National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: A Review on Biochar-Concrete: Production, Properties and Sustainability
Speaker	: Mukthi Shivanjali (Roll No:523ce1005)
Supervisor	: Dr. M. Gattu
Venue	: CE Seminar Hall
Date and Time	: 11 Jul 2025 (02:45 PM)
Abstract	: The construction industry is a major contributor to global CO_2 emissions, significantly affecting climate change. Reducing the carbon footprint of cement-based materials is essential for sustainable development. One promising approach is incorporating biochar, a carbon-rich byproduct of biomass pyrolysis, as a partial cement replacement. Biochar improves the sustainability of concrete and enhances its mechanical, thermal, and durability properties when used correctly. This review thoroughly analyses biochar-concrete, covering biochar production methods, influencing factors, and types of biomass. It also discusses the physicochemical properties of biochar, its effects on the properties of both fresh and hardened concrete, and its role in carbon sequestration. Challenges such as optimizing mix design, ensuring compatibility with cement hydration, and large-scale application are examined, along with future research directions. This review emphasizes the potential of biochar to support sustainable construction while addressing key engineering and environmental issues.