A Review of the Queensland Mines and Quarries Annual Safety Performance and Health Report

Final Report

11 October 2007

Professor Tony Parker
Institute of Health and Biomedical Innovation, QUT

and

Assoc Prof David Cliff
Minerals Industry Safety and Health Centre, UQ

Table of Contents

A Review of the Queensland Mines and Quarries Annual Safety Performance and Health Report

1. EXECUTIVE SUMMARY

The overall aim of this project is to review the content and communication effectiveness of the Queensland Mines and Quarries Annual Safety Performance and Health Report.

Specifically the review considered:

- The validity and accuracy of the accident and incident data currently included in the annual Safety Performance and Health Report
- The effectiveness of the report in communicating health and safety data across the Queensland mining industry;
- The possible inclusion of other key performance indicators in relation to international best practice in this area; and
- The need to provide a more proactive and preventative measures associated with health and safety performance.

A plan for consultation with industry was implemented to include a broad range of stakeholders including unions, management, regulatory authorities and others. This involved structured focus group discussions, individual discussion and on-line submissions. The response from the mining companies was extremely limited with only nine participants in the regional meetings. The project team then catalysed input from industry through direct contact and industry association meetings.

1.1 CONCLUSIONS

General

- There is no “best” practice model for reporting Safety and Health performance.
- Very few industries as a whole do any reporting of Safety and Health performance.
- Mining company Safety and Health reports are generally mainly narratives of initiatives and programs implemented to improve performance with some statistics.
- The DME report represents the most comprehensive safety performance statistical report available for an industry.
- The effort put into compiling the annual Safety Performance and Health report is not reflected in the attention industry currently pays to the document.
- In general, industry is not aware of the other reports such as HPI’s, generated by the DME through its webpage and by email.
- As measured by all of the traditional lag indicators (LTI, Fatality and WC data) there has been a general improvement in safety performance over the past decade in the Queensland Mining Industry.

- There is an attitude amongst some sections of the mining industry that they do not need to bother about reporting information accurately as the DME do not do anything meaningful with it.
- There was strong support for the DME annual report and other reports to be used to assist in improving OHS performance rather than merely reporting statistics.

Validity and accuracy of accident and incident data currently included in the annual Safety Performance and Health Report

The current data reported in the DME Annual Safety Performance and Health report is inadequate because:

- Over 50 % of injuries that result in the worker not being able to carry out their normal work on their next shift are not collected in any detail. This is due to detailed reporting being limited to LTI and not including DI or RWI.
- There is limited analysis of the severity or duration of injuries or illnesses.
- The collection of permanent disability injuries and illnesses is not adequate. This may be due in part to the definition used in the annual DME census report referring to incapacity. There were some instances reported where workers with permanent disabilities received redundancy or retrenchment payment rather than Workers Compensation.
- A number of cases of permanent disability were reported to the review that had been identified at the mine site as not LTI but either DI or MTI and as such not reported as LTI.
- Some industry personnel who fill out the DME forms are inadequately trained in understanding the definitions of the terms.
- The definition of HPI is governed by regulatory definitions rather than being for incidents with a high potential to cause death or serious injury and needs to be revised.
- The current method of reporting individual mine performance may encourage the underreporting of incidents.
- The current practice of presenting awards to mines who have no LTI may encourage underreporting of incidents.
- There is a perception that mines will be penalised by the DME for reporting too many incidents.
- The form for reporting injuries is too long and complex.
- There is little data checking and validation carried out by the DME.
- The form contains no real occupational health or disease data.
- The focus on LTI and the small number of LTI per mine makes derived parameters very sensitive to small variations and encourages underreporting.
- The ability to categorise and dissect LTI is limited by the relatively small number of LTI.
- The use of ICAM incident analysis is of dubious value due to the input format of the forms, the limited training of data entry personnel in ICAM and the use by a number of companies of alternate incident investigation techniques that are not necessarily transposable into the ICAM format.
- A number of comments were made that some contractors and subcontractors were not reporting all the accidents and incidents that they were involved in.

This was apparently sometimes due to safety targets being a condition of contract.

The effectiveness of the report in communicating health and safety data across the Queensland mining industry

- The low number of respondents to the review may indicate that the Queensland mining industry does not place great reliance on the DME annual report to assist them in managing health and safety. The major companies particularly focus on internal incident reporting and analysis processes.
- There is no effective communication of occupational health data in the report.
- The inconsistencies in applying incident and injury definitions by companies especially HPI and DI have contributed to the low level of emphasis placed upon the report.

The possible inclusion of other key performance indicators in relation to international best practice in this area.

- The report could include data on occupational hygiene exposure of workers to the various common hazards:
    - Respirable dust
    - Respirable silica
    - Noise
    - Diesel Particulate Matter
    - Heat Stress
    - Chemicals such as cyanide or lead
    - Ionising radiation
- These data could be reported by similar exposure groups to allow mines to benchmark against the industry norms.
- There are a number of lead indicators of safety performance that could be included. Many relate to specific processes and would suit targeted initiatives aimed at addressing specific issues. Lead indicators could be used in the areas of training, use of PPE, and audit compliance results.
- Information relating to work related travel incidents should be collected, analysed and reported. The TRAVELSAFE group may provide useful guidance on this issue.

The need to provide more proactive and preventative measures associated with health and safety performance.

- Many of the respondents asked for case studies and examples of best practice to assist them in managing health and safety.
- Many respondents wanted the data that is reported to be interpreted rather than merely reported.
- A number of respondents wanted to get access to the raw data to allow them to make their own analysis and interpretation and focus on areas of concern to them.
- A number of respondents wanted more detail on coroner's investigations and the findings and recommendations coming out of them. It would be possible to report on the progress in implementing these recommendations.

1.2 RECOMMENDATIONS

Case studies and examples of best practice

1. The annual report should include examples of good practice in the industry in health and safety performance.
2. The annual report should include case studies demonstrating how individual mines are managing specific health and safety issues.
3. The annual report should reference information and practices from other countries and jurisdictions.
4. The annual report should include in depth studies on particular OHS issues such as fatigue, diesel particulate matter or tyre changing.

