National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Study on Strength and Durability Characteristics of Copper Slag-Based Geopolymer Mortar
Speaker	: Aman Deep
Supervisor	: Prof. Pradip Sarkar
Venue	: CE Seminar Hall
Date and Time	: 03 Sep 2025 (10 A.M.)
Abstract	: Geopolymer mortar (GPM), which utilizes aluminosilicate precursor materials as binders, has emerged as an environmentally friendly alternative to ordinary Portland cement mortar (OPCM). These precursor materials typically include natural sources like metakaolin and volcanic ash, along with industrial by-products such as fly ash (FA) and ground granulated blast furnace slag (GGBFS). While GPM eliminates the need for cement, it still faces environmental challenges due to its reliance on natural aggregates, which contributes to the depletion of natural resources. To address this issue, researchers have explored replacing natural aggregates with waste materials to enhance resource conservation and promote effective waste management. Copper slag (CS), an industrial by-product, shows significant potential as a sustainable fine aggregate in GPM due to its non-toxic, non-hazardous, and non-leachable properties. This study provides a comprehensive evaluation of FA-GGBFS-based GPM incorporating CS as a fine aggregate. The results demonstrate that GPM outperforms OPCM in various aspects, including mechanical properties such as compressive strength and durability attributes like alkali-silica reactivity, acid resistance, and slake durability. These findings highlight the dual benefits of integrating copper slag into GPM, combining enhanced performance with sustainable construction practices, thereby addressing critical environmental concerns in the construction industry.