AS 2870—1986
UDC [691.327-41 + 624.156.31]:728

ERRATUM

Map see memo

Amdt 1 - 1987-06-01
SUPPLEMENT 1 08.02.05

Industrial see AS 1480

Australian Standard®
2870—1986

RESIDENTIAL SLABS AND FOOTINGS

Supp 2 - 1988 relates to Syd. metro area only - soil identificat map

NOTE

AS 2870 - 1986
superseded in part by
AS 2870.1 - 1988

C/S BY A.C. 2870.1 #2

* WITHDRAWN TAS AUGUST 1991
C/S BY A.S. 2870.1 #2

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

This Australian standard was prepared by Committee BD/25, Residential Slabs and Footings. It was approved on behalf of the Council of the Standards Association of Australia on 24 June 1986 and published on 7 July 1986.

The following interests are represented on Committee BD/25:

Association of Consulting Engineers Australia

Australian Institute of Building Surveyors

Australian Timber Research Institute

Australian Uniform Building Regulations Co-ordinating Council

Brick Development Research Institute

Building Management Authority (Western Australia)

Cement and Concrete Association of Australia

Department of Housing and Construction (Commonwealth)

Department of Housing and Construction (South Australia)

Division of Building Research (CSIRO)

Housing Industry Association

Institution of Engineers Australia

Master Builders Federation of Australia

National Building Technology Centre

Steel Reinforcement Promotion Group

This standard was issued in draft form for comment as DR 85108.

STANDARDS ASSOCIATION OF AUSTRALIA
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AMENDMENT No 1
to
AS 2870—1986
RESIDENTIAL SLABS AND FOOTINGS

REVISED TEXT

SUMMARY: This amendment applies to the Foreword, Clauses 1.4.30, 1.4.48, 2.2, 7.2.2, and 7.2.5; Figs 3.1, 3.2, 4.1 and 4.2.

Published on 1 June 1987.

AMDT No 1 JUNE 1987

Page 5. Foreword.

Second paragraph for definition of *Building Authority*, *delete* 'It is expected' in the second line and *substitute* 'Many building authorities are able'

Second paragraph for definition of *Classifier*, *add* 'except where otherwise stated' at the end of the second sentence after 'builder'.

AMDT No 1 JUNE 1987

Page 7. Clause 1.4.30.

Delete existing Clause 1.4.30 and *substitute*:

1.4.30 Load bearing wall—any wall imposing a load greater than 10 kN/m. Any internal wall less than 3 m in height in a one-storey house is deemed to be a non-load bearing wall.

AMDT No 1 JUNE 1987

Page 7. Clause 1.4.48.

At the 4th line of existing Clause 1.4.48, *delete* 'that is retained on' and *substitute* 'passing'.

AMDT No 1 JUNE 1987

Page 10. Clause 2.2.

Delete existing Clause 2.2(e).

Add as the last paragraph of Clause 2.2:

Site classification for South Australia shall be in accordance with Clause 7.2.

AMDT No 1 JUNE 1987

Page 34. Clause 7.2.2.

Delete 'The following minimum practice is recommended:' in Clause 7.2.2 and *substitute*: 'The following practice shall apply:'.

In the first line of Clause 7.2.2(b), *delete* 'should' and substitute 'shall'.

In the first line of Clause 7.2.2(d), *delete* 'should' and substitute 'shall'.

AMDT No 1 JUNE 1987

Page 34. Clause 7.2.5.

Delete existing Clause 7.2.5 and *substitute*:

7.2.5 Structural design for stiffened rafts on reactive sites. A stiffened raft footing system for a reactive site shall be designed in accordance with either of the following methods:

(a) The stiffened raft proportions for one-storey construction shall comply with Fig. 7.1, except that these designs shall not apply without an assessment by a qualified engineer for—

(i) slabs containing contraction joints;

(ii) support of loads from columns or fireplaces except in accordance with Clause 4.4; and

(iii) houses including masonry arches except arches detailed for movement in accordance with CN 9 'Articulated Walling' published by the Cement and Concrete Association of Australia.

(b) The stiffened raft shall be designed by a qualified engineer in accordance with Appendix E.

NOTE: Designs are not given in Fig. 7.1 for full masonry on any reactive site or for articulated masonry on Class E sites. Such construction is possible, but it is recommended that the design of the footing system and superstructure be given individual consideration by a qualified engineer.

AMDT No 1 JUNE 1987

Page 14. Fig. 3.1.

At the top of Fig. 3.1(a) and 3.1(b) under Load bearing wall, *delete* '(see Note 4)'.