Occupational Safety indicators

5. Serious injury should be extended to include disabling injury as well as lost time injury.
6. Injuries should be monitored by severity (number of work days not at normal work) as well as number of injuries.
7. The definitions of what constitute HPI needs to be revisited.
8. The detailed analysis to determine underlying causal factors should be undertaken by suitably qualified specialists such as the occupational hygienists, ergonomists and human factors personnel currently employed by the DME. This may necessitate the DME requesting additional information from the mines on the targeted injuries.
9. Workers compensation statistics should be included for comparison and data verification as well as providing some occupational illness information.
10. The definition of incapacity should be amended to industry accepted phraseology that enables capture of permanent partial disability.
11. The annual report should contain current data where possible from other states and countries for benchmarking.
12. The practice of reporting the data for individual mines should be discontinued
13. The incident reporting form should be simplified and the ICAM fields removed.
14. Routine analysis of injury data should be rationalised and more detailed analysis restricted to identified specific areas of interest or concern where considered appropriate. This may require additional investigation and data collection by specialists.
15. Options for collecting statistics on work related travel incidents should be investigated.

Occupational Safety Lead Indicators

16. The department should develop in consultation with industry a list of lead occupational safety indicators from which individual mine sites can choose an appropriate sub-set.
17. The annual report should include the outcomes of generic and operational lead indicators for safety effectiveness and occupational health.

Occupational Hygiene Lead indicators

18. (a)The report could include data on occupational hygiene exposure of workers to the various common hazards:
    - Respirable dust
    - Respirable silica
    - Noise
    - Diesel Particulate Matter
    - Heat Stress
    - Chemicals such as cyanide or lead
    - Ionising radiation

    (b)These data could be reported by similar exposure groups to allow mines to benchmark against the industry norms.

Occupational Health Indicators

19. A more holistic approach to health care should be supported and encouraged through inclusion of information in the report which recognises the extent of health promotion activity, the quality control procedures in place and the impact of such activity such as participation rates, and changes in health status and behaviour.
20. In relation to the previous recommendation:
    a. It is recommended that the type of health surveillance carried out in the coal sector be investigated for expansion across the other sectors.
    b. Review the current health surveillance practices within the mining industry with the aim of developing a more preventative and proactive approach to health management and to provide opportunities for evaluating the outcomes of quality interventions with respect to prevention of work related injury and disease.
    c. Provide appropriate resources to maintain and analyse the DME health data bases to provide short and longer term trends in injury and medical disorders for inclusion in the DME annual report. This should include information from all sectors of the industry.
21. The analysis of existing industry data sources should be enhanced to include information on injury, illness or disorder rates according to demographic characteristics, (age, gender, and ethnicity) particularly age.
22. The report should include health information incorporating levels of psychological and sleep disorders and strategies in place to address these issues.
23. Information should be included which identifies opportunities or barriers to effect appropriate rehabilitation related to the availability of resources for preventive health, rehabilitation processes and early return to work. This would include for example, number of personnel involved in immediate treatment and rehabilitation processes, access to medical and allied health specialists, expenditures on prevention and rehabilitation, opportunities for alternative duties and reintegration following injury.
24. The use of survey instruments should be encouraged to provide additional data to identify the status of safety and health performance in the workplace. Selected results could be reported as case studies within the annual report.

25. The use of a modified version of the Work Ability Index (WAI) developed at the Finnish Institute of Occupational Health is recommended. The WAI provides a composite measure of health status, such as the number of medical conditions and their impact on individual work ability. It may be used in conjunction with medical examinations to allow longitudinal data collection on the work ability of individual workers. The information would also provide industry-wide knowledge of the work ability status of the workforce and opportunity for benchmarking with other industries. This would allow the mining industry to compare its performance against general international practice.
26. The DME should ensure that doctors carrying out medical examinations of miners have a basic knowledge of the mining environment.
27. The extent and impact of strategies to evaluate and reduce exposure to mechanical loading, and key (evidence based) risk factors for musculoskeletal injury, such as repetitive movement, awkward postures, manual handling, ergonomic interventions etc be included in the annual report.
28. It is recommended that reporting of implementation of strategies designed to communicate and increase awareness of the risks to safety associated with poor health status such as obesity, sleep apnea etc., be encouraged. Reporting of these initiatives may be progressively developed, initially using a case study approach and evaluated for inclusion in the annual report based on quality of the strategy/intervention with respect to evidence base, reliability and utility.

Incident and Accident reporting audits

29. The DME needs to undertake regular and unannounced audits of mine sites to ensure that incident and accident reporting, by both operators and contractors, is being carried out according to the regulations
30. The DME needs to maintain data verification processes to ensure the accuracy of reported data.

Training/Education

31. Training should be provided to mine personnel to ensure uniform application of definitions relating to the reporting of accidents and incidents.
32. Training should be provided to contractors and subcontractors to ensure awareness of the need to report all accidents and incidents. DME should conduct regular audits to ensure that training is effective.

Data collection/reporting

33. The DME should investigate the potential for mines to submit incident reports electronically direct from their own reporting systems.
34. The DME should explore ways of improving the accuracy of a simple electronic data base for recording information included in the annual report.
35. The DME should investigate the potential for mines to interrogate the injury and HPI databases directly.
36. The DME needs provide adequate resources for the enhanced collection, analysis and reporting of information in the annual report and other media.

GLOSSARY OF TERMS

AMMA	Australian Mines and Metals Association
AS	Australian Standard
ASCC	Australian Safety and Compensation Commission
AWU	Australian Workers Union
CFMEU	Construction, Forestry Mining and Energy Union
CI	Classified injury = DI + LTI
COMET	Common Mines and Environment Database
DME	Department of Mines and Energy, Queensland
DOCEP	Department of Consumer and Employee Protection, WA
DPI	Department of Primary Industries, NSW or Victoria
DPIFM	Department of Primary Industries, Fisheries and Mines, NT
DI	Disabling injury
DR	Duration rate
FR	Frequency rate – incidence per million worker hours
IR	Incidence rate – incidence per thousand workers
LTI	Lost time injury
MCA	Minerals Council of Australia
MSAC	Mine Safety Advisory Council, NSW
MSD	Musculoskeletal disorder
MTI	Medical treatment injury
NMSF	National Mine Safety Framework
NOSI	National Online Safety and Illness database
QCOMP	Queensland Workers Compensation Scheme
QISU	Queensland Injury Surveillance Unit
QRC	Queensland Resources Council
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
RWI	Restricted work injury, equivalent to disabling injury
SR	Severity Rate
TRI	Total recordable injuries = LTI + DI + MTI
WC	Workers' Compensation

2. BACKGROUND

There has been considerable discussion over many years with respect to the limitations of the traditional reporting of health and safety data which emphasises the more negative and reactive lag time indicators such as lost time injuries. In particular, discussion has focussed on the inability of outcome measures such as these to provide meaningful information about organisational health and safety performance. More recently, concern has been raised about the accuracy and validity of the reported data with examples cited of LTI being classified as disabling or medical treatment injuries. Additionally, injuries leading to permanent disability are believed to be underreported which may in part be related to some cases not ending up as workers compensation claims.

