



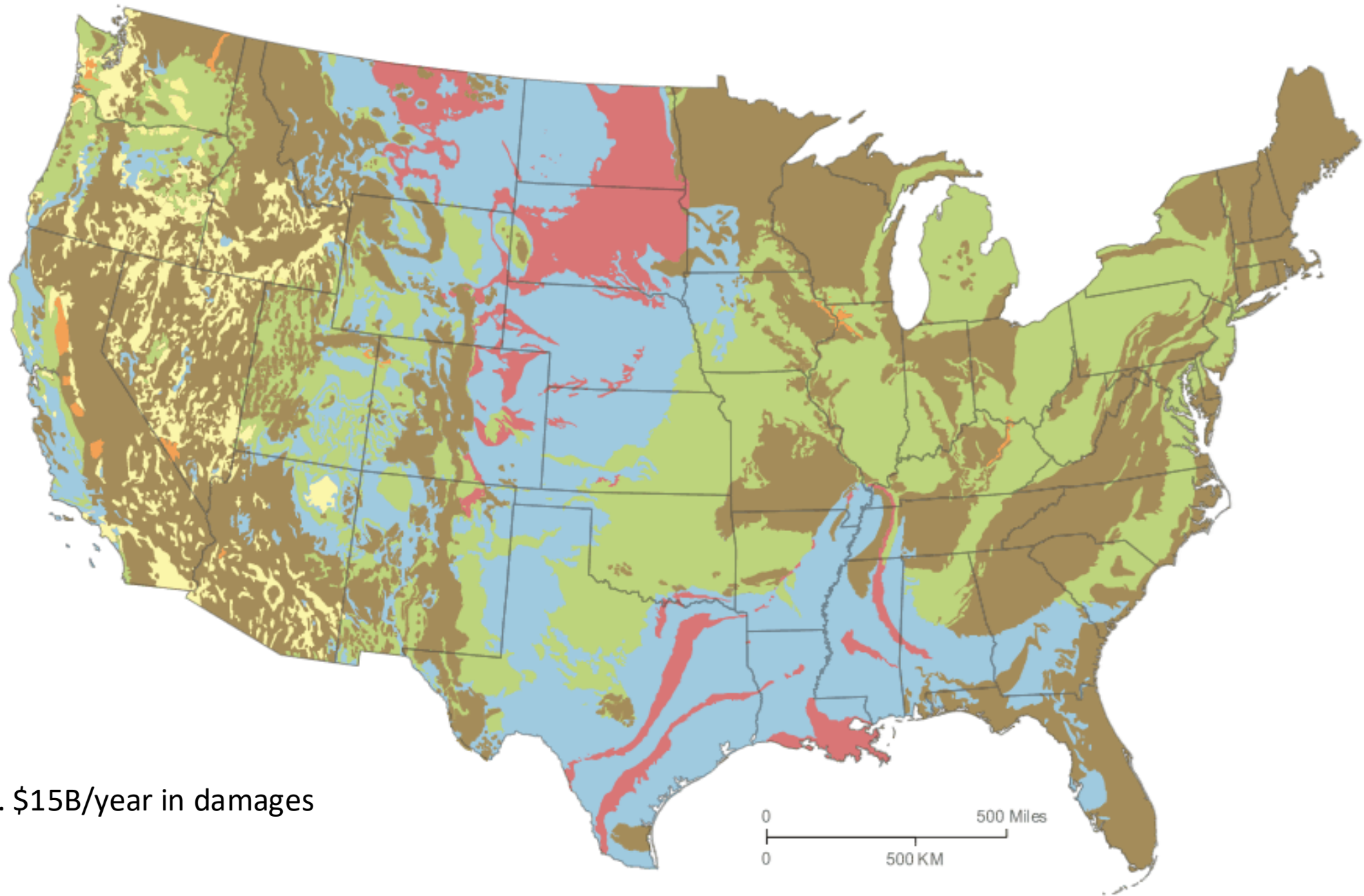
RESEARCH AND APPROACH IN TREATING HIGHLY  
PLASTIC SOILS WITH CEMENT | MAY 22, 2025











Est. \$15B/year in damages



## Treatment Guide for Soils and in Pavement

Materials & Tests Division  
Soils & Aggregates Section

August 2019

ents.

