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NASH Standard

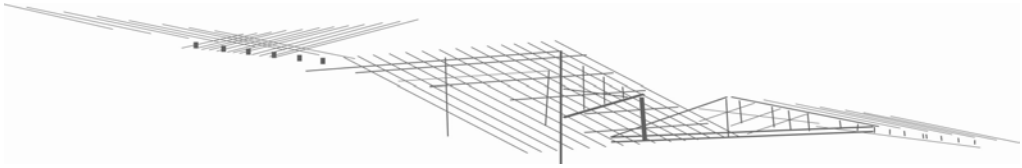
# Residential and Low-rise Steel Framing

## Part 1: Design Criteria

## 2005

Amendment A: December 2006
Amendment B: May 2009





# National Association of Steel-framed Housing Inc (NASH)

NASH is an active industry association centred on light structural framing systems for residential and similar construction. We represent the interests of suppliers, practitioners and customers – all those involved in steel framing systems.

## NASH's key objectives are to:

- Support the long term growth and sustainability of the steel frame industry.
- Maximise awareness of the steel frame industry in the market place.
- Promote the advantages of steel frames to the building industry and homeowners.

## Committee

The following companies and organisations were represented on the industry committee responsible for preparing this Standard:

- National Association of Steel-Framed Housing Inc
- CSIRO
- BlueScope Steel
- BMCC Services
- Stramit Building Products
- Smorgon Steel
- Structerre Consulting Engineers
- TGM Group
- Trevor John & Associates
- BlueScope Lysaght
- OneSteel
- Welding Technology Institute of Australia
- ITW Buildex
- University of Melbourne
- Australian Building Codes Board
- Swinburne University of Technology
- Rondo Building Products

# Foreword

This standard is intended to be referenced in the Building Code of Australia (BCA). It sets out the design criteria to comply with the performance requirements of the BCA for steel framing of low-rise buildings including houses and low-rise commercial buildings.

The major developments of this NASH standard include:

- Limit state standard in line with the AS/NZS 1170 series
- Serviceability criteria
- Tolerances for manufacture and installation
- Guide for self-weight of materials

In this Standard, notes provide guidance only and are not normative. Appendices can be either informative or normative as indicated.

Other non regulatory matters such as building practice, commentary and load tables will be included in subsequent parts of this standard.

Amendment A applies to Committee, Forward, Clauses 1.1, 1.2, 1.4, 1.7.1, 2.2.1, 2.2.2, 2.4.1, 2.4.2, 3.2.2.1 and Tables 2.2.1, 2.2.2(b), 2.3.1, 2.3.2(b), 3.2.2.1(a), 3.2.2.1(b), 3.2.2.2, 3.2.3.1(a), 3.2.3.1(b), 3.2.3.2, 3.5.4, 3.6.3, 4.2.3.

Amendment B applies to Clause 1.2.

A line on the left hand margin indicates an Amendment A or B change.

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## SECTION 1 SCOPE AND GENERAL

### 1.1 SCOPE AND APPLICATION

This document sets out the design criteria, in terms of structural adequacy and serviceability, for use in the design of low-rise steel framing. These include houses, residential and commercial low-rise buildings using Australian traditional framing methods. (Fig. 1.1 (a))

The design criteria are applicable for the steel framing of buildings that comply with the geometric limitations shown in Fig. 1.1 (b).

For the design of houses (Class 1a) outside the geometric limits as shown in Fig 1.1(b), wind actions must be determined in accordance with AS/NZS 1170.2.

For design of low rise buildings other than houses within the geometric limits of Fig 1.1(b), the imposed actions must be determined in accordance with AS/NZS 1170.1. For buildings outside the geometric limits but not exceeding 8.5m in height as shown in Figure 1.1(b), the imposed actions must be determined in accordance with AS/NZS 1170.1 and the wind actions in accordance with AS/NZ 1170.2.