The more traditional measures have limited validity for use as measures of overall OH and S performance and have little predictive value. Consequently development of a more comprehensive and balanced approach to the reporting of health and safety performance with the inclusion of appropriate Positive Performance Indicators (PPI) is important and most timely. Development of these positive performance measures aligns with the objectives of the government sponsored National Mine Safety Forum initiative on data collection and reporting.

Lead indicators (LPI) which include positive performance indicators (PPI) have received considerable attention from industry groups overseas and detailed information concerned with the development and implementation of LPI's and PPI's are available. However industry application of the more appropriate industry wide indicators is more limited and remains the focus of considerable discussion internationally and in Australia.

PPI's aim to reflect the effectiveness of the OH&S processes that are implemented and which are relevant to increasing or decreasing the likelihood of an injury or health condition occurring. These indicators may also be predictive of health and safety outcomes. PPI's have been widely used within individual companies or mine sites, but no serious attempt has been made to incorporate them into whole of industry and sector reports such as are generated by the state governments and the Minerals Council of Australia. Guidelines for their use have been around since the late 1990's. However, significant differences may exist between those PPI's that an individual company uses to monitor health and safety performance and those that the industry as a whole can use. Consequently there is a need to consult with industry to identify PPI's that have been shown to be successful in measuring health and safety performance. This would involve consideration of a potential range of OH&S processes which could be benchmarked and which encompass indicators which extend beyond human behaviour, to those which address the total work environment and work organisation.

As for other measures of OH&S performance there is a need for reliable, meaningful and valid PPI's which are easily understood and of value in improving OH&S performance.

These criteria will also be used to review the current DME report together with its current utility and perceived purposes and value to the Queensland mining industry.

The project will use information derived from the international literature and from consultation with a range of industry groups including: corporate offices, individual mine sites, unions and other relevant stakeholders. This consultation will examine how and to what extent process or 'proactive' measures should be incorporated into injury data measurement systems and will provide a sound understanding of what works, what does not and why.

3. THE PROJECT

3.1 OBJECTIVES

The objectives of this project were:

1. To consider the current content of the Queensland Mines and Quarries Annual Safety Performance and Health Report and identify any inaccuracies and omissions and opportunities to enhance the validity and effectiveness of the reporting process;

2. To review similar reports and processes used in the mining industry and other industries, to provide an understanding of process measures in relation to health and safety performance which are currently in use; and

3. To make recommendations on changes to the current content and identify suitable process indicators that could be aggregated on an industry wide basis and used in the Queensland Mines and Quarries Annual Safety Performance and Health Report.

More specifically in satisfying these objectives the project considered:

- How data should be displayed and analysed in the annual report. The validity and accuracy of the current reporting process and the value of the information in enhancing strategies which assist in the prevention of injury and illness was also evaluated;

- What other information could be included in the report. For example, it has been suggested that the findings from coroner's inquests and progress in implementing the recommendations resulting from them should be included;

- The most effective and timely way to report the data with respect to the requirements of the end users and health and safety objectives. For example, it has been suggested that data should be released in a timelier manner and not just once a year in an annual report. The DME already provide a considerable volume of information on their website. These and other electronic mechanisms will be considered in order to enhance the reporting of OH and S information. Consideration will be given to including special interest topics such as travel related incidents or diesel particulate matter; and

- Evaluation of the data collection and validation mechanisms to ensure optimum accuracy of the data.

3.2 EXPECTED OUTCOMES AND BENEFITS

This project will provide information which may be used to enhance the current reporting process for Safety Performance and Health and the generation of an annual whole of industry OH and S report that does not solely focus on the traditional reactive measures of performance. The outcomes of this project will enable industry

to develop better strategies for preventing injury and illness and to benchmark performance both within and outside the industry.

The principal outcome of this project would be the development of a more comprehensive and balanced reporting process which identifies any relevant omissions and promotes the more positive strategies adopted by mine sites to prevent injury and promote a healthy workplace. The use of additional health related information would also promote strategies to improve health and better understand the strong relationship which exists between health and safety, as well as removing the perceived stigma of relying solely on lost time injury reporting and all its limitations.

3.3 METHODOLOGY

Prior to commencement of the review a Ministerial Reference group was established to determine the terms of reference for the review and advise on the proposed review procedures. This group also assisted in establishing contacts with key stakeholder groups and in organising meetings to facilitate the collection of information. Key stakeholders included but were not limited to:

- Department of Mines and Energy;
- CFMEU;
- Australian Workers Union (AWU);
- Queensland Resources Council (QRC) and member companies;
- Australian Mines & Metals Association (AMMA)
- Quarrying Association
- Other unions

The review was completed within a 3-month period which allowed time for consultation with key industry stakeholders. A range of strategies were implemented for consultation including structured focus group discussions at regional centres in Queensland, individual discussions and mail and on-line submissions. A web-site relating to the review was established early in the review process and served to raise awareness of the terms of reference for the review and the opportunity to make individual confidential submissions. The regional meetings were held in Townsville, Mackay, Mt Isa, Emerald and Brisbane.

Discussion focused on the terms of reference with questions used to guide the process and allow some degree of comparison across different groups and settings. While the focus of the discussion varied with the particular group involved a number of core questions or issues raised included:

- *What are the strengths and weaknesses in the current SP&H report?*
- *Do you find the annual DME report of value in managing OH&S at your site?*
- *Is the report widely disseminated and read within your company?*
- *Do you believe that the data presented in the report is valid and a true or meaningful representation of the injury and disorders in the industry?*

- *Do you believe that the injury data represented in the DME report is complete and includes all reportable injuries*

- *Is the method of recording of injury and the definitions used in DME process consistent with that in your own company?*

- *Do you feel that those involved in the recording of information for the DME report are adequately trained for this task?*

- *Is there any information that is currently in the report that you feel is redundant and of limited or no value to you?*

- *Could other information be included in the report?*

- *Are you using positive or lead performance indicators in your own health and safety reporting processes?*

- *What do you consider to be the more difficult areas in the reporting of injury/disorder? Eg. definition of condition (chronic as against acute injury or conditions).*

Information obtained from the various interactions was categorised and analysed with respect to the nature and degree of consistency in responses. The information was then synthesised and compared with data available from sources within the mining industry and other industries (appendix two) Recommendations were made on the basis of the results of the consultation process and relevant literature.

An oral progress report on the preliminary findings was provided with the DME and the Minister for Mines and Energy.

