Report on measurement of thermal conductivities of dry and moist Bottom ash powders

Michael Shapiro, 2005

Faculty of Mechanical Engineering, Technion

Thermal conductivities (defined as the heat rate passing perpendicular to a surface area due to a temperature difference, when its amount is dependent only on the temperature gradient) measurements were performed on powdered soils containing fine and coarse Bottom ash, and sand. Two type of soils were tested: dry solis lack of water after drying in the oven at 150°C during several hours, and moist soils containing water after reaching water saturation state.

Thermal conductivity of coarse and fine Bottom ash is found to differ insignificantly, with higher values up to 30% in the dry fine ash and 25% in the moist fine ash, compare to the dry and moist coarse ash, respectively.

Sand is found to be better thermal conductor than any Bottom ash, by a factor of 1.5 in the dry soils and up to 4 in the moist soils. Correspondingly, the effect of moisture is to increase the thermal conductivity by a factor of 4-8.

Additional measurements were performed under mechanical load of 30 kPa on the dry solis and 100 kPa on the moist soils, and it is shown that the effect of mechanical load is to increase the thermal conductivity by 15-25% and 10-25% in the dry and moist soils, respectively.