In the Notes for Fig. 3.1, *delete* the existing Note 4 and *substitute*:

4. Edge beam depths may be increased to comply with local health regulations.

AMDT No 1 JUNE 1987

Page 15. Fig. 3.2.

At the top of Fig. 3.2 under Load bearing wall, *delete* '(see Note 7)'.

In the Notes for Fig. 3.2, *delete* the existing Note 7.

AMDT No 1 JUNE 1987

Page 19. Fig. 4.1.

At the top of Fig. 4.1 under Load bearing walls, *delete* '(see Note 7)'.

In the Notes for Fig. 4.1, *delete* the existing Note 7 and *substitute*:

7. Edge beam depths may be increased to comply with local health regulations.

AMDT No 1 JUNE 1987

Page 20. Fig. 4.2.

At the top of Fig. 4.2 under Load bearing walls, *delete* '(see Note 7, Fig. 4.1)'.

STANDARDS ASSOCIATION OF AUSTRALIA
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ERRATUM
to
AS 2870—1986
RESIDENTIAL SLABS AND FOOTINGS

SUMMARY: This erratum applies to Clauses 1.3, 1.4.45, Fig. 4.2, Clause 6.1.15, Appendix E and Appendix H.

Published on 7 August 1986.

Page 6. Clause 1.3.

Delete referenced document ISO 2896 and *substitute:*

AS 1366 Rigid Cellular Plastics Sheets for Thermal Insulation
Part 3—Rigid Cellular Polystyrene.

Page 7. Clause 1.4.45.

Last line *delete* 'Clause 2.5' and *substitute* 'Clause 2.1'.

Page 20. Fig. 4.2.

Delete Fig. 4.2 and *substitute* attached Fig. 4.2.

Page 30. Clause 6.1.15.

Delete existing Clause 6.1.15 and *substitute* the following:

6.1.15 Insulation of slabs. Rigid cellular plastic may be used as insulation under a slab provided that—

(a) a minimum of Class M board (with black colour stripe, having 105 kPa compressive stress at 10 percent deformation) is used under slab panels or vertically at slab edges and Class H board (with green stripes having 135 kPa compressive stress at 10 percent deformation) is used under edge or internal beams;

(b) insulation board complies with AS 1366, Part 3;

(c) reactive sites shall not have insulation placed under the edge or internal beams or footings of slabs nor as a vertical layer adjacent to the slab; and

(d) insulation board shall be laid on a sand blinding layer.

Page 46. Appendix E. Clause E2(f)(i).

Delete existing Clause E2(f)(i) Mound Stiffness, and *substitute* the following:

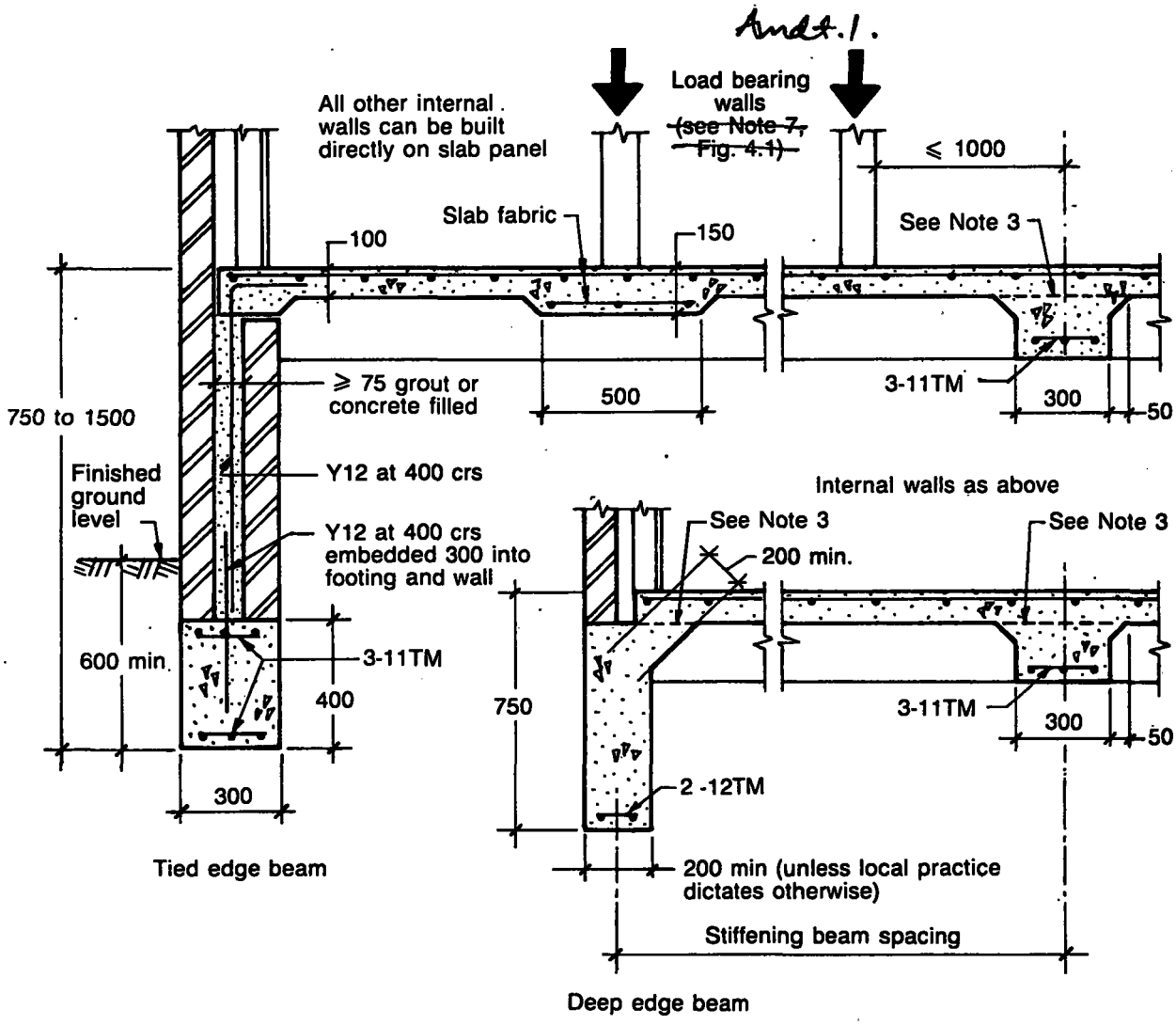
(i) *Mound Stiffness.* For beams in contact with swelling soil the swell modulus will range from k = 400 kPa/m to k = 1500 kPa/m. The computed forces and displacements are not particularly sensitive to the value of k used.