4. RESULTS AND DISCUSSION

.

4.1 STAKEHOLDER INPUT

In spite of extensive promotion of the review throughout the review period stakeholder input was limited. The regional focus group discussions attracted a total of nine attendees. There were no attendees in Townsville and Brisbane, three at the Emerald meeting, five at Mackay and one person attended the entire Mt Isa meeting. Two DME employees and the District Workers' Representative were also briefly at the Mt Isa meeting but were called away to attend an accident. The Member of Parliament for Mt Isa was unable to attend this meeting at the last moment due to constituency issues and sent her apologies.

The website attracted seven submissions. A detailed submission was made by the CFMEU, who also facilitated contact with two sets of solicitors who regularly represent workers in injury claims.

After numerous follow-up phone calls and emails to stakeholders, a presentation to the operators' forum at the Annual Queensland Mining Industry OH&S conference, and repeated contact with industry bodies such as the QRC, AMMA and the Quarrying Association, twelve responses were received from organisations and individuals. Submissions were also received from two OH&S consultants.

Discussions were also held with the Department of Mines and Energy personnel and a representative from QCOMP.

The lack of input generally and particularly from the metalliferous and quarrying sectors was disappointing and a significant limitation with respect to the consultation process.

Appendix one contains a list of contributors to the review.

4.2 COMPARISON TO OTHER SAFETY AND HEALTH REPORTS

The mining industry worldwide is unique in that it is the only industry, with the partial exception of the oil and gas industry, where occupational health and safety is managed separately to mainstream industry. As such it is the only industry where data are collected in detail separately to the rest of industry.

Comparison of mining industry performance to other industries other than through workers' compensation data is not possible, as the other standard indicators such as LTIFR, are either not collected or publicly reported by other industries, except for fatalities. Individual companies do report some of these parameters. The 2005-06 Queensland Workers' Compensation Scheme Statistics Report tabulates little injury specific information, The majority of the analysis is based on the whole of industry data. This does however indicate the type of analysis that may be available upon request to the DME. The report indicates that mining rate of claim is slightly above the all industry average. It ranks lower than manufacturing, government, transportation and storage, and wholesale trade. It ranks higher than 12 other

industry categories including construction and agriculture, forestry and fishing. Analysis of WC data would be possible by injury type,

General industry reporting relies on analysing workers' compensation data. The limitations of using this data are widely known, relating to variable capture efficiency due to poor reporting of injuries. Mining probably has a higher data capture efficiency than other industries due to the more comprehensive reporting procedures, the nature of the industry and the support offered by companies to injured persons. The accuracy of the data may be compromised by late reporting as a function of the delay before claims are processed and finalised. Permanent disability claims can take years to finalise. In NSW for example under the Coal Industry Workers' Compensation scheme, workers are allowed up to 78 weeks on paid leave from work before the case has to be resolved. According to Workcover NSW the average lost time frequency rate in NSW in 2004-05 was 17 per million worker hours. This does not include self employed persons who are not required to have worker's compensation insurance. This figure would include all injuries where compensation was paid for at least one day off work. This is considerably higher than average LTFIR of 4 for mining in Queensland as reported in the DME report. There is a difference in the manner in which the LTIFR figures are derived. The LTIFR for NSW mining derived from WorkCover NSW workers' compensation data would be about 21 when compared to the LTIFR derived from the MCA reported LTIFR value 14 which is sourced from DPI NSW and Coal Services data.

Recently, the Queensland Injury Surveillance Unit published a report on the injuries presenting to Queensland Hospital emergency wards. This report offers interesting analysis of the types of injuries reported but otherwise offers limited information of assistance to the management of injuries and illness at the mines. For example, the data are reported by the time the injury is reported to the hospital, which bears a variable relationship to the time the injury actually occurred. It does suggest that whilst the majority of injuries occur on day shift, the proportion of serious injuries to all injuries is higher on night shift than on day shift

4.3 AUSTRALIAN MINING INDUSTRY

Western Australia is the only state that offers a report of similar depth to that of the DME report. In addition to annual reports the DOCEP website allows access to significant incident reports, and individual fatality reports, sorted by commodity, surface or underground and date. These reports are freely available to anyone. Annual reports are available for download since 1997/98. The annual report currently reports:

- Fatal Accidents;
- Serious Injuries (LTI where person is disabled for >=14 days);
- LTI;
- Disabling injury;
- Workers Compensation premium rates, and number of injuries by part of body, nature of injury, location of accident, and type of accident; and
- Derived frequency rates.

The data are reported by commodity mined. The report discusses the allegations that LTI are managed to provide favourable accident reporting data, Since 2001-02

they have collected disabling injury data specifically to address this issue as DOCEP believe that DI are not amenable to this manipulation. The report is a statistical summary of performance and offers no real commentary or suggestion on how to improve performance.

It is interesting to note the comment in the latest report (2005-06) where due to the number of LTI being reported being so small "the value of the LTIFR as an indicator of safety performance is questionable and recorded improvements in the rate are more marginal". In 2005-06 there were 506 DI reported and 462 LTI. The serious injury rate (LTI >14 days) per million worker hours indicated that 75 % of LTI result in 14 or more days away from work.

The Mine Safety Advisory Council in NSW has begun issuing quarterly reports. The latest publicly available MSAC data is March 2006. These quarterly reports listed statistical information by sector relating to:

- Fatalities;
- Permanent and temporary disability based upon workers' compensation data;
- Serious injury - as defined by the legislation;
- Lost time injury frequency rate;
- Cost of WC; and
- Number of enforcement notices issued by legislative clause.

In addition for the coal sector, Coal Services Pty Ltd who manages workers' compensation for coal workers publishes annual reports based upon the claims made during the year. There are two annual reports (latest available is 2004-05) one focussing on analysing lost time injuries and fatalities and the other looking at injury and disease claims.

The lost time injury and fatality report presents information on:

- lost time injury trends over time;
- LTI for each mine, dissected by time lost (>=1 day, >=1 week, >=2 weeks and >=4 weeks);
- LTI for each mine, frequency, severity, duration and per million tonnes of coal produced;
- By mining company;
- LTI and claim for each contractor and claim rate and duration;
- 5 year history of LTIFR for each mine;
- LTI by nature of injury, part of body injured, mechanism of injury, employee activity, agency of accident, place of accident, and employee activity; and
- LTI were dissected by hour of day, day of week, age of worker and shift. Hour of day data were further segmented into no. of days lost, as above. The data were not normalised eg by number of people working at that time.

