1112.3: 2000 ISO metric hexagon nuts Part 3: Product grade C.

"AS/NZS 1170.0" refers to AS/NZS 1170.0: 2002 Structural design actions Part 0: General principles.

"AS/NZS 1170.1" refers to AS/NZS 1170.1: 2002 Structural design actions Part 1: Permanent, imposed and other actions.

"AS 1237.1" refers to AS 1237.1: 2002 Plain washers for metric bolts, screws and nuts for general purposes Part 1: General plan.

"AS/NZS 1252" refers to AS/NZS 1252: 1996 High-strength steel bolts with associated nuts and washers for structural engineering.

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"AS/NZS 1554.1" refers to AS/NZS 1554.1: 2004 Structural steel welding – Welding of steel structures.

"AS 3566.1" refers to AS 3566.1: 2002 Self-drilling screws for the building and construction industries Part 1: General requirements and mechanical properties.

"AS 3566.2" refers to AS 3566.2: 2002 Self-drilling screws for the building and construction industries Part 2: Corrosion resistance requirements.

"AS 3623" refers to AS 3623 – 1993 Domestic metal framing.

"AS 4100" refers to AS 4100: 1998 Steel structures.

"AS 4291.1" refers to AS 4291.1: 2000 Mechanical properties of fasteners made of carbon steel and alloy steel Part 1: Bolts, screws and studs.

"AS/NZS 4600" refers to AS/NZS 4600: 1996 Cold-formed steel structures.

1.7.2 Other References

ABCB (2005), "BCA 2005 Building Code of Australia, Class 2 to Class 9 Buildings, Volume One", Australian Building Codes Board, Canberra.

AISI (2001), "North American Specification for the Design of Cold-Formed Steel Structural Members", American Iron and Steel Institute, Washington DC, USA.

Buildex (2004), "Product Catalogue and Selection Guide – 2004, Self-Drilling Screws and Rivets", ITW Buildex, Victoria, Australia.

PAA (2002), "Structural Plywood for Commercial and Industrial Flooring – Design Manual", Plywood Association of Australasia Ltd, Brisbane, Australia.

SSTM (2003), "Design Capacity Tables for Structural Steel Hollow Sections", Smorgon Steel Tube Mills, Brisbane, Australia.

LST (2007a), "Design Capacity Tables for LiteSteel® beam", LiteSteel Technologies, Brisbane, Australia.

LST (2007b), "Connection Design Manual for LiteSteel® beam", LiteSteel Technologies, Brisbane, Australia.

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Syam, A. A. & Chapman, B. G. (1996), "Design of Structural Steel Hollow Section Connections", Vol. 1 Design Models, first edition, Australian Institute of Steel Construction. (Note: AISC is now ASI – the Australian Steel Institute.)

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