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Amend 2: 1993.03.15

Australian Standard®

Residential slabs and footings

Part 2: Guide to design by engineering principles

STANDARDS AUSTRALIA

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This Australian Standard was prepared by Committee BD/25, Residential Slabs and Footings. It was approved on behalf of the Council of Standards Australia on 9 April 1990 and published on 16 July 1990.

The following interests are represented on Committee BD/25:

Association of Consulting Engineers, Australia

Australian Construction Services—Department of Administrative Services

Australian Geomechanics Society

Australian Institute of Building Surveyors

Australian Timber Research Institute

Australian Uniform Building Regulations Co-ordinating Council

Building Management Authority, W.A.

Cement and Concrete Association of Australia

Clay Brick and Paver Institute

Construction and Housing Association of Australia

CSIRO, Division of Building, Construction and Engineering

Department of Housing and Construction, S.A.

Housing Industry Association

Institution of Engineers, Australia

Royal Australian Institute of Architects

South Australian Institute of Technology

Steel Reinforcement Institute of Australia

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Amendment No 1
to
AS 2870.2—1990
Residential slabs and footings
Part 2: Guide to design by engineering principles

REVISED TEXT

SUMMARY: This Amendment applies to Paragraphs A3, E2(b), E2(f)(i), E2(f), F7(a) and F7(b).

Published on 13 May 1991.

AMDT No 1 MAY 1991

Page 14 Paragraph A3

Delete existing first Paragraph and *substitute*:

A3 PERFORMANCE REQUIREMENT WITH RESPECT TO THE WALLS It is acknowledged that minor foundation movements occur on nearly all sites and that it is impossible to design a footing system that will protect the house from movement under all circumstances. The expected performance of footing systems designed in accordance with this Standard is defined in terms of the damage classifications in AS 2870.1.

Crack width is used as the major criterion for damage assessment, although tilting and twisting distortions can also influence the assessment. Local deviations of slope of walls exceeding 1/150 are undesirable. The assessment of damage may also be affected by where it occurs, and the function of the building, although these effects are not likely to be significant in conventional housing. In the classification of damage, account should also be taken of the history of cracking.

For most situations Category 0 or 1 should be the limit. However, under adverse conditions, Category 2 should be expected although such damage should be rare. Significant damage is defined as Category 3 or worse.

AMDT No 1 MAY 1991

Page 22 Paragraph E2(b)

Delete Items (i), (ii) and (iii) and *substitute*:

	Walsh method	*Mitchell method*
(i) Centre heave	$0.7y_s$	$0.7y_s$
(ii) Edge heave on initially dry site	$0.5y_s$	$0.7y_s$

On an initially wet site, a reduction of y_m for edge heave not exceeding 40% may be made.

AMDT No 1 MAY 1991

Page 23 Paragraph E2(f)(i)

At the beginning of the second paragraph *insert*:

For Adelaide soils, a soil stiffness of $100q$ but not less than 1000 kPa/m may be used, where q is the total building load divided by the plan area of the slab.

AMDT No 1 MAY 1991

Page 23 Paragraph E2(f)

Delete the following paragraph:

For the Mitchell method, alternative published parameters may be appropriate.

and *substitute*:

For the Mitchell method:

Mound exponent $(m) = 1.5L/(D_{cr} - D_f)$

where

$D_{cr} = 0.6 + Y_m/25$ metres, where Y_m is in millimetres, but D_{cr} shall not be greater than 4.2 metres or the depth of bedrock from finished ground level.

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AMDT No 1 MAY 1991

Page 26 Paragraph F7(a)

Delete existing Paragraph and *substitute*:

(a) Penetrations of the edge beams of a raft and perimeter strip footings should be avoided if possible, but where necessary should be sleeved to allow for movement.

Closed-cell polyethylene lagging should be used around all stormwater and sewer pipe penetrations through external footings. The lagging should be a minimum of 20 mm thick on Class H sites and 40 mm thick on Class E sites. Lagging is not required on Class S or Class M sites. Sleeves allowing equivalent movements may be used as an alternative. Lagging is not required around vertical penetrations through slab panels.

AMDT No 1 MAY 1991

Page 26 Paragraph F7(b)

Add to the end of the Paragraph the words 'of E Classification'.

STANDARDS AUSTRALIA

Amendment No. 2
to
AS 2870.2—1990
Residential slabs and footings
Part 2: Guide to design by engineering principles

REVISED TEXT

The 1990 edition of AS 2870.2 is amended as follows; the amendments should be inserted in the appropriate place.

SUMMARY: This Amendment applies to Appendix C Table C2 and to Appendix E.

Published on 15 March 1993.

AMDT No. 2 MAR. 1993

Page 16 Table C2

1 *Delete* Note 1 and *substitute* the following:

> 1 The H classification arises from the possibility of moisture changes at depths in excess of 1.5 m because of changing groundwater regimes and hence the depths of influence of Appendix D are inappropriate. Some less reactive soils do occur and if a check is desired, the methods of Appendix D may be used but with a depth of influence equal to the depth from the surface to the level at which extremely to highly weathered rock is encountered which exhibits a clear rock structure. In addition, the crack depth should be taken as 0.5 m. The lower of H or the computed classification should be adopted.

2 *Add* the following Note:

> 3 To satisfy the requirements for controlled fill, non-sand fill greater than 400 mm deep should be placed with the quality assurance procedures as set out in Table 6.1 of 'Guidelines for the specification and testing of earthworks', *Australian Geomechanics News Journal*, Number 15 June 1988, pp 31 to 37, with field density test and laboratory compaction test frequencies as set out in Table 5.1 and Section 5.2 of the same document.