For Melbourne basaltic clays a swell modulus of 400 kPa/m may be used. For other soils a value of 1000 kPa/m can be adopted. Other values may be adopted if supported by local experience or experimental data.

For mound distortion where the beam is in contact with soil that is shrinking or stable then the soil stiffness should be taken as higher and a value at least 5000 kPa/m is recommended.

Page 51. Appendix H. Clause H1.

Delete the second sentence of Clause H1.



SSD for clad frame, masonry veneer and articulated masonry veneer

NOTES:

1. The reinforcement of the cavity shall consist of Y12 bars at 400 mm centres in both directions properly anchored into both the footing and the slab. The cavity is filled with well compacted 20 MPa concrete or grout. Single-leaf core filled reinforced masonry may also be used.
2. The sizes and reinforcement are given in Fig. 4.1.
3. Horizontal construction joints are permitted between the beams and the slab provided that the concrete to concrete joint is at least 150 mm wide and is traversed by R10 fitments at 600 mm centres.
4. Internal stiffening beams are 6 m from the centre of the edge beam and at 6 m in both directions.
5. Where local practice indicates satisfactory performance, the internal stiffening beams may be omitted when all internal partition walls are of non load bearing framed construction.
6. The diagram is intended to show the structural proportions of the footing system only and any other details are illustrative only.

DIMENSIONS IN MILLIMETRES

Fig. 4.2. PROPORTIONS OF STIFFENED SLAB WITH DEEP EDGE BEAMS, CLASS M (SSD)

AUSTRALIAN STANDARD

RESIDENTIAL SLABS AND FOOTINGS

AS 2870—1986

First published 1986

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PREFACE

This standard was prepared by the Association's Committee on Residential Slabs and Footings in response to an Australia-wide need for guidance on the design of slabs and footings for houses on the commonly encountered foundation conditions of sands, silts and clays, including reactive clays and certain types of fill. General principles only are given on design for mine subsidence, collapsing soils and landslip, as these conditions require individual design specific to the particular site.

The purpose of this standard is to state the requirements for the classification of sites and the design and construction of residential slabs and footings. Where it is not possible to develop general definitive requirements, such as for site classification, a range of procedures is provided. For building control, minimum mandatory requirements are essential and in the standard they are introduced by the word 'shall'. In addition, recommendations are made in non-mandatory clauses, notes and appendices but with adequate consideration these may be replaced by local proven alternatives.

It should be appreciated that since this standard deals with Australia-wide conditions, there may be some changes from previous local practices and terminology. Where a uniform approach has not been found to be practicable, specific State requirements are given.