The data for the last dot point indicate some interesting factors:

- For all LTI, there is no apparent peak time;
- For severe LTI (>=20 days lost time) underground coal has a distinct peak at 2 – 3 am; where as open cut has a equal number of peaks 7 – 8 am, 3 – 4 pm, 4 -5 pm, midnight to 1 am and 4 -5 am. Interestingly between these peaks the LTI is often 0 or very low. This suggests a reporting issue. Note that the total

number of LTI for open cut coal in NSW in 2004-05 was 60 with 29 severe injuries. Thus dissecting into 24 parts may well give "bumpy" data. There were 247 LTI in the underground sector, though less than 100 were more than 20 days;

- When analysed by hour of shift underground does not show any strong trend with a slight peak in the 2nd and 3rd hours, Open cut have a distinct peak in the first hour with a second peak for severe injuries in hour 6 and 10; and
- It is therefore important to understand the limits and uncertainties in the data before drawing conclusions.

The injury and disease claims report contains:

- Analysis by claims per 100 employees;
- Age distribution compared to the age distribution of the industry;
- Extent of disability, temporary 6 months and over, permanent – over the past few years the total claim incidence is approximately 17 per 100 employees, temporary 6 months and over is approximately 0.25 and permanent about 1.4 claims per 100 employees;
- Duty status;
- Nature of Injury;
- Part of Body;
- Employee Activity;
- Occupational disease – dominated by deafness claims (64 % of occupational disease claims – 6.5 % of overall claims);
- Agency of accident; and
- Agency of injury.

The annual report of Coal Services contains two health and safety statistics; days lost per mineworker due to workers' compensation (fallen from 3.1 in 2000-01 to 1.4 in 2005-06 – allow for lag in claims) and lost time injuries per million man hours worked (fallen from 27 to 16).

The NSW DPI has also commissioned the University of NSW to undertake a series of targeted analyses of data in the COMET Database (Common Mines and Environment). Normally COMET data would not be accessible to anyone outside DPI. The data were analysed in an effort to provide industry with information to assist them in managing and preventing injury. Five areas have been identified for further research:

- Electrical energy;
- Mechanical Equipment;
- Work Environment;
- Hours of Work; and
- Contractors' involvement in accidents and incidents.

Detailed analyses have been published for electrical energy and analysis of the whole COMET database 1999-2005.

Victoria, via the Department of Primary Industries website offers information on Mining and Extractive Industries Health and Safety Statistics. Workplace injury is characterised by the lost time injury and related frequency, incidence and duration

data. The data are reported by sector and sub sector only. Whilst the website refers to health and safety reports only safety statistics are included (LTI).

Tasmania and South Australia do not centrally collect injury or incident data for the mining industry.

The Northern Territory Department of Primary Industries, Fisheries and Mines provide a single page report on their website that lists LTI and derived parameters. In addition they publish quarterly reports covering total recordable injury and derived frequency data by sector. The report also lists the total number of first aid injuries, medical treatment injuries, serious injuries (person unable to carry out their normal task for one or more full shifts), lost time injuries, LTIFR, severe injuries (injury resulting in a minimum of two full weeks off work) and fatal injuries. Severe injuries are dissected by breakdown agency, body location, nature of injury and mechanism of injury. Graphs of injury type by quarter and LTIFR by quarter are also included. Annual Mine Accident and Injury Summaries are also published on the website. These offer a detailed dissection of lost time injuries and frequencies across the industry, as well as listing the descriptions of severe incidents. No individual mine data is published.

The Minerals Council of Australia publishes an annual safety performance report as well as a quarterly bulletin. The annual report contains analysis of LTI and fatalities. The data are collected from the state authorities or, in the case of South Australia and Tasmania, direct from companies. There is virtually no mention of health nor the impact or variability of the severity of injuries. The quarterly report is based upon data directly from member companies, it summarises any fatalities as well as reporting LTI rates and total recordable injury rates. The quarterly report also contains safety news which is a digest of events and issues.

The National Mine Safety Framework – an initiative of the Ministerial Council on Mineral and Petroleum Resources, was initially developed by the Chief Inspectors of Mines, a sub-committee of the Council. There are seven strategies of the Framework, one being effective data collection, management and analysis. A tri-partite steering group was established in 2005, consisting of representatives from government, the state and federal mining industry bodies and the CFMEU and the AWU. In July of this year a discussion document and regional meetings were held looking into three of the strategies including the data strategy. The recommendation of the data working group was to adopt Australian Standard AS 1885 – Workplace injury and disease recording document, and customise it for the mining industry. In addition to filling out this form for each fatality, LTI, restricted duty injury, medical treatment injury or near miss, quarterly statistics will be gathered to allow calculation of frequency rates. In the future other statistical indicators will be considered such as lead, health and regulatory activity indicators. It is proposed that this reporting be in addition to any state regulatory reporting requirements. In the detail of the document supplied as a basis for the discussion it would appear that restricted duty injuries and medical treatment injuries will be reported on the quarterly summary document only. The document does not contain any duration data and thus any analysis would be simply based on the number of injuries and related frequency rates. The quarterly data includes requirements to detail the total number of days lost due to LTI, and restricted duties as well as the number of medical treatment injuries.

Many of the major mining companies focus on Total Recordable Injuries (TRI) as their principle injury statistic rather than LTI.

4.4 OVERSEAS MINING INDUSTRY

There appears to be very limited reporting of safety and health performance in overseas countries by governments. In the USA, MSHA report fatality number and frequency as well as non fatal days, lost injuries and frequency by mine sector and within the sector employee data is reported separately to contractor data and there is a further breakdown by work location.

In Canada, the situation is similar though fragmented by province. Good safety performance is defined by absence of reportable injury and mines who achieve this receive an award. Data published by the Ontario Ministry of Labour centres on lost time injuries, medical treatment injuries and safety training expenditure per employee. As well as reporting the workplace safety and insurance board premium rates for Ontario Mining Association members.

The Centre for Sustainability in Mining and Industry at the University of Witwatersrand, South Africa, maintain a Safety, Health, Environment and Communities Benchmarking database for the International Council of Mining and Metallurgy. Member companies are able to enter data and compare their performance against the average data in the database. The safety indicators used are:

- Number of fatalities and injuries;
- Exposure hours;
- Total lost days;
- Fatality rate per million or 200 000 worker hours;
- Injury rates per million or 200 000 worker hours – injury is defined as LTI or RWI;
- Severity rates per million or 200 000 worker hours; and
- Sub-indicators eg agencies in the fatality category.

