

Seminar Title	: Conference Return Seminar: Geotechnical properties of Alkali-Activated Fly Ash
Speaker	: Sambit Bohidar
Supervisor	: Dr. M. Gattu
Venue	: CE Seminar Hall
Date and Time	: 24 Dec 2024 (130 pm)
Abstract	: Class-F fly ash (FA) is a byproduct of coal-based thermal power plants (TPP), containing a considerable amount of aluminosilicates in the glassy phase. However, the poor pozzolanic/cementitious behavior of FA limits its direct usage as a geo-material. In this paper, the cementitious behavior of FA is improved by activating it with a sodium hydroxide (NaOH) solution. The compaction characteristics, unconfined compressive strength (UCS), California bearing ratio (CBR), and hydraulic conductivity were evaluated by varying the NaOH concentrations (2 M to 10 M) and curing durations (0, 7, 28, 60, and 90 days). The observation was made that the maximum dry density (MDD) increases and the optimum moisture content (OMC) of FA decreases with a rise in the alkali concentration up to 10 M. The strength properties (UCS and CBR) increase and hydraulic conductivity decreases with increased alkali concentrations and curing durations. A 28-day UCS of 5.20 MPa and a 60-day UCS of 17.3 MPa were observed at 8 M and 10 M concentrations, respectively. The 28-day-soaked CBR value of 574% was obtained at 8 M NaOH concentration. The hydraulic conductivity of compacted FA was reduced from 2.62E-7 m/s to 2.48E-8 m/s by activating it with 10 M NaOH solution and 28 days of curing. The scanning electron microscope analysis indicated that the changes in these geotechnical properties were due to the significant formation of cementitious gels in the stabilized material.