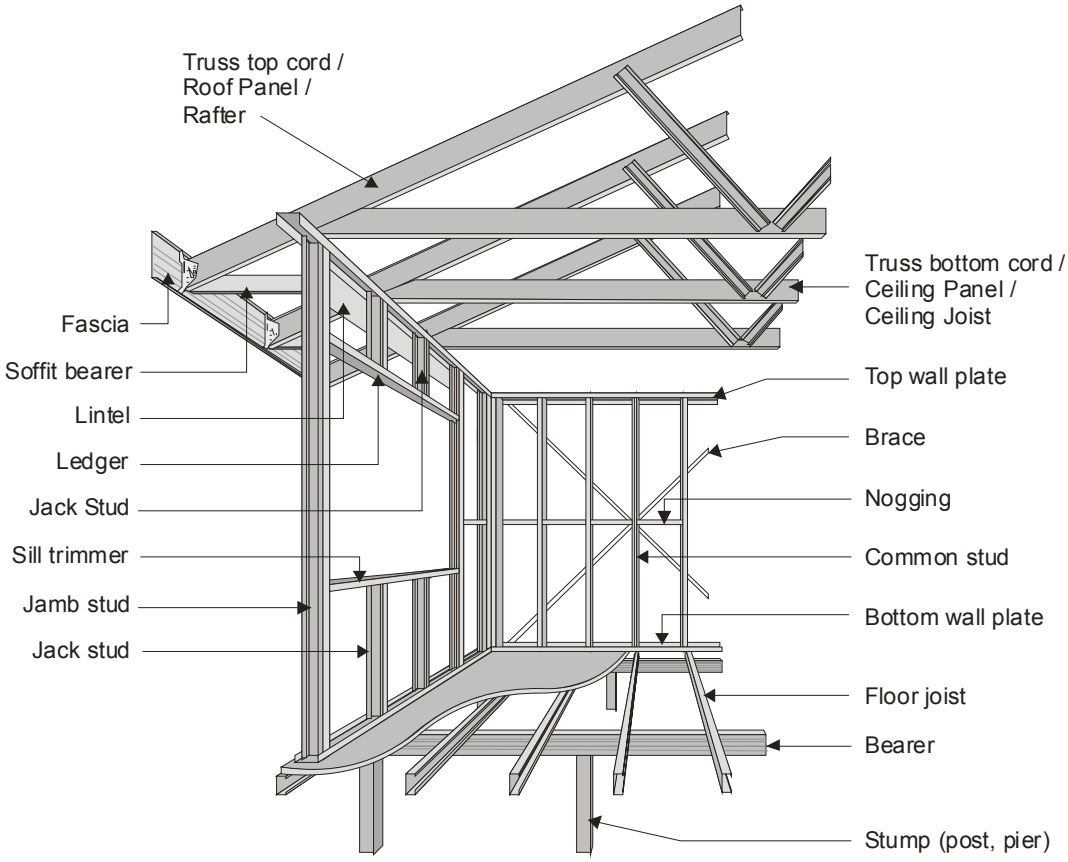
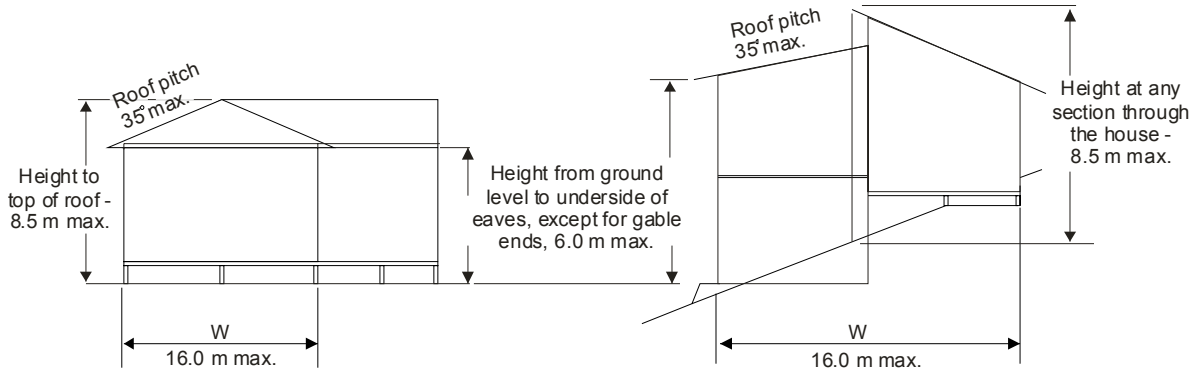
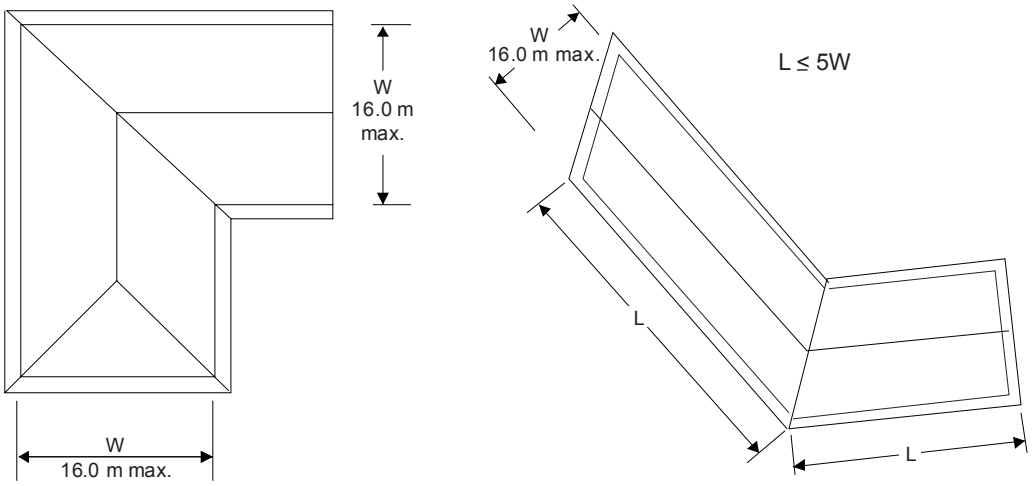



