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**15. SUPPLEMENTARY NOTES** 

## 16. ABSTRACT

In a comprehensive laboratory study, different tests namely, unconfined compressive strength (UCS) at the end of freezethaw/wet-dry (F-T/W-D) cycles, resilient modulus (Mr) at the end of F-T/W-D cycles, vacuum saturation, tube suction, and moisture susceptibility tests were used for evaluating durability of cementitiously stabilized subgrade soils. Five clay soils commonly encountered as subgrades in Oklahoma, namely, Port (silty clay with sand), Kingfisher (lean clay), Carnasaw (fat clay), Dennis (fat clay), and Lomill (fat clay) series, were utilized. These soils were stabilized with 6% hydrated lime (or lime), 10% class C fly ash (CFA), and 10% cement kiln dust (CKD). Cylindrical specimens of three different sizes were compacted and cured for 7 days. Then, Harvard miniature specimens were tested for UCS at the end of F-T/W-D cycles and moisture susceptibility (5hour soaking). Additionally, cylindrical specimens were tested for M<sub>r</sub> at the end of F-T and W-D cycles for evaluating the effect of F-T and W-D cycles on M<sub>r</sub> values. Further, Proctor size specimens were tested for UCS after vacuum saturation test. Additionally, a total of three different methods were used for conducting tube suction tests by taking into account different specimen sizes (4.0 in. x 4.0 in., 6.0 in. x 6.0 in., 4.0 in. x 8.0 in.) and compaction methods (standard Proctor and Superpave gyratory compactor). All the specimens showed a decrease in the UCS values at the end of F-T cycles and vacuum saturation. All the specimens tested in this study, in general, showed an increase in the UCS values at the end of 1 W-D cycle. The M<sub>r</sub> values of both raw and stabilized soil specimens were found to decrease with an increase in the number of F-T or W-D cycles. Overall, the Port series soil specimens (silty clay with sand) stabilized with 10% CKD offered maximum resistance towards F-T and W-D cycles. A similar trend of behavior is evident from the results obtained by moisture susceptibility and vacuum saturation tests where the Port series soil specimens stabilized with 10% CKD produced the highest retained UCS values. The Kingfisher series soil specimens (lean clay) did not show any clear trend with one particular additive. However, specimens stabilized with 6% lime and 10% CKD showed better performance, as compared to specimens stabilized with 10% CFA. All three fat clays used in this study (Carnasaw, Dennis, and Lomill) showed maximum resistance towards F-T and W-D cycles after stabilizing with 6% lime as compared to 10% CFA and 10% CKD. This fact was also evident from both moisture susceptibility and vacuum saturation tests. Further, a strong correlation ( $R^2 \approx 0.70 - 0.86$ ) between retained UCS after moisture susceptibility test and other durability indicators such as retained UCS after 1 F-T cycle, retained UCS after 1 W-D cycle, and retained Mr after 1 F-T cycle is evident from this study. This is an indication that moisture susceptibility could be used for evaluating long-term performance of stabilized soil specimens.

17. KEY WORDS Freeze-Thaw, Wet-Dry, Fly Ash, Cement Kiln Dust, Vacuum Saturation, Moisture Susceptibility, Tube Suction Test, Subgrade, Resilient Modulus.	18. DISTRIBUTION STATEMEN No restrictions. This publica Oklahoma DOT.		The Office of Research,
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