

Foundation Failure

We experienced a tragic but all too familiar case of soil erosion and subsidence in this tranquil and world-famous retirement estate.

It is sad to see that in today's world, even with all our technology and access to information, many homeowners are oblivious to the devastating effects of growing trees and bushes against the external walls of so many homes.

Many of the retired homeowners love gardening. However, the growing of trees near the external walls have huge negative consequences. In almost all the cases we have visited, we have seen these trees and vegetation grow out of proportion and start to invade the perimeter of the foundations and in some cases grow into and below the foundation footings itself.

The law is clear on the tree size and distance it should be placed in expansive soil horizons:
SANS 1400-H:2012
So, the soil type dictates the proximity of the trees category:
H2 = 1m x maturity height of the tree.



In this instance the proximity of these trees should have been a minimum of 3 metres from the external walls. A blanket rule 1.5m beyond the perimeter of the house must be maintained.

Added to this non-conformance, is the incorrect stormwater disposal from downpipes and you have a recipe for disaster. The illustration below shows the poor method of rainwater management.



Notice the end of the downpipe with no stormwater channel. The stormwater discharges directly into the soil and ponding occurs. This ponding is a trigger mechanism to a greater problem - Subsidence and Soil Erosion - the result of which can be seen in the few illustrations below.



The result of the ponding water and the close proximity of the trees with its shallow root system results in settlement. In this instance the roots together with the ponding water have distorted the soil around the foundations, which have resulted in soil subsidence & large localized gaps below skirting boards and some cracking in the floor slab is evident. Furthermore, the floor tilts with a sharp fall to edge of slab.

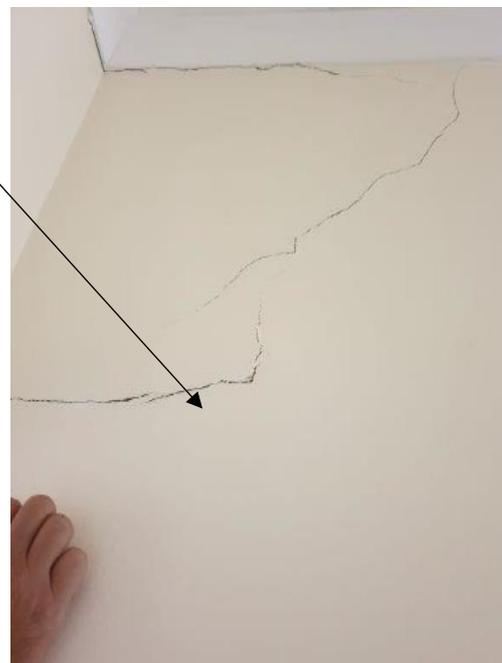
Diagonal cracking which supports distress structure. The lateral displacement indicates that movement is happening near the surface of the structure as the brickwork is rotating around the fixed masonry.



The cracks are out of plane which indicate the masonry units have lost their structural integrity and will eventually shear completely which will have a negative impact on the total structure. In some cases, the unit failure has occurred. (the masonry unit has lost its structural integrity)



The settlement in this corner of the room amounts to just over 25mm.
Note that the slab has failed given a large diagonal crack half way through the area of the room.



In conclusion, it is important to remember that we need to be extra careful when deciding where to plant trees and shrubs around our homes. We must also enquire about the soil type so that we know the limitations of what and where to grow in our gardens. Please also look around your homes and ensure that all rainwater downpipes discharge into channels that lead to at least 1.5m from the house. This will safeguard against ponding of water near foundation footings.

Do not hesitate to contact me at michael@vaughan-cmc.co.za for further information.