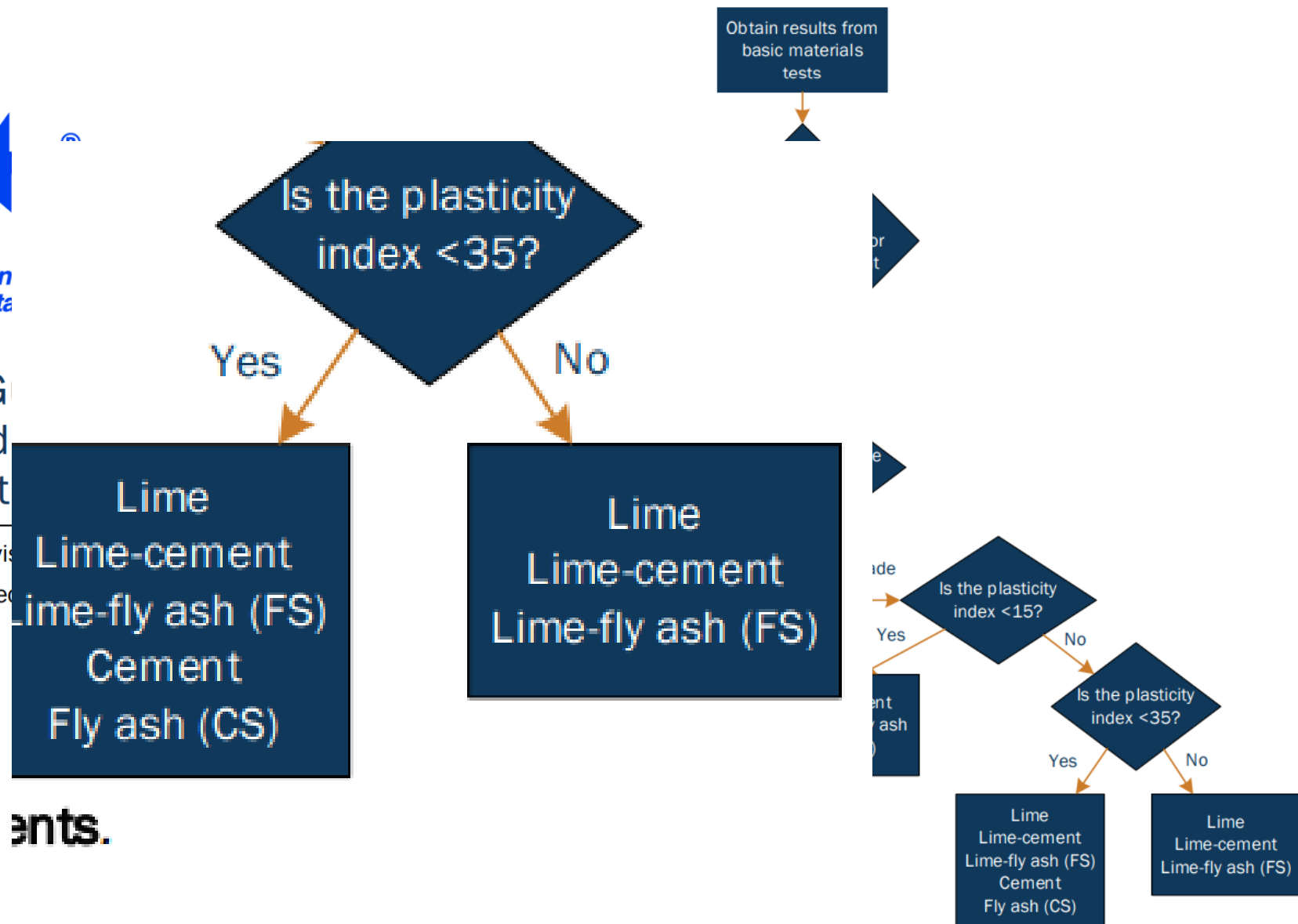


Figure 10. Selecting Treatments.



