National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: ASSESSMENT OF HEAT STRESS CONDITIONS AND ESTABLISHING MAXIMUM ALLOWABLE LIMITS & VENTILATION STRATEGIES TO PROTECT UNDERGROUND MINERS FROM HEAT RELATED HAZARDS
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Venue	: Seminar Hall, Mining Engineering Department
Date and Time	: 02 Apr 2025 (11:00 AM)
Abstract	: Heat stress conditions in underground mines significantly affect workers' health, safety, and productivity. Therefore, precise heat stress assessment is critical for implementing appropriate mitigation strategies. This study presents a comprehensive evaluation of heat stress conditions using both quantitative and qualitative approaches through field monitoring and questionnaire surveys with workers, respectively. The study revealed ventilation deficiencies in underground workplaces and the workers experiencing thermal discomfort. An Artificial Neural Network (ANN) model with hyper tuning was developed for estimating heat stress conditions the model demonstrated a good prediction accuracy with an R^2 value of 0.96. Additionally, an empirical equation was developed to estimate wet bulb globe temperature (WBGT) from ventilation survey data, providing a rapid and practical heat stress assessment tool for underground mines. The results of the present study highlight the influence of key environmental parameters on heat stress conditions and underscore the urgent need for appropriate ventilation strategies to mitigate heat stress risk and provide a safe and sustainable working environment in underground mines. In future work, this study aims to determine the maximum allowable limits of heat conditions to safeguard workers' health and frame suitable ventilation strategies to maintain a safe and healthy environment in underground mines.