The database has been going in some form since 2002 and companies as they join are encouraged to enter historical data into the database. Data are entered by mine and include employee and contractor data entered separately. Data are entered by calendar month, so individual detailed records are not kept of each incident. The database allows tailored reporting of the data within these confines.

These data are only available to member companies and the ICMM.

In terms of corporate safety and health reports most of the major mining companies, do still quote injury statistics, but place a greater emphasis on case studies and activities showing examples of how improvements have been achieved.

In the BHP Billiton Sustainability report 2006 for example, each individual fatality is listed and the circumstances of the event and the learning from the event are described. Injury frequency rates are tabulated based upon classified injuries (LTI+DI) and also they have started tracking total recordable injury frequency rates.

They benchmark against US and AUS industry averages. Severity is only reported through the average duration rate. Other items contained in the report include:

- Details of every safety fine (target 0);
- Near miss and Significant incident reporting numbers, dissected by fatal risk protocol type;
- Occupational exposures to noise and other pollutants are reported in terms of percentage of employees that would be exposed to greater than the occupational exposure limit if they were not wearing PPE. BHP describes what has been done and what will be done to improve the results;
- Occupational illness is reported under four categories; NIHL, All respiratory disease, repetitive trauma and other illnesses. In addition the percentage of employees who have completed required medical examinations. Again details are provided of occupational illness initiatives such as fatigue management programs;
- PPE compliance is reported; and
- Fines for health issues.

The full report details examples of lead indicators being used at sites. These include:

- Field visits conducted;
- Observations/audits/inspections conducted versus planned;
- Face time in field versus planned;
- Number of safety contacts;
- Safety communications conducted;
- Implementation of site safety action plan;
- Implementation of Fatal Risk Control Protocols;
- Implementation of action plans resulting from HSEC audit findings;
- Percentage of incidents investigated;
- Number of positive rewards and recognition given;
- Number of near misses reported;
- Number of repeat incidents;
- Percentage of Job Safety Analyses completed for critical activities;
- Percentage of safety behaviours observed;
- Percentage of actions implemented from observations;
- Percentage of significant incidents reviewed and closed out from circulation data;
- Percentage of hazards rectified; and
- Ratio of near misses to accidents reported.

In addition the report describes:

- The BHP approach to near miss reporting;
- Safety excellence awards;
- Contractor partnering and Engagement;
- Safety case studies relating to:
    - Road safety
    - Safety leadership
    - Confined space management
    - Learning from fatalities
    - Heavy equipment
    - Aviation safety

    - Safety in the supply chain.
- The BHP Billiton Sustainable Development Road Map;
- Health case studies relating to:
    - Community health clinics
    - HIV/AIDS management
    - Health Exposure management
    - Employee health.
- The Health report details the roadmap to a healthy workforce;
- The 2006 Performance summary, target versus actual:
    - Number of fatalities;
    - No. of fines;
    - Percentage of required risk assessments completed;
    - Degree of conformance with standards;
    - Percentage of sites with risk registers;
    - Classified injury frequency rate;
    - Percentage of sites implementing baseline occupational health surveys;
    - Percentage of employees who would be exposed to greater than the exposure limit if not wearing PPE; and
    - Incidence of occupational illness.

The Rio Tinto 2006 Sustainability report contains a similar mix of statistics and narrative. The safety targets are zero fatalities, 50 % reduction in LTIFR, and a 50 % reduction in all injury frequency rates. The health targets are: full implementation of occupational health standards, 40 % reduction in the rate of new occupational illnesses and a 20 % reduction in the number of employees exposed to in excess of the occupational noise standard. These targets are to be achieved by 2008 based on the 2003 figures.

Xstrata similarly focus more on narrative than reporting numbers and highlight initiatives aimed at improving occupational health and safety performance. Numerical targets are based upon LTIFR, TRIFR, No fines and penalties, no new occupational diseases, implementation of HIV/AIDS programs in Africa, meeting occupational exposure standards and all employees being trained in hearing conservation.

4.5 OTHER INDUSTRY

Generally the only statistics available on other industries as a whole is via the state or federal collections of workers' compensation statistics. On a federal level the most recent data available is for the period 2003-04 in the Workplace Relations Ministers Council Comparative Performance Monitoring Report on occupational health and safety and workers compensation schemes in Australia and New Zealand. Direct online access to workers' compensation data via the Australian Safety and Compensation Council website and the National Occupational Safety and Illness database is limited to 2003-04. The CPM report only details the whole of mining and compares claims incidence for 1 week or more and 12 weeks or more, standardised by the sub-industry mix by state. With the exception of NSW all states report 1 week or more incidences at below the national average. Only Victoria and WA report 12 weeks or more below the national average. In Queensland the incidence rate for both categories has risen from 1998-99 to 2002-03, most

significantly in the 12 weeks or more category, from less than 2 claims per 1000 employees to over 5 claims per 1000 employees.

The Australian Safety and Compensation Commission provides online access to the National Data Set for Compensation-based Statistics via the National Online Statistics Information (NOSI) system.

QCOMP report annually, but publicly the only mining information relates to analysing claims in terms of:

- Number of claims submitted;
- Number of claims finalised;
- % of claims finalised where worker:
    - Returned to work same task same employer (80.0%)
    - Returned to work same employer different task (4.7 %)
    - Returned to work different employer same task (1.5 %)
    - Fit for work different employer different task (3.6 %)
    - Fit for work employee does not return (2.7 %)
    - Fit for work no job (1 %)
    - Not fit for work (2.7 %)

In terms of claims per 100,000 employees; mining ranks fourth (5373.7) behind manufacturing (12373.9), government (7588.8) and transport (6240.1). This is marginally worse than wholesale trade (5335.6), construction (4258.2) and agriculture (3032.7). This is merely number of claims and does not account for severity. Mining had by far the highest average claim cost ($ 23,699) which is twice as high as the next industries and nearly three times the all industry average. The average duration of a finalised claim was 54.4 days, the highest of any industry. Most analysis in the report agglomerates all industry together, for such things as injury type, gender, geographical region, age. In 2005-06, 11.8 % of claims were for a work related impairment (73 % were for an impairment of less than 20 %).

The Workers Compensation data, suggests a greater improvement in safety performance for mining than for other industries over the past 5 years.

In Queensland all workplace serious injuries (fatality. loss of distinct part or organ, or absent from work for more than four normal working days), work related illness or a dangerous event must be reported within 24 hours to the Division of Workplace Health and Safety. These data do not appear to be used proactively.