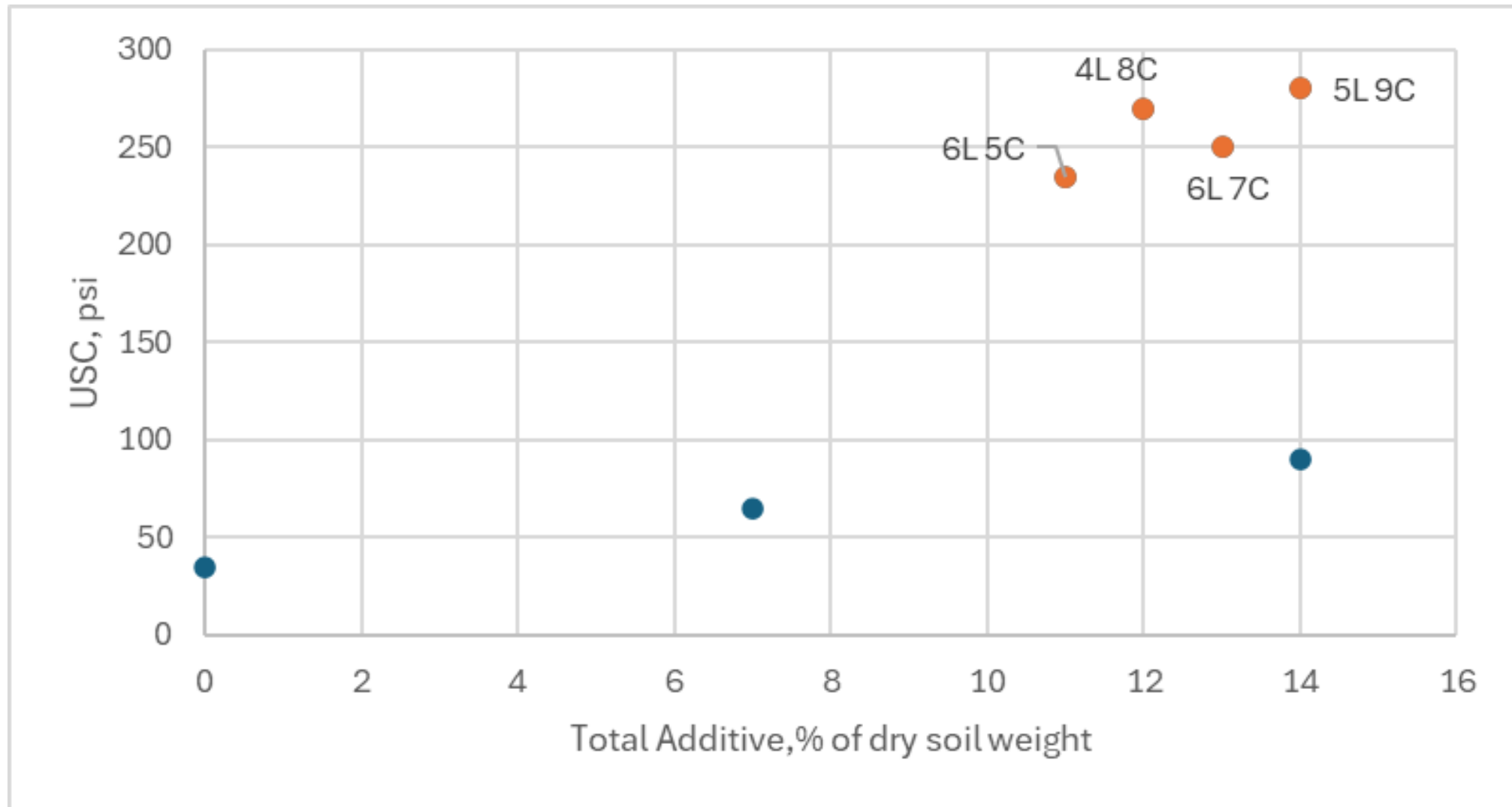




60

**Avg Natural PI: 62**

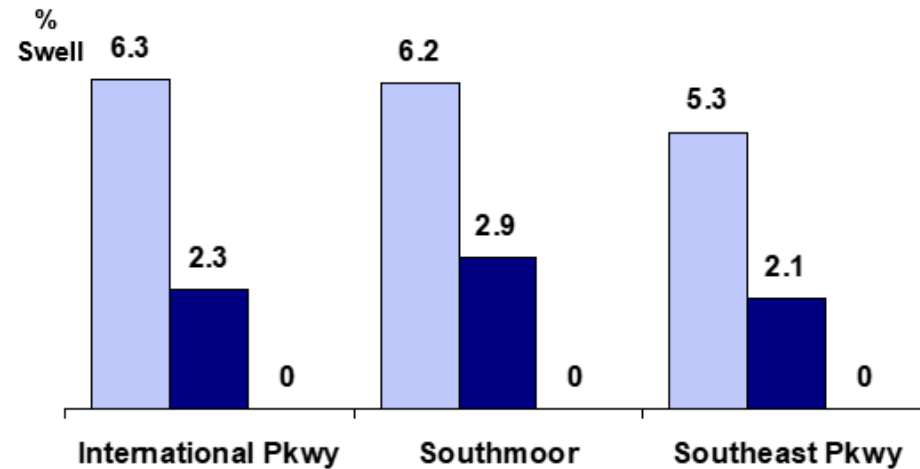
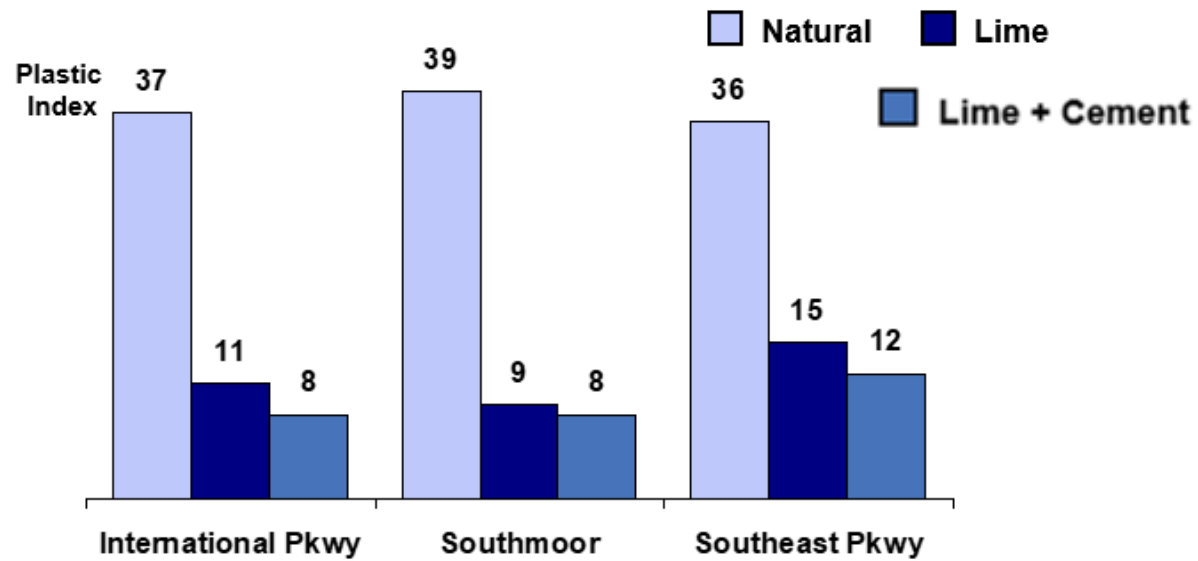
**Avg Stabilized PI: 16**



