
Registration Seminar

Seminar Title	: Design of roof bolts as goaf edge support based on roof-rib mechanics for extraction of pillars with stowing
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Venue	: Seminar Hall, Department of Mining Engineering
Date and Time	: 28 Apr 2025 (4:30PM)
Abstract	: Conventional goaf edge support methods in underground coal mining pose safety risks during erection and withdrawal in a semi-mechanised depillaring operation. These supports also suffer from reduced bearing capacity with increasing working height and reduces the rate of extraction. Application of roof bolts support system at the goaf edge is found to be effective during continuous miner-based mechanised depillaring operation due to adjacent stable natural support. It works irrespective to the height of working and enhances inherent properties of rock mass. However, application of roof bolt as goaf edge support during semi-mechanised depillaring remains underexplored. It is planned to investigate the possibility of roof bolt-based goaf edge supports (RBGES) during semi-mechanised depillaring with stowing through systematic field and numerical modelling study to avoid the above-mentioned safety risk. An attempt is to be made to addresses critical strata mechanics challenges, including roof-rib interactions, stress dynamics, and stability at the goaf edge. An attempt is also made to design suitable design of rib as per geo-mining conditions. Field investigations and numerical simulations are carried to evaluate RBGES performance under varying geo-mining conditions. Field study is carried out in different mines of Singareni Collieries Company Limited (SCCL) and Eastern Coalfields Limited (ECL). Results of field study revealed that the natural supports including rib/ fender along line of extraction are found to be stable to provide confinement to the roof bolts supports in the adjacent gallery. Under the conditions, RBGES performed efficiently and no influence of stowed goaf was observed on the slice under extraction. Further, stowed goaf also provide condiment to the ribs and control the roof deformation efficiently. Preliminary study in few numerical models also observed that the RBGES can be a better option in a semi-mechanised depillaring with stowing. Aim of the study is to establish guidelines for RBGES, rib design and critical unstowed roof span in goaf during depillaring with stowing to improve coal recovery and safety. A detailed field and numerical modelling study are required to develop the guidelines.