The Queensland Department of Employment and Industrial Relations do set priorities for workplace health and safety management. They report numbers of full time equivalent staff, total expenses by DWHS and claims per 1000 workers. The key performance indicators are a 20 % reduction in fatalities by 2012 and 40 % reduction in workplace compensated injury. The achievements listed against the key priorities include:

- Reduction in workplace fatality rate; and
- Targets for regional compliance interventions identified using an evidence based approach and number of other process based outcomes.

In WA the department of Consumer and Employment Protection issued a State of the Work Environment Report which looked at workplace fatalities from 1988-89 to 2005-06. Worksafe WA does provide benchmarking data for individual industries on their website so that companies can evaluate their own performance. The data provided is based upon lost time injuries, frequency and incidence, split into 1+ days lost and 60 + days lost. The mining industry reports a lower 1+ day frequency than general WA industry (8.8 vs 13.8) and a similar though slightly higher 60 + day frequency (0.6 vs 0.5) within the mining sector 1+days frequency rates were:

- Oil and gas 6.3;
- Metal Ore mining 6.6;
- Coal Mining (OC) 11.5;
- Other Mining 16.4; and
- Services to Mining 12.4.

The Health and Safety Executive (UK) have issued a report looking at Offshore Injury, Ill Health and Incident statistics for 2005-06. This report looks at:

- Fatalities;
- major injuries;
- injuries resulting in more than 3 days off work;
- reportable diseases;
- dangerous occurrences; and
- dissection of injury by the standard categories.

The Health and Safety Executive issue Health and Safety statistics reports. The health data are based upon the self reporting by individuals from an annual Labour Force Survey as well as doctor reporting data. Fatalities and serious injuries are reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). Injury analysis is dominated by number and frequency analysis. The statistics are evaluated against national Health and Safety priority targets (*Revitalising Health and Safety*). These exist for the whole working population as well as specific industries, eg agriculture, construction, manufacturing and health services. The 2005-06 report listed enforcement details including number of notices issued and proceedings instituted. Ways of achieving these targets are set out in other documents on the HSE website.

The HSE are concerned about underreporting of injuries and have undertaken surveys of companies aimed at identifying the level of underreporting. These surveys have indicated that in general, 60-80 % of major injuries are reported to RIDDOR and only 50-60 % of over 3 day injuries are reported to RIDDOR. The majority of companies (54%) reported the same number of incidents to both systems. Thirty four % reported fewer injuries to RIDDOR than in the survey. The overall reporting level to RIDDOR was estimated at 57 %, 71% for major injuries and 56 % for over 3 day injuries. Some industries are more likely to underreport than others: food and beverage, wood products, rubber and plastic products and other manufacturing. Medium and large sized businesses are the most likely to underreport major injury. Under reporting is not prevalent in small companies. No reasons were offered to explain this behaviour.

HSE have also commissioned research into the effect of economic factors on injury rate and have found that half the decrease in the overall injury rate is due to changes

in the occupations of workers. In addition the business cycle is linked to workplace injury – a 1% increase in GDP is associated with a 1.4 % increase in major injury though no change in over 3 day injury.

The HSE have also commissioned peer reviews of the injury and illness reporting processes which made a series of minor suggestions.

5. THE DME REPORT

5.1 THE CURRENT REPORT(S)

The DME Queensland Mines and Quarries Safety Performance and Health Report 2005-06 is available in hard copy and via download from the DME website. It is a 74 page glossy document which is well presented and reflects considerable effort to produce. The annual report is usually available within 3 months of the end of the financial year.

The emphasis of the report can be gauged in a number of ways:

- The foreword by the Director-General focuses on lost time injuries and the associated frequency rate. It also lists the fatalities and describes the appointment of specialist staff to increase the attention on the health of workers as well as studying diesel particulates;
- The summary from the Chief Inspectors of Mines again focuses on LTI, and associated indicators, particularly the LTIFR. Two fatalities are described. The number of High Potential Incidents reported is mentioned. The winners of the safety awards are listed. The outcomes of the latest review are also discussed. It flags the development of a new health surveillance process for coal and metalliferous mines;
- The body of the report contains more than forty figures that dissect fatalities, LTI and HPI. There is a page of narrative about serious incidents, half a page on coroner's recommendations, and a page and a half on high potential incidents. The LTI and associated indicators including days lost, and frequency form the bulk of the performance analysis. They are analysed by sector and individual mine. Disabling injuries are mentioned in two summary tables and then also for each mine. Permanent incapacity is mentioned in one table. LTI and associated indicators appear in more than twenty tables and figures, including a table ranking the LTIFR for each mine in order. The health report consists of two pages based almost entirely on the coal industry. There is one table which presents workers' compensation data by injury type and sector and half a page of narrative associated with this table. The HPI are analysed by ICAM category.

The annual report has changed little over the past five years. Additional inclusions in the 2000/01 report included the outcomes and recommendations from the Mining Warden's inquiries into fatalities and serious injury. A three page section on health issues was presented based upon coal industry periodic and pre employment medicals. It provided details of the nature of any work restrictions imposed by nominated medical advisors on workers. In addition details of respiratory function, blood pressure, body mass index and hearing loss at 2 kHz were included. Comparison was made between pre-employment medicals and periodic medicals. The distribution of lost time due to industrial disputes, injury, sickness and medical disorder, unauthorised absence and other was also tabulated. These figures highlighted the dominance of industrial disputes as a cause of lost time, followed by sickness and medical disorder which was approximately eight times the number of absences due to injury. No reasons were offered to explain these differences. Workcover workers compensation costs were also analysed by sector against injury classification, including both number of claims and total costs. Again, the

commentary was limited to stating the data and no interpretation was offered except to highlight the increase in injuries associated with commuting. The HPI analysis was limited to types of incidents. Comparison was made between LTIFR with data from the USA and NSW. The rest of the report is the same as the current report.

Additional information in the 2001/02 report included a discussion of the site surveillance risk matrix used by the DME inspectorate to prioritise inspections and audits; the matrix was not defined. A historical analysis of data from 1983 to present was presented for coal mines and 1991 to present for metalliferous mines, including the average number of days lost per injury type, and average age of worker at the time of lost time injury. The health report was considerably truncated by comparison to the previous year, with no analysis of coal board medicals being included. It included the other aspects of the 2000/01 report.

The 2002/03 report is essentially the same as 2001/02. Extra information included a table listing the relative risk of various activities at mines based upon LTI and a review of the health surveillance unit with a series of recommendations.

The 2003/04 report is similar in content to the previous year. It highlights initiatives undertaken by the DME to improve health and safety but injury performance was not highlighted. It also lists successful prosecutions, the size of the fine and the nature of the offence. LTI data was analysed by time of occurrence within shift (in deciles of the shift) and by day of roster for a number of roster types. These data unfortunately combine a number of other factors, such as shift length, as there was a finite number of LTI to analyse.