After City of Garland 2007



## Laboratory Index Properties and Swell

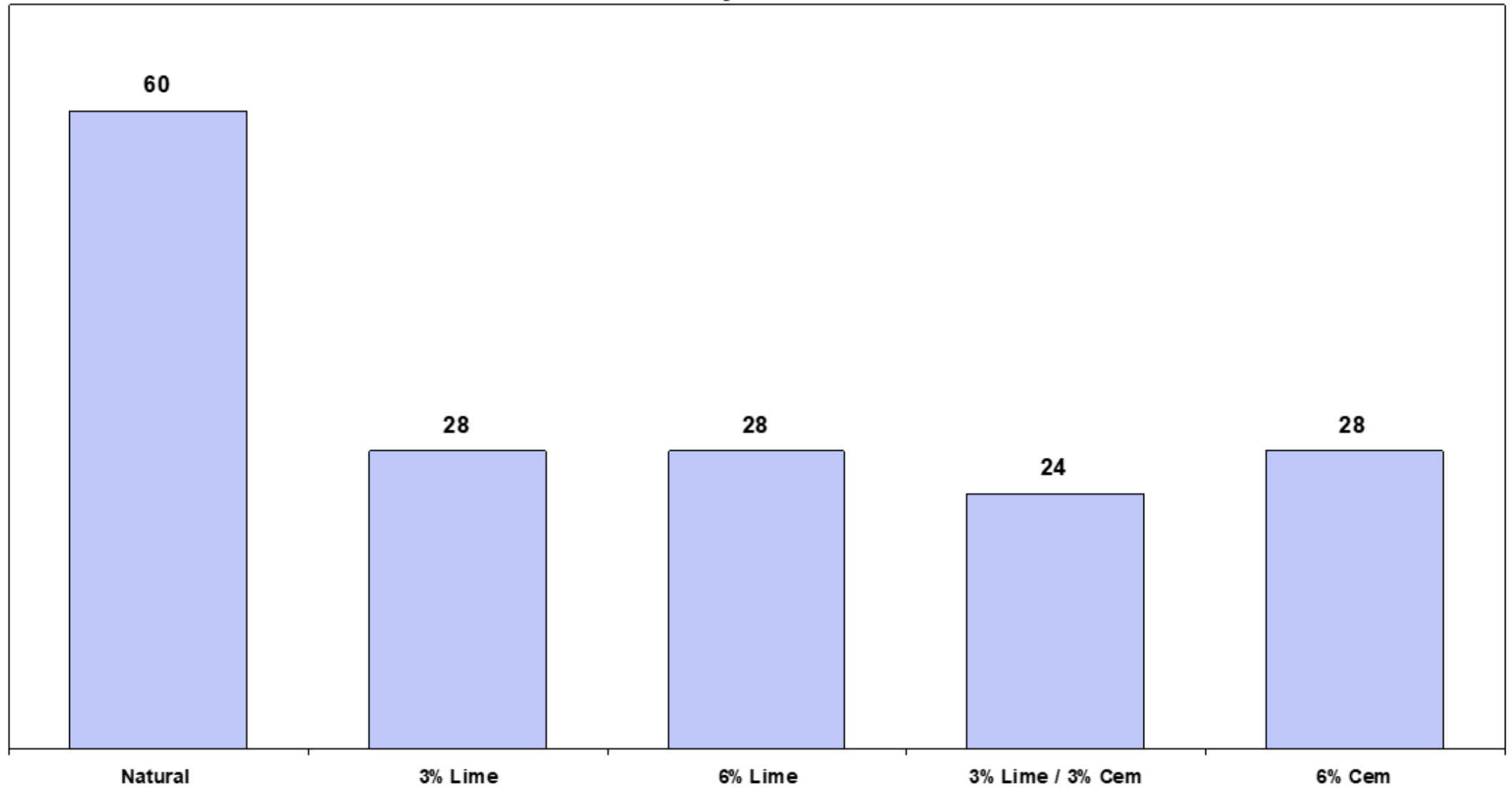


After City of Arlington 2009





## Plasticity Index



Zollinger – College Station



PI = 17



PI = 34

