

**AN ABSTRACT OF A THESIS**  
**CONTROLLED LOW STRENGTH MATERIAL:**  
**EFFECTS OF CLASS C FLY ASH**

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Mix designers have incorporated fly ash in Controlled Low Strength Material (CLSM) for years and have seen great benefits from it. Fly ash in general will enhance a mixture's workability while also contributing to its strength gain. ASTM C 618 separates fly ash into classes, Class C or F, based on oxide content. Although both classes are commonly found in Portland cement concrete and CLSM mixtures, F-ash has been used more prevalently in Kentucky and Tennessee due to availability. However, numerous producers in these two states stock Class C fly ash exclusively and would benefit from research done on C-ash. This study is a follow up to a previous research project performed at Tennessee Technological University (TTU) that evaluated plastic properties, compressive strength, load applicability, and excavatability of various F-ash mixtures

A laboratory study was conducted on various C-ash CLSM mixtures to evaluate their plastic properties and compressive strength development over a one year period. Sixteen different CLSM mixtures were designed by modifying the Portland cement or Class C fly ash contents. All mixtures were tested for flow, unit weight, and compressive strength according to ASTM and Tennessee Department of Transportation (TDOT) procedures. Nine of the mixtures were drawn from the previous F-ash study but utilized C-ash in lieu of F-ash. These nine mixtures were compared in order to quantify the differences that could be expected when using either of the two fly ash classes. Inferences on the suitability for load application and excavatability of the C-ash mixtures were made based on the results and correlations from the F-ash study.

In general, C-ash CLSM mix designs will be more flowable and obtain higher compressive strengths when compared to F-ash mixtures of similar proportions. Based on this study producers could obtain mix designs that may be tailored to meet specific project criteria by being excavatable or non-excavatable and would likely be accepted by state agencies in Tennessee or Kentucky.