

## Don't Get Fooled By Lean Clay Soils

**Sometimes we tend to ignore the risks of "Lean Clays":** This past year we (STI) analyzed soils for their "swell" potential at several sites. At most sites, it was the "fat clays" and "shale" that presented significant risks of building distress. However, at two sites, we found that "lean clays" also presented significant risks.

We performed two "pressure swell tests" on lean clay soils obtained from two different sites and found that both of the lean clays had either high swell pressures or high swell % (volumes), or both. One of the lean clay soils had a swell pressure of 1800 pounds/square foot (psf) but swelled only 1%. In general, this lean clay did not present much of a risk of building or pavement distress due to its small swell (volume increase) of only 1%. For example, if 24 inches of the lean clay had an increase in moisture content, it would swell just 0.24" ( $0.1 \times 24" = 0.24$ )

However, the other lean clay soil swelled nearly 5% and had a swell pressure of 2500 psf. This lean clay presented a significant risk of building and pavement distress due to both its higher swell of nearly 5% and its higher swell pressure of 2500 psf. What is really surprising is that the Liquid Limit on this lean clay was relatively low, not even close to being classified as "fat clay."

So, what's the take away from this? .... Even if the soils at your site are classified as "lean clay" and not "fat clay," the lean clay soils may still present a significant risk of building or pavement distress. The geotechnical engineer should be careful to closely examine the soil samples from the borings and do the necessary tests to determine their potential to cause foundations, floors, and pavements to move and crack. The areas of the state where the lean clay soils come from can also be an important clue as to their swell potential.

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