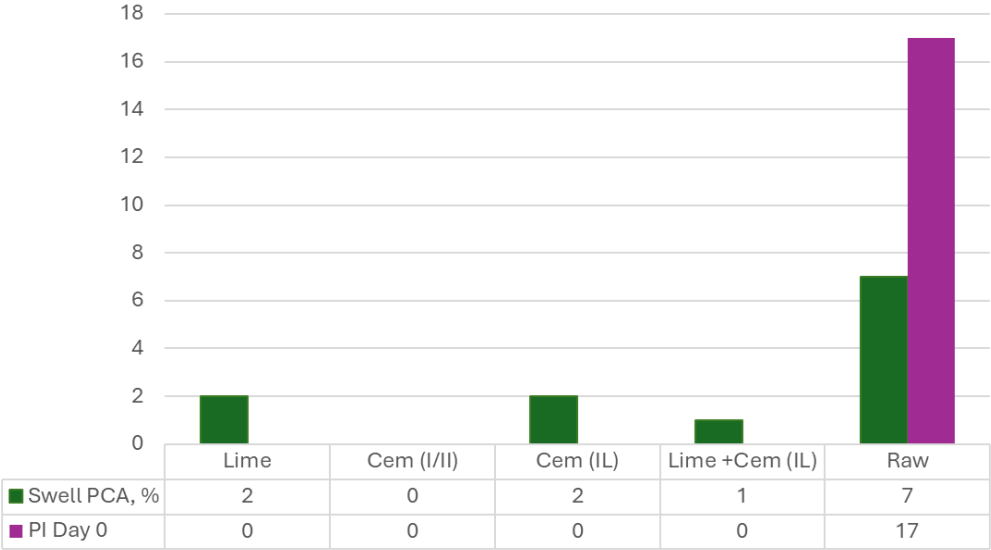
PI = 55



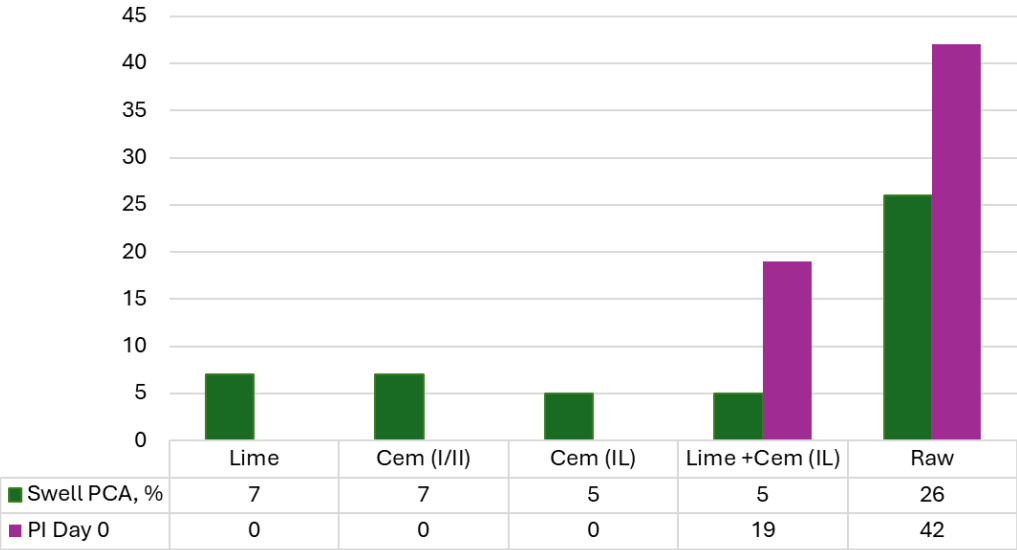




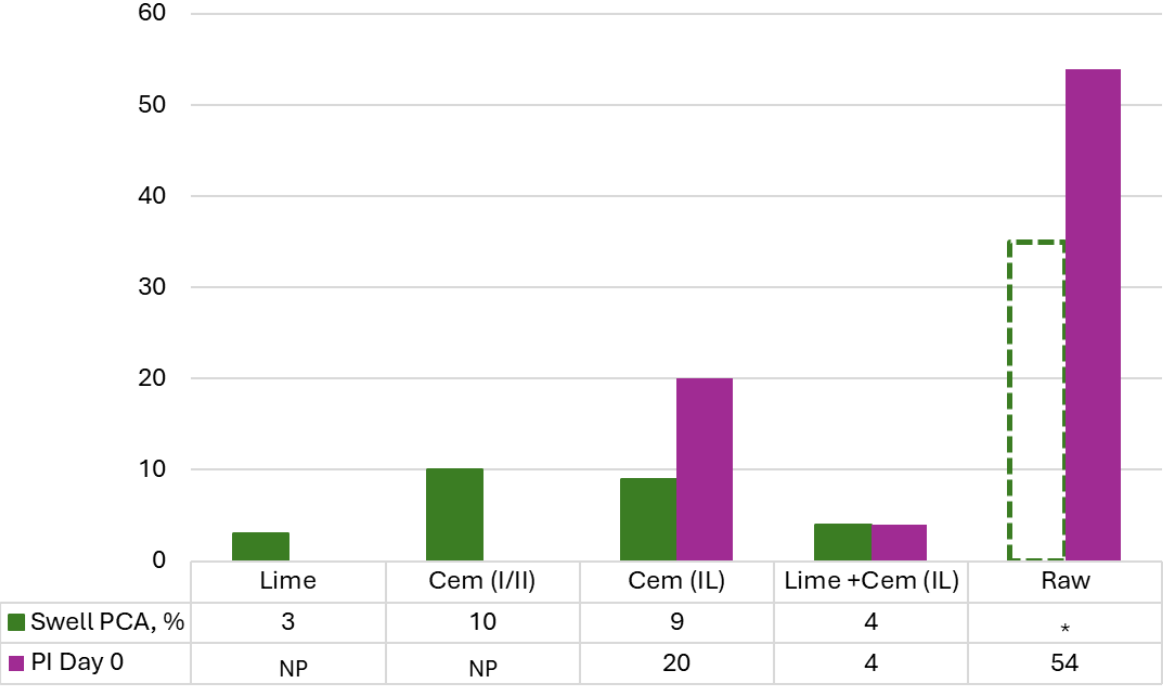
Lean Clay



Medium Clay

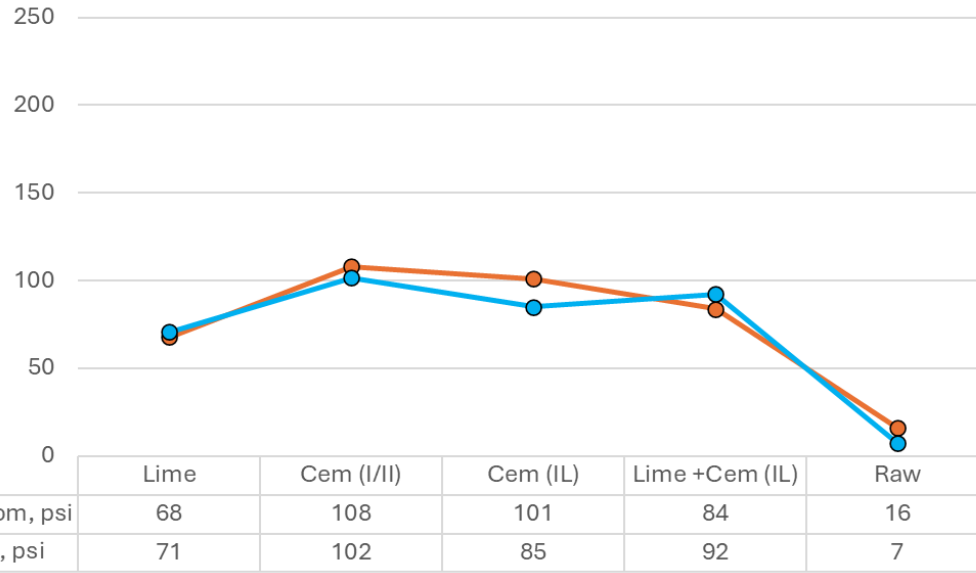


Fat Clay