CONTENTS

Page

FOREWORD

The purpose of this standard is to give general design principles and to lay down specific designs for footing systems for foundation conditions commonly found in Australia. Although a wide range of conditions is covered, this standard places particular emphasis on the design for reactive clay sites susceptible to significant ground movement due to moisture changes. This standard may be used to satisfy the requirement that the structural design of footings and floor slabs shall take account of the following:

(a) Swelling and shrinkage movements of reactive clay soils due to moisture changes.

(b) Settlement of compressible soils or fill.

(c) Distribution to the subgrade of the applied loads; and

(d) Tolerance of the superstructure to movement.

This standard 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 are as follows:

Building Authority. The building authority is the body having statutory powers to control the design and erection of the building. ~~It is expected~~* to provide preliminary advice on site classification and this advice may include presumed site classifications or a map of site classifications. Amdt 1.

* Many building authorities are able

Classifier. The classifier is the person or organisation responsible for the site classification. Classification of a site should be carried out by a qualified engineer or experienced engineering geologist but, where there is established local knowledge, classification may be carried out by the builder. except where otherwise stated. Amdt 1.

Designer. The designer is the person or organisation responsible for the design of the footing system. Where the design consists of the selection of a design given in this standard, the designer may be the builder (see below) or a draftsperson experienced in residential building construction. For problem sites, however, the designer should be a qualified engineer experienced in the design of footing systems for houses.

Builder. The builder is the person or organisation 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 this 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 Appendix A of this standard, and in the CSIRO pamphlet, 10-91, 'Guide to Home Owners on Foundation Maintenance and Footing Performance'.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
RESIDENTIAL SLABS AND FOOTINGS

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out the requirements for—

(a) the classification of a site; and

(b) the design and construction of a footing system, including slab supported on the ground, strip and pad footings or a piled or piered system, which supports a masonry or framed one or two storey house, extension or outbuilding.

For residential footing system design and construction, this standard shall take precedence over AS 1480.

1.2 APPLICATION. The standard applies to houses and to 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 in size, loading and superstructure flexibility to houses.

The standard requires that sites shall be classified in accordance with Section 2 and footings shall be designed in accordance with Sections 3, 4 or 5, as appropriate. All construction shall comply with Section 6. Additional provisions specific to certain states shall be in accordance with Section 7.

The performance requirement of the standard is the avoidance of significant damage as defined in Appendix A provided that the site is properly maintained in accordance with the recommendations in Appendix A.

Specifically, the standard should not be used to prevent the use of locally proven designs or alternative designs by a qualified engineer.

This standard shall not be interpreted to prevent the use of materials or methods of design or construction not specifically referred to herein.

1.3 REFERENCED DOCUMENTS. This standard refers to the following documents:

AS 1170 SAA Loading Code
Part 1—Dead and Live Loads
Part 2—Wind Forces

AS 1289 Methods of Testing Soils for Engineering Purposes
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
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
E3.1 Part E—Soil compaction and density tests—Determination of the field dry density of a soil—Sand replacement method using a sand-cone pouring apparatus
E4.1 Part E—Soil compaction and density tests—Compaction control test—Dry density ratio—normal method
E5.1 Part E—Soil compaction and density tests—Determination of minimum and maximum dry density of a cohesionless material
E6.1 Part E—Soil compaction and density tests—Compaction control test—Density index method for a cohesionless material
F3.3 Part F—Soil strength and consolidation tests—Determination of the penetration resistance of a soil with a perth sand penetrometer

AS 1302 Steel Reinforcing Bars for Concrete

AS 1304 Welded Wire Reinforcing Fabric for Concrete

AS 1480 SAA Concrete Structures Code

AS 1684 SAA Timber Framing Code

AS 1694 Code of Practice for Physical Barriers used in the Protection of Buildings against Subterranean Termites

AS 1720 SAA Timber Engineering Code

AS 2057 Soil Treatment for Buildings under Construction for Protection against Subterranean Termites

AS 2159 SAA Piling Code.

AS 2178 Code of Practice for the Treatment of Subterranean Termite Infestation in Existing Buildings

~~ISO 2896—Rigid Cellular Plastics—Determination of Water Absorption.~~
AS 1366 SEE ERRATUM

1.4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.4.1 Allowable bearing pressure—maximum foundation bearing pressure from the proposed footing system under service loads which should avoid failure or excessive settlement.

1.4.2 Articulated full masonry—full masonry construction in which special provision is made for movement by articulation by the method given in CN9 'Articulated Walling' published by Cement and Concrete Association of Australia or equivalent.

1.4.3 Articulated masonry veneer—masonry veneer construction in which the provisions for articulated masonry have been applied to the masonry veneer.

1.4.4 Bored pier—poured in situ concrete cylindrical load support element.

1.4.5 Builder—person or organisation responsible for the construction of the entire building.