

Research findings on slab heave

May 2014

In 2011, the VBA was made aware of several dwellings in an area of Melbourne's western suburbs that were experiencing slab heave (floor slab movement causing cracks in the floor and walls).

Research was commissioned into several homes built by large builders in Melbourne's west.

Findings

The research found that 5.3 percent of dwellings built in an area of Melbourne's western suburbs between 2003 and 2011 showed some form of distress (such as cracks in the floor and walls).

Building industry sources suggested that the breaking of the long drought in 2011 may have been a factor in these problems. However, the high number of dwellings with no cracks (almost 95 percent) suggested that weather was not the main cause.

The research found that in the cases of the affected houses:

- appropriate engineering design processes were followed
- geotechnical investigation was done properly
- floor slab designs met the regulatory process
- the affected houses were spread throughout the area
- most, if not all, dwellings in the area were on sites with similar sub-soil composition
- matters that were not factors included:
 - unique sub-soil conditions
 - local area influences, including uncontrolled filling
 - poor engineering design.

Australian Standard for residential slabs and footings

The Australian Standard for the design of floor slabs in dwellings is *AS2870 – Residential Slabs and Footings*. This standard guides the site classification and lists the requirements of the concrete elements for the dwelling. AS2870 references potential problems caused by inadequate and incorrect drainage at sites that have been classified as reactive.

The research found the key issues relating to slab heave were associated with deficiencies in the stormwater drainage systems of the dwellings.

The VBA believes sections of the standard relating to drainage, rather than slab design, were not well known or understood by practitioners and some were not complying with them.

Recommendations

As a result of the research, the VBA has made several recommendations:

- Geotechnical investigations are only carried out for domestic dwellings after the sub-division is completed and no further earthworks are required (apart from those by the registered building practitioner).
- Dwelling owners be provided with a copy of the geotechnical report.
- The VBA provide material for owners about foundations and slab maintenance.
- The VBA publishes a technical note (or similar) for registered building practitioners, highlighting and reinforcing the requirements of AS2870-2011 – clause 5.6 (residential drainage) and clause 6.6 (geotechnical works).
- The minimum cover required for sub-divisional infrastructure stormwater drainage works be increased to make the legal point of discharge (LPD) for each dwelling lower. This would provide adequate falls to site stormwater drainage points of discharge.
- All sub-divisional designs are to include the LPD level.
- All design information be made available to the public.
- An additional requirement be added to the building permit approval process, so that the stormwater drainage system for each dwelling is designed in detail as part of the slab engineering drawings. The design should include:
 - location of the LPD
 - plans of the stormwater drains from the LPD to each downpipe and grate
 - invert levels and minimum falls to all stormwater drains.
- Stormwater drainage design documentations be provided to the dwelling owner as part of a dwelling maintenance information pack.
- An independent inspection (rather than self-certification) of installed stormwater drainage systems be carried out. This would be an extension of mandatory inspections for building structures.
- As part of the practical completion process, stormwater drainage for each dwelling to be inspected by independent CCTV to confirm the condition of the underground stormwater system. A copy of the footage should be provided to the dwelling owner as part of a dwelling maintenance information pack.

The VBA has developed a plan to consider each recommendation and will monitor what changes are required, carrying out further research as required.