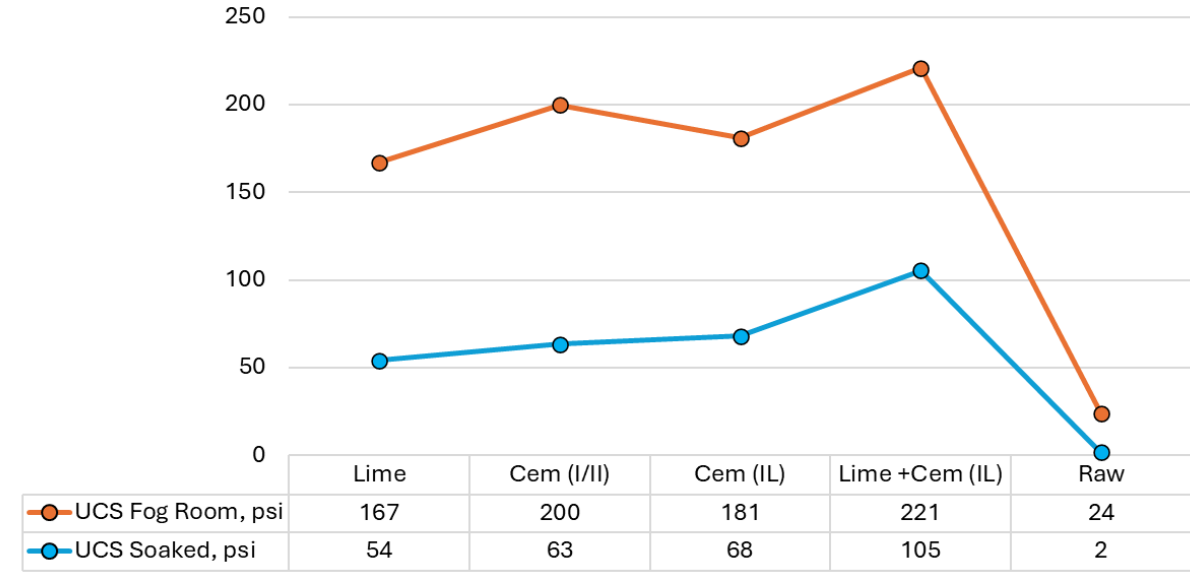




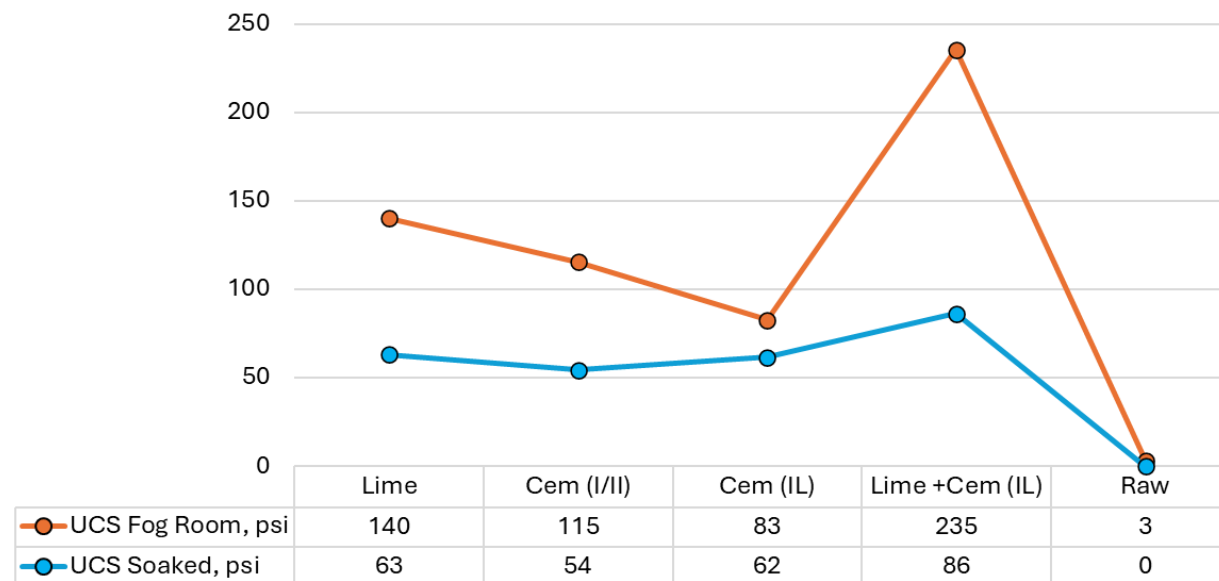
Lean Clay

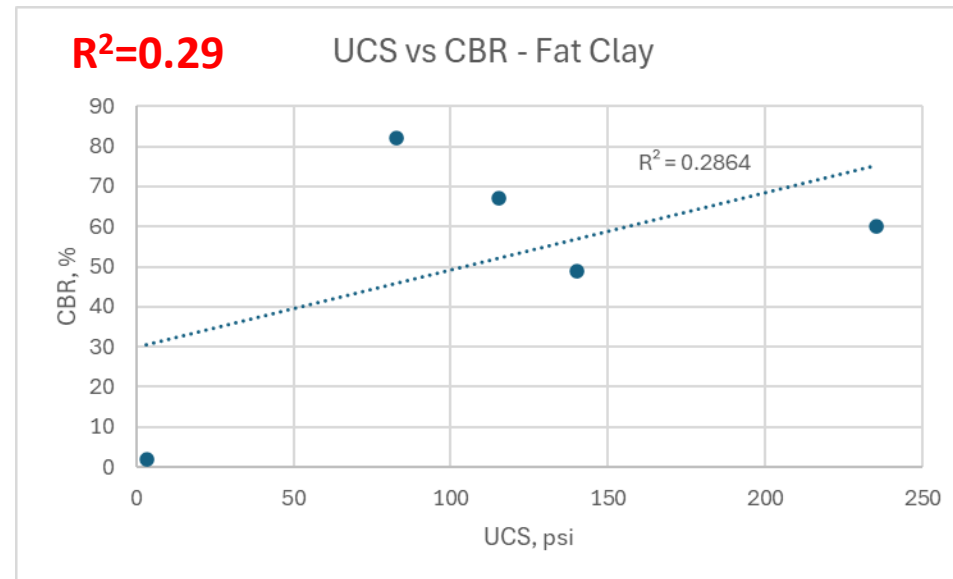
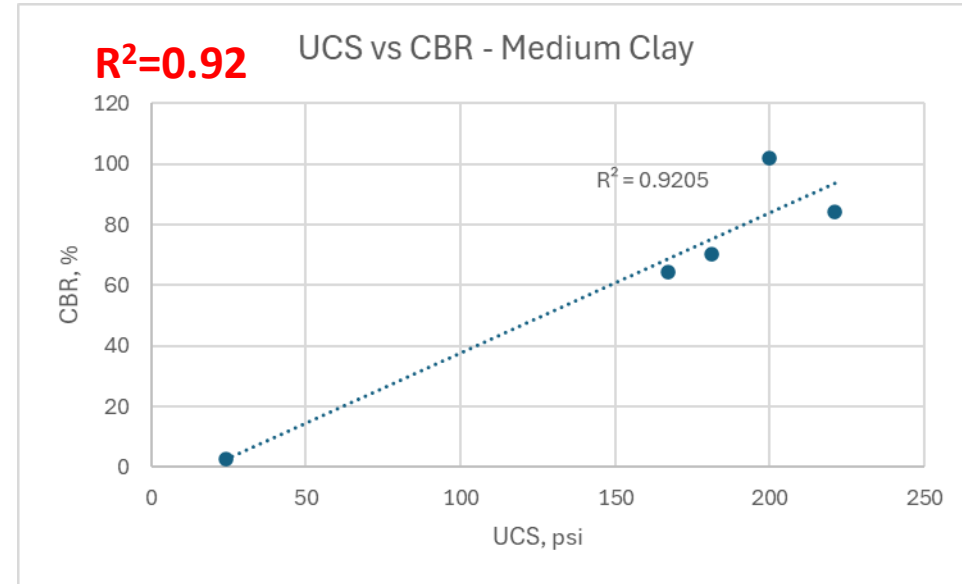
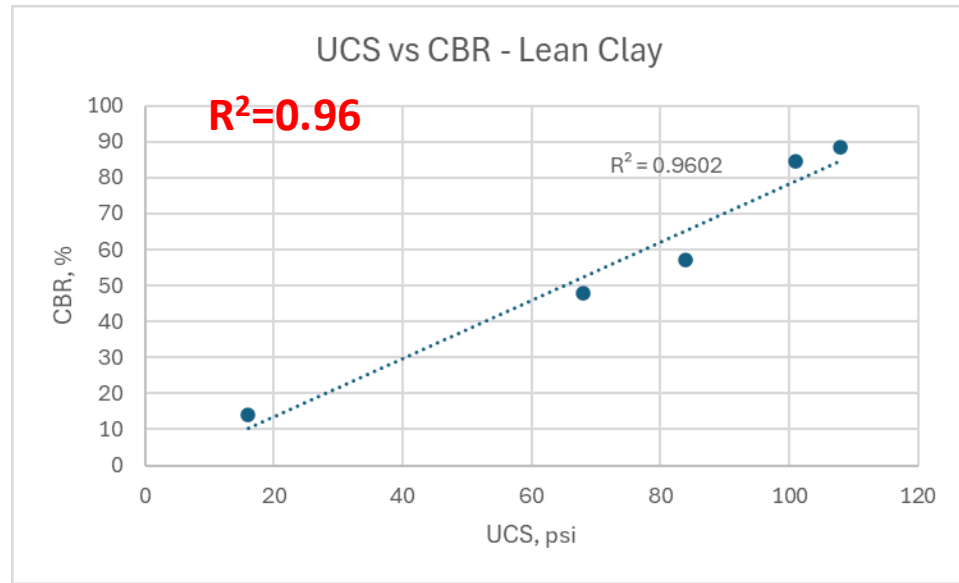


