

Safety in Mines Research Advisory Committee

Project Summary: GAP816b

Project Title	Review of past research areas – seismology and mine layout design
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Report Date:	14 February 2002	Related Projects:	None
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Category:	Gold and Platinum	Review of fundamental research	Seismology and mine layouts
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Summary

The Safety in Mines Research Advisory Committee (SIMRAC) has managed research on behalf of the mining industry since 1993, and is now becoming concerned that the industry may not have implemented many of the results. SIMRAC selected six projects, valued at R52.89-million, to be evaluated under Project GAP 816b for their level of implementation in industry. The six projects with abbreviated titles are:

1. SIMRAC Project GAP 017: Seismology for Rockbursts: Control, Prevention and Prediction;
2. SIMRAC Project GAP 034: Deep Mine Layout Design Criteria;
3. SIMRAC Project GAP 223: Deep Mine Layout Design Criteria (continued);
4. SIMRAC Project GAP 303: Mine Layout, Geological Features and Geological Hazard;
5. SIMRAC Project GAP 336: Preconditioning;
6. SIMRAC Project GAP 409: Seismology for Rockburst Prediction.

The objectives of GAP 816b as defined by SIMRAC are:

1. To compile a succinct and clear summary of the research outputs of the six project reports listed above;
2. To list those research findings that can be implemented together with guidelines on how to implement them;
3. To analyse the research done in the six projects and identifying gaps in the research;
4. To provide general guidelines for future research.

The work is tackled by studying the six project reports, summarising them, noting their outputs, and evaluating them for their implementability in industry. Then gaps in the research are identified and future research guidelines are given. There is a danger that this work may have a bias, originating from the personal perceptions and prejudices of the project leader. In order to avoid such a possibility, a survey of the level of

implementation of the research in industry was carried out. An outside collaborator in industry then evaluated the work.

Conclusions

The study has found that research into seismic monitoring will produce the most beneficial results for deep level mining. Fundamental aspects, such as event location accuracy, and more precise seismic source and seismicity quantification should be addressed. Automatic p- and s-wave picking in seismograms represents the last real bottleneck to real-time monitoring. This, and accurate seismic source quantification, are important steps towards improved seismic prediction.

Future research strategy therefore seems clear: develop seismic monitoring techniques with particular emphasis on the accurate quantification of seismic parameters such as location and size. Then develop real-time seismic monitoring, concentrating on accurate automatic seismic event location technology. Once seismic monitoring techniques have been perfected, and rockmass behaviour understood, mine layout design will come naturally.

There are two overall conclusions that can be drawn from the industry study:

- The research outputs are being implemented where they are perceived to add value;
- The level of research implementation is higher than is perceived by the observer.

Overall there is a high level of awareness in the industry of SIMRAC research, although it is often associated with the contractor who did the work. The high level of awareness probably arises because of pressure to reduce accident levels, and by SIMRAC marketing of the results by workshops, papers, seminars and product launches.