



## **ROCK STRESS FACTORS IN MINE DESIGN AND OPERATION**

A number of recent incidents, including serious and fatal accidents, warrant the issue of an advisory note to employers, mine managers, technical and supervisory staff and employees regarding the importance of issues connected with the proper management of mining operations under the influence of natural and mining-induced rock stress.

As mining operations in Western Australia exploit mineral reserves at ever-increasing depths below surface, the part played by the local stress regime in the safe working of individual mines (particularly, though not necessarily exclusively, underground operations) is assuming a rapidly increasing importance. Emphasis must be placed on ensuring that problems arising from rock stress are clearly identified, subjected to the necessary technical analysis, and the risks managed to avoid injury to personnel from sudden and unexpected failure of the rock mass.

There is a risk that mining techniques (including managerial, geotechnical and supervisory practices) which have been developed over a number of years in the exploitation of relatively near-surface deposits, may be automatically applied to deeper operations which really require a substantially different approach. It is essential that the industry develops across all enterprises and operations an appreciation of the magnitude of the problem and its potential for increased incidence of sudden rock failure.

The general duty of care obligations in the Mines Safety and Inspection Act require that employers and managers at mining operations thoroughly examine, in this context, existing practices in the following areas:

- Measurement and understanding of the rock stress regime within which the mine is worked;
- Education of managerial and supervisory staff and mine workers on the effects of rock stress and how to recognise them;
- The appropriateness of the overall mine design and local-scale design of development and extraction openings within the mine, having due regard to the pre-mining stresses and to mining-induced stresses to which the mine is subject.

Of particular importance are such issues as size, orientation and reinforcement of mine openings, extraction and fill sequencing and design, and the ability of technical, supervisory and managerial staff and workers in the mine to detect and deal appropriately with the effects of rock-stress.

There is now available a great deal of information derived both theoretically and empirically, and from collation of practical experience.

The availability of this information, and of geotechnical professionals skilled and experienced in its application, requires that these issues are fully accounted for in doing all that is practicable in maintaining safe places and systems of work.

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