Medium Clay

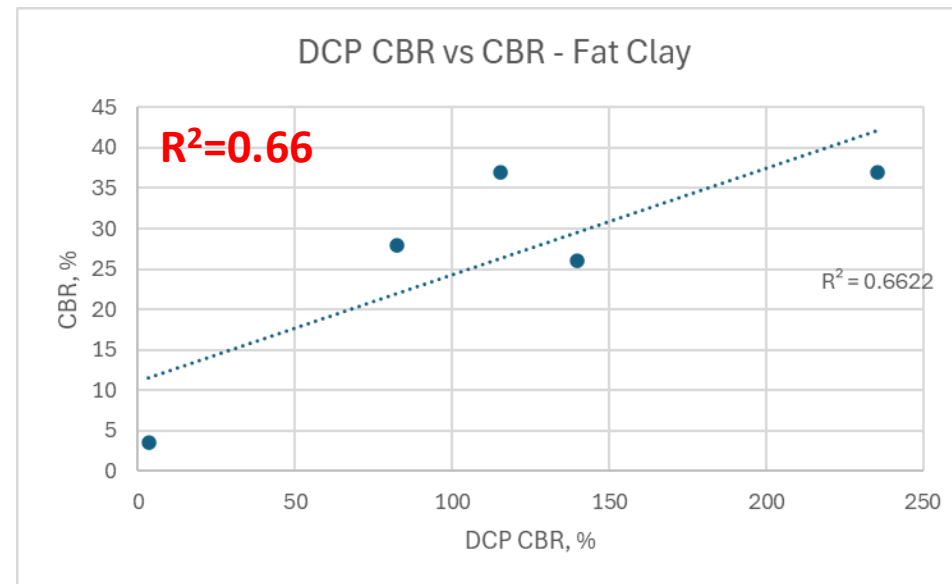
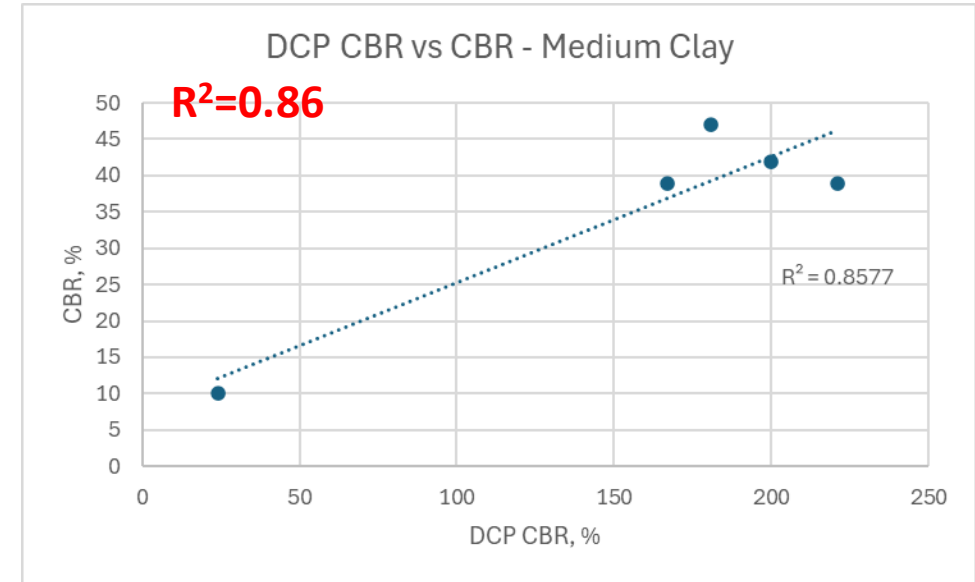
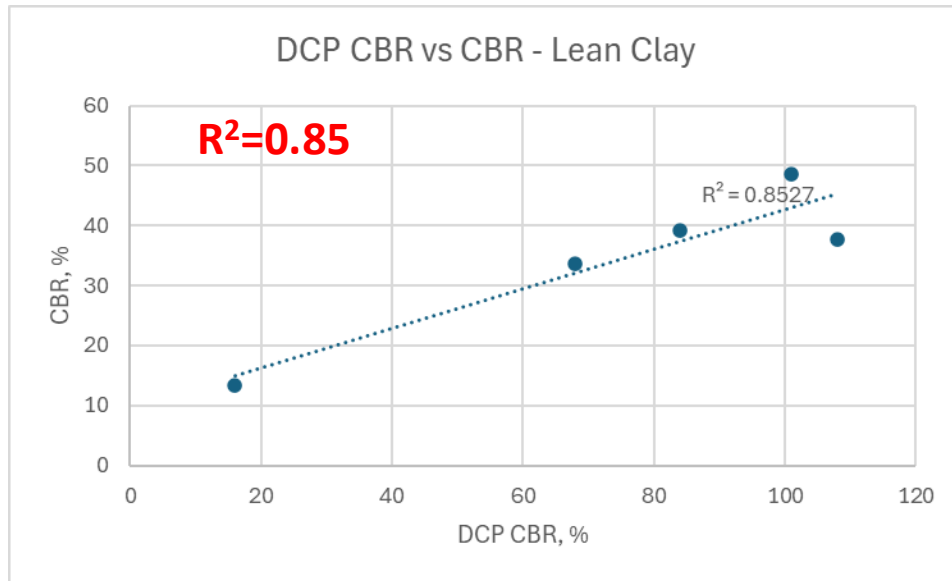


