

Safety in Mines Research Advisory Committee

Project Summary : OTH 003

Project Title:	Establish the primary causes of accidents on mines other than gold, coal and platinum 39p, 1 Appendices 16p.		
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Category:	Other	Fundamental Research	Rock Engineering; Engineering

Summary

This project comprised an analysis of five years= accident data as recorded on SAMRASS (South African Mining Reportable Accident Statistics System) and a study of reportable accident investigation reports.

The more than 2800 reportable accidents which occurred on mines other than gold, platinum and coal during the period January 1988 to December 1992 provided the database for statistical analysis. The data stored on SAMRASS is derived from the MD16A and MD16C forms (now Forms 10 and 11), and represents a summary of the circumstances and other conditions relevant to the accident. The most important data available are the type of accident, the type of working place, the activity of the injured mineworker, the day of the week and time of day, the assessed cause, the type of injury sustained and the allocated severity expressed as days lost. In addition, more than 180 accident investigation reports encompassing a representative range of accident types were reviewed to obtain more qualitative information.

The distribution of risk, as measured by allocated lost days, attributable to different accident types is presented in the pie chart, Table 1. It is evident that a wide variety of accident types is responsible for the occupational safety risk, with accidents of an operational nature (eg falling, slipping, free steered vehicles, explosives) predominating as opposed to technical failures (eg fall of ground, explosion).

Table 1
Major accident types

Accident type	Risk (%)
Free steered vehicles	14,5
Fall of ground	13,4
Machinery	7,6
Falling in shafts or from structures	7,1
Inundation/drowning	6,0
Falling material or ore	4,7
Explosives	4,1
Conveyance	2,7

With the wide variety of commodity types in the other mining sector and associated different mining methods, different distributions of accident types are identified for the various types of underground and surface mining. The differences in the distributions tend to reflect the degree of mechanization, the type of ore, men and materials transport systems used and the nature of mining machinery.

The report emphasizes the importance of effective training in preventing accidents. According to both the statistical analysis and the review of accident investigation reports, the most frequently cited cause of accidents is a failure to comply with recognized good practice or work standards. It is inferred that the reasons underlying this immediate cause

are mineworkers not receiving proper training, mineworkers not carrying out tasks as they have been taught and mineworkers being allowed to perform work in an unsafe manner. The full distribution of allocated lost days attributable to the various assigned causes is presented in Table 2.

Table 2
Dominant assigned accident causes

Accident cause	Risk (%)
Failure to comply with good practice/standards	30,4
Lack of caution or alertness	15,5
Inadequate examination, inspection or test	12,2
Safety or protective devices	10,8
Failure to comply with instructions	9,0
Unsuitable equipment or facilities	8,6

Inspection of Table 2 reveals a strong preference for assigning immediate acts of omission or commission rather than the root causes which are possible selections. This to some extent restricts the usefulness of the information in terms of establishing research needs since, to have a real impact, research projects must address the root causes of accidents. Nevertheless, based on the information, the authors conclude that seven areas would represent areas for research where significant impact could be made on mine safety. These are human behaviour, employee education and training, guarding of machinery, handling and use of explosives, systems and methods for handling heavy or awkward equipment or materials, operation and maintenance of machinery and warning systems on mobile equipment and vehicles.

Conclusions

- X A wide variety of accident types are experienced on mines other than gold, platinum and coal with accidents associated with operational problems featuring more prominently than accidents of a technical nature
- X Free steered vehicles and falls of ground are the largest individual contributors to risk.
- X The distribution of accident types on each commodity reflects the mining method and types of equipment employed
- X Failure to comply with good practice and standards is identified as the most important cause of accidents
- X While it was found possible to establish the circumstances and immediate causes of accidents, the data available to the study restricted the degree of insight which could be provided on the root causes of accidents
- X Training and education are identified as the most critical areas for improvement in safety