AS 1170.3—1990

Australian Standard®

SAA Loading Code

Part 3: Snow loads

This Australian Standard was prepared by Committee BD/6, Loading on Structures. It was approved on behalf of the Council of Standards Australia on 31 October 1989 and published on 26 January 1990.

The following interests are represented on Committee BD/6:

Association of Consulting Engineers, Australia

Association of Consulting Structural Engineers, Australia

Australian Clay Brick Association

Australian Construction Services (Department of Administrative Services)

Australian Council of Local Government Associations

Australian Federation of Construction Contractors

Australian Institute of Steel Construction

Australian Mining Industry Council

Bureau of Meteorology

Bureau of Steel Manufacturers of Australia

CSIRO, Division of Building, Construction and Engineering

Department of Local Government, Qld

Electricity Supply Association of Australia

Engineering and Water Supply Department, S.A.

James Cook University of North Queensland

Master Builders' Construction and Housing Association, Australia

Monash University

National Association of Australian State Road Authorities

Public Works Department, N.S.W.

University of Melbourne

University of Newcastle

Additional interests participating in preparation of Standard:

National Parks and Wildlife Service, N.S.W.

Public Works Department, Vic.

Shire of Bright, Vic.

Snowy Mountains Hydro–Electric Authority, N.S.W.

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Australian Standard®

Minimum design loads on structures

Part 3: Snow loads

(known as the SAA Loading Code)

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PREFACE

This Standard was prepared by the Standards Australia Committee for Loading on Structures.

In preparing this Standard the Committee referred to the following:

(a) ANSI A58.1–1982, *American National Standards Institute – Minimum Design Loads for Buildings and other Structures.*

(b) *National Building Code of Canada,* 1980.

The Supplement to the National Building Code of Canada – 1980.

(c) ISO 4355–1981 International Standard, *Bases for Design of Structures, Determination of Snow Loads on Roofs.*

Data on ground snow depths and densities were obtained mainly from the Bureau of Meteorology, Authorities, such as The Snowy Mountains Authority, and a private meteorologist .

The Committee acknowledges the assistance obtained from these sources.

The relationship between roof snow load and ground snow load was established on the basis of field observations by members of the Committee over many years, particularly years of very heavy snowfalls.

This Standard is intended to be used in establishing snow loads on roofs, balconies, walkways and other building surfaces which retain snow. It also provides guidance (see Appendix B) on the avoidance of common problems which occur mainly in alpine regions due to movement, sliding or drifting of snow.

Snow loads are difficult to assess accurately not only because the amount of snow which falls is sensitive to general and local topography but also because the amount of snow which is retained on the roof is sensitive to roof slope, roof geometry and orientation.

Designers must be alert to the extra snow loads which certain roof shapes attract, because of drifting effects. Blockages and effects of sliding snow or snow creep on the roof and in the environs of the building are further considerations for the designer.

Statements expressed in mandatory terms in Notes to tables and figures are deemed to be requirements of this Standard.

A Commentary (see AS 1170.3 Supplement 1) provides background material to the requirements of this Standard and includes some worked examples to illustrate its application.

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard sets out data and procedures for determining snow loads to be used in structural design.

1.2 APPLICATION. This Standard is intended to apply to all buildings and building components, including roofs and other building surfaces, walkways and access platforms, subject to snow accumulation.

1.3 REFERENCED DOCUMENTS. The following documents are referred to in this Standard.

AS

1170 SAA Loading Code

1170.1 Part 1: Dead and live loads and load combinations

1170.2 Part 2: Wind loads

1.4 METHODS OF DETERMINATION OF SNOW LOADS. The snow load on a structure or part of a structure shall be determined by one or more of the following:

(a) The applicable clauses of this Standard.

(b) Reliable data and references used consistently with the clauses of this Standard coupled with extensive information of the local conditions.

(c) Wind tunnel or similar tests which accurately simulate the local snow accumulations.

NOTE: Extensive information of local conditions should include the years of maximum snow depths (such as 1964 and 1981 in the Snowy Mountains).

1.5 LOAD COMBINATIONS. Snow loads shall be combined with dead load, live load, wind load and other loads in accordance with AS 1170.1. The most unfavourable load combination shall be used in the design of the structure or structural element being considered.

In addition to the load combinations specified in AS 1170.1, the following shall also be taken into account:

(a) Load combinations for strength limit states -

(i) $1.25G + 1.5S_r + \Psi_c Q + 0.5W_u$

(ii) $0.8G + 1.5S_r$

(b) Load combinations for serviceability limit states, short-term effects -

(i) S_r

(ii) $G + S_r$

(iii) $G + \Psi_s Q + S_r$

where

G = dead load

S_r = snow load on roof or other structural element

Ψ_c = live load combination factor used in assessing the design load for strength limit state

Q = live load

W_u = wind load for the strength limit state

Ψ_s = short-term live load factor used in assessing the design load for serviceability limit state.

1.6 NOTATION. Symbols occurring in this Standard are listed below.

Unless a contrary intention appears, the following applies:

(a) The notation used in this Standard have the meanings ascribed to them below, with respect to the structure, or member, or condition to which a clause is applied.

(b) The dimensional units for length, height, depth and stress in all expressions or equations shall be taken as metres (m) and kilopascals (kPa) respectively.

(c) The SI system of units is used throughout.

b_p = dimension of the local projection normal to the direction of drifting

C_p = snow load coefficient taking into account wind, sliding, drifting and other effects

C_{pb} = snow load coefficient for balanced loading

C_{pd} = snow load coefficient for drifting snow

C_{pp} = snow load coefficient for drifting snow at roof projections

C_{pr} = snow load coefficient at the ridge of a multi-span roof with valleys

C_{ps} = snow load coefficient for sliding snow

C_{pu} = snow load coefficient for unbalanced loading

d_g = ground snow depth

d_r = snow depth on roof or other structural elements

G = dead load

h_a = height from crown level to eaves level in a curved roof

h_b = height above ground level to the point at which the roof slope on a curved roof exceeds 60°