Fat Clay











## Conclusions

- Cement works – should be allowed as an option even in high PI clays
  - Requires mechanical effort
    - Mix as dry as possible
  - IL works
- As PI increases – Lime+Cem works best
- Common correlations may not translate to treated materials
  - Test project specific



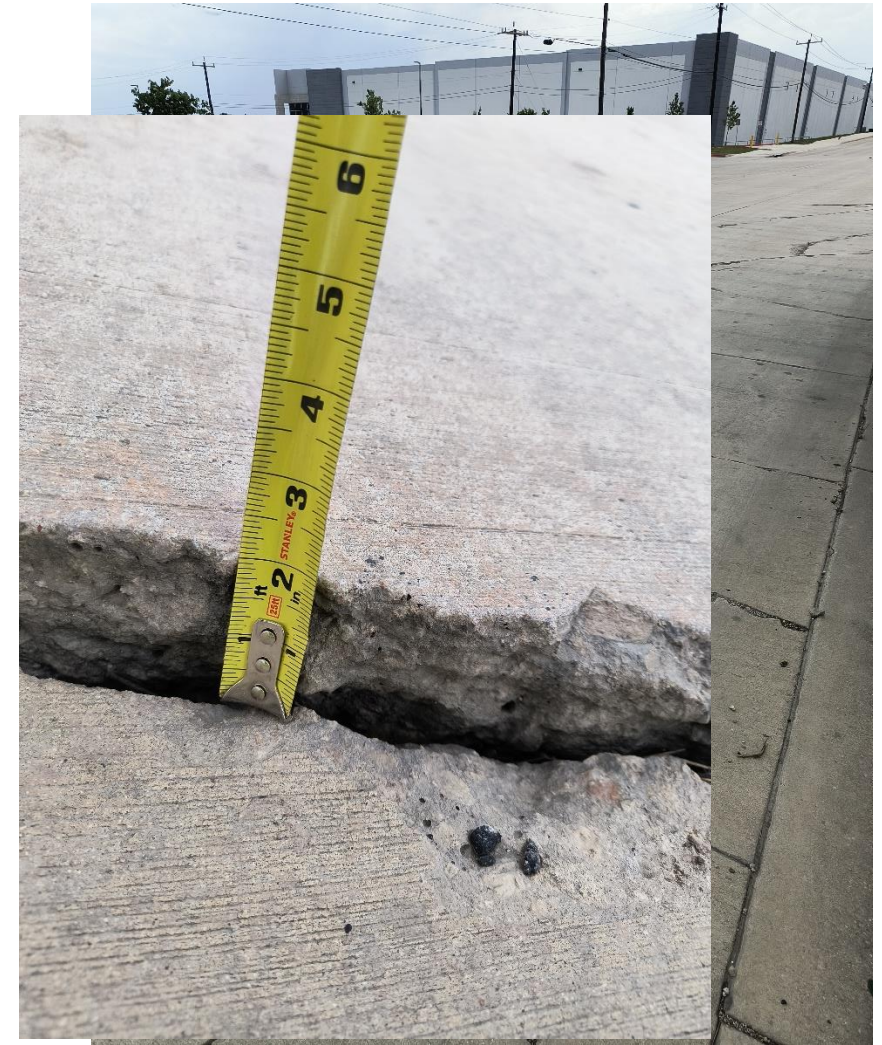


Raw PI = 62, PVR = 6 in ~ 10 years old

## The rest of the story



12 in. Cement = 1 in. differential; est 20-25% distressed slabs



6 in. lime = 2 in. differential; est. 10-15% distressed slabs





# The rest of the story

- Realistic expectations – no magic elixirs, “failure” still possible
  - What is failure?
- Treat as much subgrade as possible
  - 12 in.  $\leq$  ½ swell as 6 in. treatment
- Cement  $\geq$  Lime in performance
- Don't consider the use of cement when:
  - contractor doesn't know, engineers don't know how
  - no performance requirements
  - when you can't spend the money to get testing right
    - Sulfates, percentages, durability/swell
- Do consider use of cement when:
  - cheaper (schedule, material, labor, etc)
  - strength = durability = sustainability = resilience







# QUESTIONS?

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