



Factors Related to Probable Cause(s) of Movement

Various factors can influence the differential movement of slab foundations. The mechanism of the typical causes for slab distress is best summarized as follows:

- The maintenance of the foundations perimeter moisture.
- The amount of water/moisture in the soil prior to placement of the concrete.
- The grading of the perimeter soils up to 10 feet away from the foundation.
- The presence of shallow groundwater seepage (bog).
- The past or present influence of large vegetation and/or trees.
- The presence of fill soils and the various amount of cut and fill across the lot.
- Soil creep.
- Structural design of the slab for the assumed soil conditions.
- The construction execution in the field.
- The antecedent weather conditions prior to pouring the concrete.
- Extreme weather patterns causing soil consolidation.

Upon years of observation and research the most significant soil-structure interaction mechanism causally related to differential slab movement is due to soil moisture withdrawn from nearby root systems of trees extracting moisture from the soils beneath the foundation.

In a study performed by The University of Texas Arlington, Buckley (1974) indicates that trees planted within the mature height of the foundation can cause substantial damage and influence the foundation systems for at-grade slabs. The following diagram shows a summary of the Buckley's observations. This shows that if the tree is within a mature height of the foundation, i.e., $D/H = 1$, then the effects of the trees roots can result in settlements of downward movements of about 2 inches. When the tree is planted closer to the structure, i.e., $D/H = 0.2$, settlements of over 5 inches can occur.

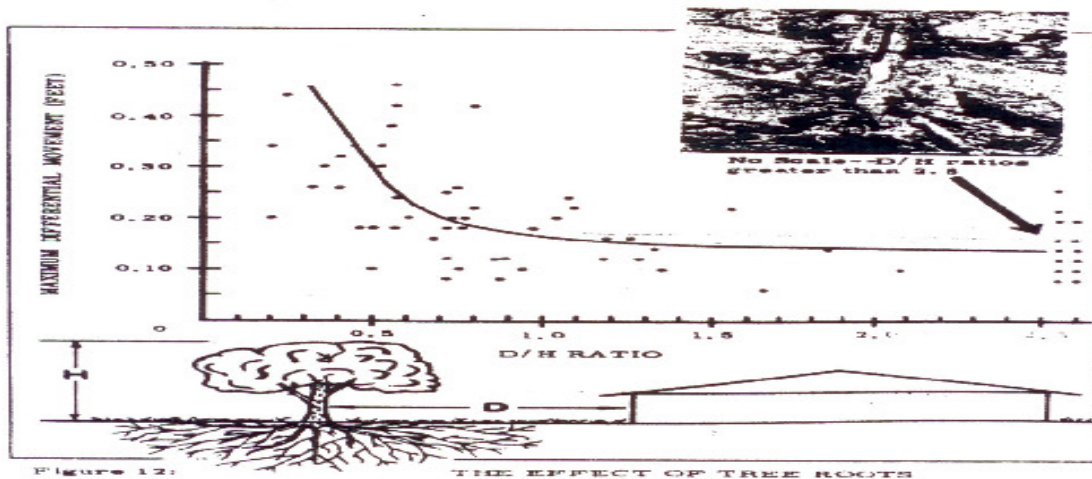


Figure 12: THE EFFECT OF TREE ROOTS

By **Walter R. Childers, Professional Inspector, TREC#8806**
429 Shady Creek Dr., Bryan, TX, Office: 979-739-8288
cimpleysolutions@live.com