Safety in Mines Research Advisory Committee
Project Summary: HEALTH 602

Project Title:	**Investigation of survey designs to determine full shift exposure of selected personnel in different occupations to respirable dust & radiation in gold, platinum & coal mines (3 volumes, total 151p)**		
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Category:	Health		

Summary

The intended main purpose of the project was to design an independent baseline survey, based on occupations and job categories, of exposure to respirable dust and radiation in gold, platinum and coal mines, the primary intention being to enable the use of the subsequent data for future epidemiological purposes.

As the project progressed, a number of key features emerged which had a significant influence on the potential scope of the project and the ability to design meaningful surveys to meet the original project mandate. In summary these relate to the absence of a clear consensus with respect to any underlying epidemiological basis for such a survey and that underlying assumptions regarding industry wide occupations and job categories, upon which sampling populations could be based are incorrect.

These issues were examined and the characteristics of the actual populations considered. A theoretical survey design based on actual populations was evaluated together with a design based on DME (1999) job code populations.

The resource and programme implications of such approaches were determined and it was concluded that a statistically based independent industry wide base line data generation exercise, based on the actual populations, could take many years to complete and require a significant resource commitment. It was concluded that such an approach is unlikely to be useful or practicable, however surveys based on DME codes may perhaps be more practicable if their use becomes widespread, although the usefulness of the resultant data was questioned.

An outline strategy to address these issues was discussed and considered in the above context.

Conclusions

- Recent statistically designed independent dust exposure surveys are fairly rare. Internationally, the trend has been to make use of operator-collected data for dust exposure studies.
- While many studies have been conducted examining dust exposure data and linking existing exposure rate data to diseases or effects the accuracy of exposure data is not evaluated, and is generally accepted as a "given", without consideration of how data were obtained, or of confidence limits. Literature detailing actual dust survey methods to obtain statistically accurate and representative exposure data is limited, and the most useful sources date back to the late 1950's and 1960's.
- Due to the fact that equipment which is now outdated was used in many of the surveys reviewed limitations on the accuracy of associated exposure data exist. Sampling methods used in such older studies are also likely to have introduced inaccuracies.
- Although use of operator-collected data overseas is the norm, there is a noticeable lack of use of such data in South Africa, apparently because the information is not in an ideal form, and uncertainties exist with regard to its accuracy.
- There is no obvious commonality of job category and occupation descriptions used in formal employment records within the Gold, Coal, and Platinum mining industries.
- There does not appear to be any clearly defined industry wide discrete (statistical) exposure populations based on occupation from which to draw samples, and upon which a survey design could be based. Discrete populations based on job category and occupation exist only at individual mine level.
- Dust exposure data is generally collected for a specific purpose, and that that purpose determines the methods and procedures used during the collection and analysis process. There are thus numerous factors which influence the extent and design of any survey. As such the underlying epidemiological basis for any independent exposure surveys have not been explicitly determined in a structured and holistic fashion such as to enable the objective design of useful or meaningful exposure surveys at this time.
- Survey strategies consisting of assessments of exposure of the existing populations to only basic dust and radiation parameters could take many years to complete at significant cost and are unlikely to be practicable or useful.
- Given that industry wide exposure surveys and epidemiological studies often require a period of several years for completion, recognition should be taken of the dynamic nature of the industry and the evolution of new work practices e.g. multi-skilling, mechanisation etc. The effect is that the work content of specific occupations may change radically over relatively short time periods and therefore any common unified coding system is likely to have only a limited period of validity.
- The intended use of any industry wide exposure survey data should be clearly specified prior to commissioning any industry wide exposure survey.
- While operator-collected data in South Africa may be associated with certain limitations, its usefulness for future research should be carefully considered before commissioning any independent surveys.
- The issue of dust exposure and radiation exposure assessment for epidemiological purposes should form part of a strategically structured programme developed within the context of a clear and agreed occupational health related policy with associated objectives.