AMDT No. 2 MAR. 1993

Page 24 Appendix E, Clause E2(i)

1 *Delete* the following sentence:

> For slabs on Class E sites, minimum torsional reinforcement in accordance with Clause 8.3 of AS 3600 within 2 m of external corners of the raft is recommended.

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Australian Standard®

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First published as part of AS 2870—1986.
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PREFACE

This Standard was prepared by the Standards Australia Committee on residential slabs and footings. It provides guidance on the design by engineering principles of footings and slabs for houses for a wide variety of site conditions and includes methods of site investigation specifically developed for housing. This document provides supplementary information useful to the implementation of AS 2870.1.

This guide includes much of the advisory material first published in AS 2870—1986 but not included in AS 2870.1—1988. Twelve months after this Standard AS 2870.2 is first published, AS 2870—1986 and its Supplements (AS 2870 Supplement 1—1988 and AS 2870 Supplement 2—1988) will be withdrawn.

The Committee acknowledges that alternative design methods may be available. It is intended that these will be considered in the next revision.

A Standard on the testing of reactive soils is in preparation and is expected to be published as part of AS 1289. It will supersede information on the testing of reactive soils in this Standard.

CONTENTS

FOREWORD

This guide is based on the general assumption that one or more of the parties listed below are involved in the design and construction of residential slabs and footings, and their functions and responsibilities are as follows:

Building Authority. The Building Authority is the body having statutory powers to control the design and erection of the building. It may provide preliminary advice on site classification and this advice may include presumed site classifications or a map of site classifications. Where the building authority has designated a presumed site classification or simplified system based on a map of site classifications, this may be used but should not preclude the adoption of a less severe classification if supported by a site investigation.

Classifier. The classifier is the person or organization responsible for the site classification. Classification may be based on the assumption of a soil type or a site investigation with or without soil tests. Where the soil type is assumed there should be well established local knowledge and the soil type and site conditions should be checked prior to construction. If a soil map is used to aid this assumption the soils should be consistent over a large area. Classification of a site should be carried out by a professional engineer or experienced engineering geologist but, where there is established local knowledge, classification may be carried out by the builder.

The site classification and the name, address and qualification of the classifier should be shown on the drawings.

Designer. The designer is the person or organization responsible for the design of the footing system. Where the design consists of the selection of a design given in the Standard, the designer may be the builder (see below) or a draftsperson experienced in residential building construction. For Class P or E sites, however, the designer should be a professional engineer experienced in the design of footing systems for houses.

The design for a reactive clay site need not take into account the possibility of extreme moisture conditions caused by the home owner's neglect of site maintenance.

The selected footing system, any special requirements and the site drainage where there is more than 0.6 m fall across the width or length of the house on a reactive site should be shown on the drawings.

Builder. The builder is the person or organization responsible for the construction of the entire building. The builder should be experienced in footing construction and where required by State legislation, should be licensed. The builder should ensure that the footing system is constructed in accordance with the design specifications and construction requirements of the Standard.

Owner. The owner is responsible for the maintenance of the building and the site and should be familiar with the performance and maintenance requirements set out in the CSIRO pamphlet, 10-91, 'Guide to Home Owners on Foundation Maintenance and Footing Performance'. The drawings should notify the owner of the availability of this pamphlet. The CSIRO pamphlet is summarized in Appendix A.

STANDARDS AUSTRALIA

Australian Standard
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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE. This guide sets out the engineering principles for—

(a) the classification of a site; and

(b) the design of a footing system.

The guide applies to houses and one or two-storey buildings containing more than one dwelling. It may also apply to other forms of construction, including some commercial and institutional buildings if they are similar to houses in size, loading and superstructure flexibility. Live loading up to 5 kPa would not in itself preclude the application of this guide.

This guide should not be used to prevent the use of methods of design and site classification not specifically referred to herein. The guide should not be used to prevent the use of locally proven designs.

1.2 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
1289	Methods of testing soils for engineering purposes
1289.E1.1	Method E1.1—Part E: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using standard compaction—Standard method
1289.E2.1	Method E2.1—Part E: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using modified compaction—Standard method
1289.E4.1	Method E4.1—Part E: Soil compaction and density tests—Dry density ratio—Normal method
1289.E5.1	Method E5.1—Part E: Soil compaction and density tests—Determination of minimum and maximum dry density of a cohesionless material
1289.E6.1	Method E6.1—Part E: Soil compaction and density tests—Compaction control test—Density index method for a cohesionless material
1289.F3.3	Method F3.3—Part F: Soil strength and consolidation tests—Determination of the penetration resistance of a soil with a perth sand penetrometer
1684	SAA Timber Framing Code
1694	Code of practice for physical barriers used in the protection of buildings against subterranean termites
1720	SAA Timber Structures Code
2057	Protection of buildings from subterranean termites—Chemical treatment of soil for buildings under construction
2159	SAA Piling Code
2178	Protection of buildings from subterranean termites—Detection and treatment of infestation in existing buildings
2870	Residential slabs and footings:
2870.1	Part 1: Construction
3600	Concrete Structures

Cement and Concrete Association, Australia.
CN9 Articulated Walling

1.3 DEFINITIONS. For the purpose of this Standard, the following definitions apply:

1.3.1 Allowable bearing pressure—maximum bearing pressure that can be sustained by the foundation from the proposed footing system under service loads which should avoid failure or excessive settlement.