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Residential slabs and footings

Part 1: Construction—Commentary

(Supplement to AS 2870.1—1988)

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STANDARDS AUSTRALIA

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PREFACE

This Commentary was prepared by Standards Australia's Committee on Residential Slabs and Footings and contains explanations and additional background material that will assist in the interpretation of AS 2870.1, *Residential slabs and footings*, Part 1: *Construction*.

The layout of this Commentary is identical to that of the Standard. The numbering differs only in that its clauses, figures and tables are prefixed by the letter 'C', e.g. Clause C3.2.1 of this Commentary refers to Clause 3.2.1 of the Standard. Where there is no commentary to a clause of the Standard the Clause number does not appear. Therefore the clause numbers in this commentary are not consecutive. References to various papers are listed as the last item of the section or appendix in which they occur.

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INTRODUCTION

PURPOSE.

The Standard provides for simple standard methods for the design of residential footings based on sound structural and geotechnical principles. It applies to a variety of footing systems for most foundation conditions including reactive soils—a very common foundation in Australia. The Standard is in mandatory form for use in building control. As a consequence, some of the advisory information in AS 2870—1986 has been deleted from the revised version.

DESIGN REQUIREMENTS.

In order to provide more background to footing design, a brief discussion follows of the aspects that are taken into account in the Standard.

(a) *Design for swelling and shrinkage movements.* The primary cause of foundation failure in domestic structures is associated with the movement of reactive clay soils. A soil is said to be reactive or expansive when it undergoes appreciable volume change upon changes in moisture content. The reactivity of a soil depends upon the size of clay particles, their mineral composition and the proportion of clay in the soil. The reactivity of clay soils cannot be clearly evaluated by tests. In particular, the usual engineering index properties (i.e. liquid and plastic limits and linear shrinkage) on their own may not be reliable.

The movement that might occur on a site depends not only on the reactivity of the clay but also on the depth and distribution of the clay in the soil profile and on changes in moisture content. Moisture changes usually occur slowly in clay and produce swelling upon wetting and shrinkage upon drying. These moisture changes often result from a combination of causes, and include the following:

(i) Seasonal and long term climate changes, including dry summers, floods and droughts.

(ii) Influence of the house, garden and drainage; in particular trees which cause severe drying.

(iii) Long term effects of the whole urban infrastructure, including paving and drainage.

(iv) Initial moisture conditions at the site relative to the long term design conditions, including special conditions such as demolition of an existing house, removal of large trees, etc.

The actual pattern of the movement of a reactive clay foundation depends on the moisture and clay variation and will be quite complex. The form could often include asymmetric and warping components. Nonetheless, for the purpose of design, the pattern of differential movement can generally be represented by one of the forms given in Figure C1.

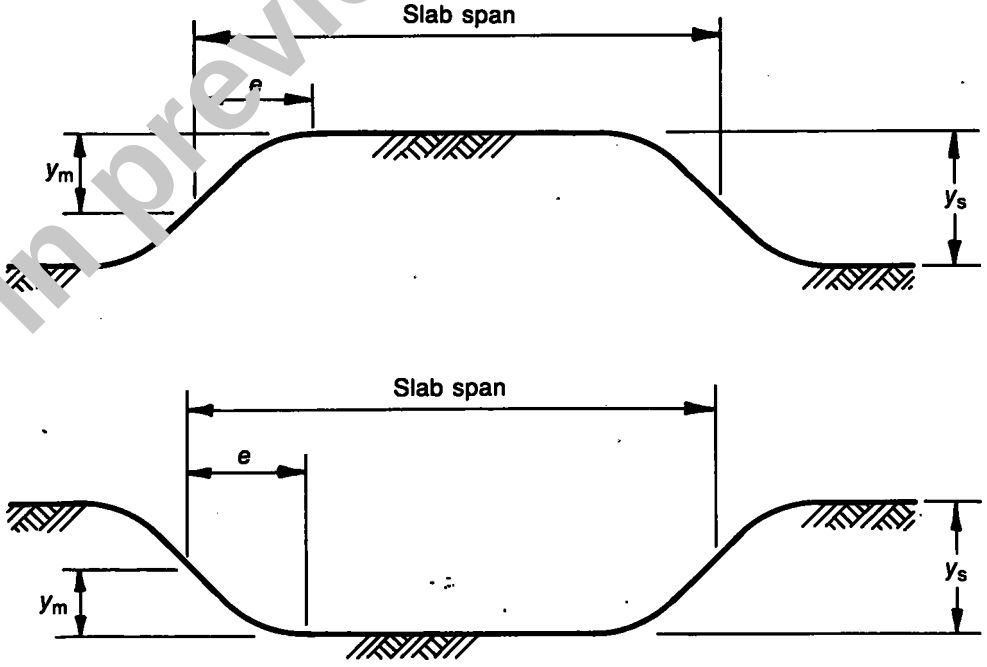

FIGURE C1. TYPICAL GROUND MOVEMENT PATTERNS FOR FOOTINGS AND SLABS ON CLAYS