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## ABSTRACT

Thermal properties of subsurface geomaterials are important for the design and performance analysis of bored piles, a temporary and generally unregulated heat source subjected to the geomaterial conditions for conduction. This study aims to build a database of thermal conductivity, specific heat capacity, and the coefficient of thermal expansion (CTE) for Florida limestone and various soil types. Measurements were made following ASTM D5334 for thermal conductivity and a modified version of ASTM E1269-24 for specific heat capacity. For CTE measurements, a previously established method was used where limestone core samples were placed inside a water-filled, sealed steel mold and heated under controlled conditions to measure the volumetric expansion and contraction under thermal loading. Specific heat capacity was determined using Differential Scanning Calorimetry (DSC), while thermal conductivity was measured using a thermal needle probe in accordance with ASTM D5334. In this method, a constant heat flux is applied, and the thermal response of the sample is recorded by the sensor on the probe.

The measured thermal properties are being used in finite difference models of pile hydrating in layered soil and limestone, realistic simulations of thermal-mechanical interactions and pile stresses over the pile length. This type of coupled analysis will ultimately help to understand how the thermal behavior of the geomaterial influences the tension and compression strain development in the curing pile.