*Fig. 1.1 (a) Typical Australian traditional framing*




(a) Sections




(b) Plan

*Fig. 1.1 (b) Geometric limitations*

## 1.2 REFERENCED DOCUMENTS

The following documents are referred to in this document:

- Building Code of Australia Volume. 1 & 2
- AS 1163 - 1991 Structural steel hollow sections
- AS/NZS 1170 Structural design actions
  Part 0: 2002 General principles
  Part 1: 2002 Permanent, imposed and other actions
  Part 2: 2002 Wind actions
  Part 3: 2003 Snow and ice actions
- AS1170 Structural design actions
  Part 4 – 2007 Earthquake actions in Australia
- AS/NZS 1365: 1996 Tolerances for flat-rolled steel products
- AS 2870 - 1996 Residential slabs and footings - Construction
- AS/NZS 3679.1: 1996 Structural steel – Hot-rolled bars and sections
- AS 4055 - 2006 Wind loads for housing
- AS 4100 - 1998 Steel Structures
- AS/NZS 4600: 2005 Cold-formed steel structures

## 1.3 BASIS FOR DESIGN

### 1.3.1 General

The design criteria contained in this document are based on the AS/NZS 1170 series, AS 4100 and AS/NZS 4600 specially formulated for low rise buildings using the Australian traditional framing methods.

### 1.3.2 System-based assumption

The design criteria recognise the interactions between structural elements and other elements of the construction system. When provision is made for the redistribution of loads, the load redistribution must be accounted for by one of the following:
- calculation of the load redistribution factor $k_s$ (Appendix B provides examples how this can be done for concentrated loads for the case of a grid system), or
- appropriate rational analysis of the system or the sub-system (such as finite element analysis), in such case $k_s = 1.0$, or
- prototype testing of the subsystem in accordance with Section 7.

*Note: In other sections of this document, areas where there is potential for the application of system-based assumptions are indicated by the use of suitable notes*

### 1.3.3 Durability

The design criteria have been developed on the assumption that materials used and their installation and maintenance ensure that components will fulfil their intended structural function for the intended life of the structure.