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Helping Queenslanders Build Better

A HOMEOWNER'S GUIDE TO SUBSIDENCE AND ACCEPTABLE TOLERANCES SPECIFIED IN AUSTRALIAN STANDARD AS2870

What is Subsidence?

Subsidence, heaving or rotation of footing systems is primarily caused by poor founding soils that compact and compress under load or clay soils that swell and contract with changes in moisture content of the soil.

Although some compaction, settlement and landslip occurs in Queensland the majority of soil movement effecting houses is caused by moisture related shrinkage or heaving. The propensity of a soil to shrink or heave due to its moisture content is primarily related to its clay content.

Can footing systems be designed to accommodate movement in the soil?

The Building Code of Australia (BCA) and its referenced Australian Standard AS 2870 Residential Slabs and Footings – Construction, requires builders to engage an engineer or qualified person to undertake an assessment of the site to identify the nature of the founding soils including their clay content and for the engineer to design a footing system that will perform within certain expectations on the site.

What are the expectations stipulated in the Building Code and Standard?

Although it may be possible to design a footing system for a site that will accommodate all movement without causing any cracking to the building it would be prohibitively expensive to do so. Accordingly the BCA and AS2870 have adopted a risk management approach where the footing and slab system must be designed and constructed to perform within certain design criteria.

Acceptable tolerances for footing and slab systems in accordance with AS2870 include:

1. Classification of Damage with Reference to Walls

Hairline cracks, fine cracks which do not need repair and cracks that are noticeable but easily filled and are less than 5mm wide, can be expected in certain circumstances and are consistent with the expectations of the Standard. Similarly doors and windows that stick slightly are not unusual. Repair of these issues is considered a maintenance responsibility of the owner.

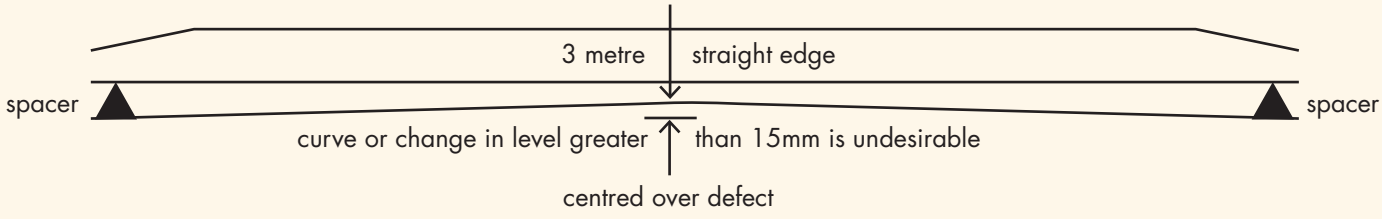
Above: Examples of cracking which would be deemed the maintenance responsibility of the building owner.

Cracks over 5mm wide that it may be possible to repair or may require whole or partial replacement of the wall, noticeable bulging of walls, and windows and doors that stick and distort exceed the expectations of the Standard.

2. Classification of Damage with Reference to Concrete Floors

Hairline cracks, fine but noticeable cracks and even distinct cracks where the slab is noticeably curved or changed in level that are less than approximately 2mm in width and where the change in offset from a 3m straight edge centred over the defect does not exceed 15mm are within the expectations of the Standard. Repair of these defects is considered a maintenance responsibility of the building owner.

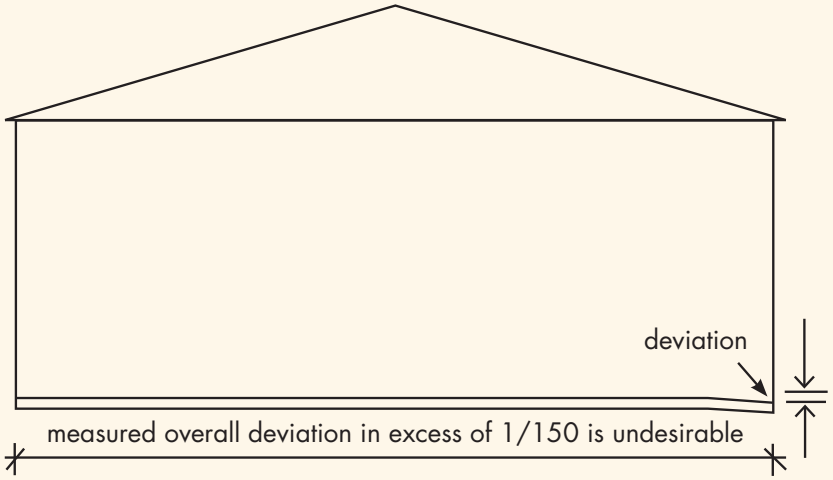
Above: Examples of cracking which would be deemed the maintenance responsibility of the building owner.



Wide cracks with an obvious curvature or change in level that exceeds 2mm in width or where the change in offset from a 3m straight edge centred over the defect exceeds 15mm are outside the expectations of the Standard.

3. Slope Deviation

Local deviation of slope from the horizontal or vertical in excess of 1/150 is undesirable.



BSA Site Inspection Procedure

If a complaint is lodged with BSA in relation to subsidence the usual process that will be adopted during a site inspection is as follows:

1. The Contractor responsible for the constructions will be invited to attend the site inspection with the home owner and a BSA Inspector.
2. A visual inspection will be undertaken to determine if the contractor has complied with all relevant requirements of the Building Code including such things as any required movement joints in masonry and internal finishes, any required movement joints in sanitary and stormwater drainage and site drainage requirements.

   The Inspector will also note any improvements or changes made after construction of the building that may be contributing to the building movement including excessive watering of garden beds or lawns close to the home, the planting of trees or shrubs within close proximity of the home and alterations to the grading and site drainage around the home. Maintenance issues such as leaking taps, air-conditioning condensate lines discharging next to the footings and gutters and downpipes blocked or restricted with leaves and debris will also be noted.

   The various effects of the movement including any cracking, binding windows and doors and any visible cracked pipe work will also be recorded.
3. A set of floor levels will be taken and recorded on a floor plan of the building for later assessment.

BSA Assessment

Subsequent to the site inspection the BSA inspector will assess the data recorded on site to determine if:

1. There are any issues of defective work that should be rectified by the contractor
2. There are any maintenance or other issues that should be addressed by the building owner
3. The building is performing within the expectations of the Standard
4. A plumbing test if warranted to determine if any pipe work is broken or leaking.

If the movement is outside the expectations of the Standard and is not caused by defective work on the part of the contractor or maintenance, drainage or landscaping issues the responsibility of the home owner, the BSA will then engage an engineer to investigate the cause of the excessive footing movement and propose a rectification method.

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