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Jonathan Stolz, Yaman Boluk, Vivek Bindiganavile



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Mechanical, Thermal and Acoustic Properties of Cellular Alkali Activated Fly Ash ConcreteJonathan Stolz, Yaman Boluk and Vivek Bindiganavile¹*Department of Civil & Environmental Engineering, University of Alberta, Edmonton, AB, Canada, T6G 1H9***Abstract**

This article characterizes a cellular system prepared from alkali activated Class C fly ash mixed with a preformed foam. The resulting mixture was cast at three densities between 1000 – 1400 kg/m³ and all tests were conducted under ambient drying conditions resulting in densities between 940-1310 kg/m³. A phase analysis of the components in the cell wall was performed using X-ray diffraction. The compressive strength ranged from 3-9 MPa, while the corresponding modulus of elasticity was between 850-1700 MPa. The thermal constants were measured using the Transient Plane Heat Source (TPS) technique per ISO 22007-2. Sound absorption and noise reduction coefficients were evaluated using the impedance tube method per ASTM C384-04. The results show that at an oven dry density near 1000 kg/m³, this alkali activated system is a viable alternative for thermal and sound insulation with properties comparable to those of current commercially available options.

Keywords: Alkali activation; Cellular concrete; Fly ash; Noise reduction coefficient; Thermal constants

¹ Associate Professor and Corresponding Author, (E) vivek@ualberta.ca; (T) 780-492-9661

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