



# Safety in Coal Mines

CMRI is not only engaged in development of mining technologies/methodologies for exploitation of complex coal deposits in different geo-mining conditions to have better ground control, better safety and higher recovery but has put commendable research including Numerical modelling exercises. CMRI has also initiated and already taken-up many multi-disciplinary research-works to suit the requirements of mining industry and conducted many seminars/workshops/ HRD courses to disseminate the knowledge to the people from industries.

## EXPERTISE

- \* Subsidence prediction and control.
- \* Three-dimensional subsidence prediction.
- \* Depillaring under hard incavable rocks or poor rocks using the yield pillar technique.
- \* Pillar design for long-term and short-term stability.
- \* Two and three-dimensional numerical computer modelling for underground excavations.
- \* Extraction below built-up areas, water-bodies, etc.
- \* Pillar and excavation stabilisation measures.
- \* Problems associated with conventional and special depillaring methods like the blasting gallery method.
- \* Design of yielding chain pillars in longwall extraction.
- \* Problems on rock burst/coal bump
- \* Support performance evaluation and monitoring.
- \* Geomechanical rock characterisation, support design during development and depillaring.
- \* Mine Design by progressive instrumentation and strata management

# Achievement

- Design of safe and eco-friendly mineral extraction-patterns, stability evaluation by numerical modeling techniques, design of support system and related strata- management strategies
- Design of guidelines for support in semi-mechanised bord and pillar depillaring working areas : on-going grant-in-aid project, near-to-completion
- Subsidence prediction approach for single seam workings in SECL Areas : Successfully completed grant-in-aid project
- Parting stability and Support requirements in coal pillar workings in level contiguous seams during depillaring and validation at Bord & Pillar mines : on-going grant-in-aid project
- Delineation of workings in 3 locations of ECL and stability analysis and validation by strata management with an aim to protect important surface and sub-surface properties: sponsored multi-disciplinary projects
- Geo-environmental assessment of subsidence hazard due to coal mining around Dhanbad and Jharia areas using Geo-informatics techniques: multi-institutional grant-in-aid project
- Problem-solving and suggesting solution of related geotechnical issues on the above mentioned activities and the subjects of on-going projects

## SOME TANGIBLE BENEFITS

- to plan extraction safely and efficiently to make underground mines viable
- roof bolting is increasingly receiving attention not only because of paucity of timbers but also because of better efficiency and confidence getting developed because of technical back-ups provided by CMRI.
- Definite results: the roof bolting with the use of resins is not only a safer but also an economical option compared to cement grout bolting, prevalent use now-a-days.
- Economics are worked to find out a better option of safe coal-pillar extraction