

ABOUT SLAB HEAVE

The first edition of AS 2870 had a Clause '*Slabs and footings shall be designed to withstand the most severe combination of loading and foundation movement*'. Whilst AS 2870 references '*Centre heave*' and '*Edge heave*' foundation movements, it does not identify which is most severe. The following paragraphs arguably identify edge subsidence as the most severe.

From the day the slab is constructed, it effectively seals the soil beneath it against moisture changes. Thereafter, normal weather-induced soil moisture changes happen only outside the soil-slab domain. Therefore, foundation movements due to normal weather-induced soil moisture changes can only be either edge heave or edge subsidence, but not centre heave.

When construction of the house is practically complete, the static weight of the house, most of which is supported on the edges of the slab, has pushed the slab deeper into soil at the edges than in the centre, distorting the slab in a dome shape. It takes a long period of wet weather for swelling soil outside the soil-slab domain to heave the edges of the slab to level with the centre, and more continuing wet weather to distort the slab into a dish shape deep enough to cause damage. Moreover, dishing distortion produces invisible cracking on the bottom of the slab stiffening ribs. Cracking of masonry walls is unlikely, because the outside walls tend to tilt inwards when the slab is dished, putting them in compression from the top down. Compression in the outside walls also provides some physical restraint against dishing distortion of the slab.

In dry weather after construction of the house is practically complete, shrinking soil outside the soil-slab domain immediately exacerbates the initial doming distortion of the slab due to the static weight of the house. Relative to edge heave, it takes lot less subsiding soil movement to distort the slab from the initial shallow dome shape into one high enough to cause damage. Moreover, doming distortion of the slab produces visible cracking on the top of the slab. Cracking of masonry walls is very likely, because the outside walls tend to tilt outwards when the slab is domed, putting them in tension from the top down, and it is a well-known fact that masonry walls crack at relatively low levels of tension.