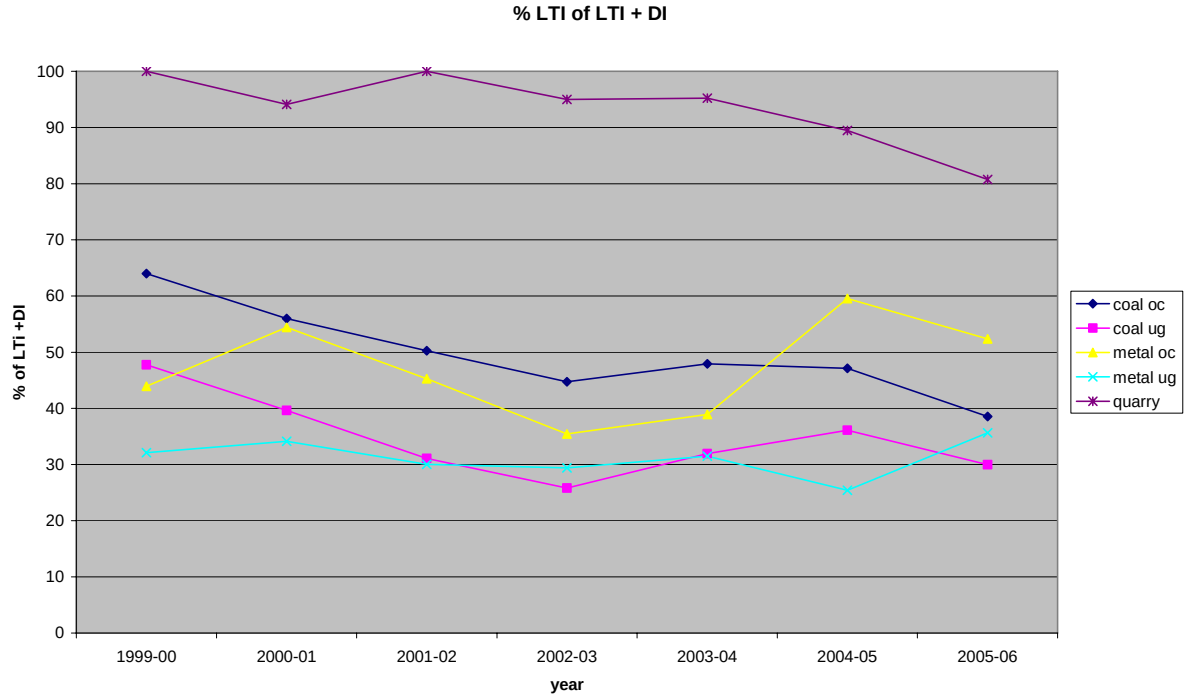
The 2004/05 report includes a more detailed analysis of high potential incidents including the ICAM factors, in addition to the content previously described.

It is important to recognise that the annual report is not the only mechanism used by the DME use to report safety and health information to the industry. The DME website provides a wealth of data and analysis, which is updated regularly, mainly on LTI and HPI and associated analysis. In addition there are a number of newsletters, alerts and bulletins issued to highlight potential and actual incidents. Comments from those consulted indicated that these electronic reports were viewed very favourably by those who used them. Surprisingly, a large number of respondents appeared to be ignorant of the resources offered by the DME website.

5.2 OMISSIONS AND DATA INACCURACIES

The emphasis on lost time injuries and the number of LTI's, is misplaced. Each individual lost time injury must be reported to the DME, in considerable detail. If however the injured person is able to undertake light duties whilst undertaking rehabilitation, then the injury is not defined as an LTI, rather as a disabling injury (DI) or a restricted work injury (RWI). These injuries are only reported in aggregated format once a month. DI or RWI are only available where the mine has suitable light duties available in conjunction with any treatment. The ability to find light duties depends on a number of factors of which the nature of the injury is only one. For example, it is more difficult to implement in fly in fly out operations and smaller mines, thus adding inconsistencies in the reporting of these measures. Analysis of the DME

annual reports since 1999-2000 does not indicate that there has been a shift to reporting DI instead of LTI. The figure below shows the % LTI to LTI+DI over the past six years, for each sector. The observed ratio of LTI to DI is very similar to that found in WA.



There appears to be a slight reduction for both coal sectors initially, but over the whole period the ratio remains relatively constant. More importantly between 1998-99 and 1999-2000 there was not a major drop in the number of LTI being reported, with the introduction of DI reporting. The table below shows the number of LTI for both years for all sectors. This indicates that there has not been a major change in reporting of LTI in recent years and thus whilst the absolute number of injuries as determined by LTI may not be accurate, the trend and rate of change is.

Sector	LTI in 1998-99	LTI in 1999-2000
Coal Open cut	98	96
Coal Underground	167	161
Metal Open Cut	145	160
Metal Underground	122	97
Quarrying	32	26

The focus of the report is on the number of incidents not severity which is represented by only one measure – the duration rate of lost time injuries. This is not analysed in any detail and for example does not indicate which injuries have the longest duration and whether or not they are the same as the short duration injuries.

There is also an issue with the rigour of reporting. In the consultation process, various comments were made that all incidents are not reported, particularly in terms of HPI. Non-reporting of data can have a significant influence on the reporting of safety and injury outcomes. For small mines the difference of one LTI can make a big change in the related LTIFR. The DME report lists every individual mine in order of

LTIFR, (shown in figure 17 p 37of the report for example). From the published data, the sensitivity to one LTI in the LTIFR can be as big as 30; that is, the LTIFR would go from 0 to 30 or 30 to 60 with one LTI. This would in turn take that mine from being the best performer to the worst. A number of mines commented on this rank order as being a disincentive to reporting, and were concerned that those who did report efficiently may be penalised in this process. This concern is reinforced by knowledge of the sensitivity of the LTIFR to a change of one LTI and suggests the unfairness of placing emphasis on this parameter. The DI classification discussed above further reduces the reliability of this ranking.

If the data were reported uniformly rigorously then it would be expected for Heinrich's triangle of injury severity to exist. That is, there should be more disabling injuries than lost time injuries and more medical treatments than disabling injuries. Data for open cut coal mines presented in the report indicated that 13 of the 37 had more LTI's than DI's and 5 had more LTI's than medical treatment injuries (MTI's). This suggests issues with the uniformity of the definition and the application of the definition of these terms in injury classification.

The situation in terms of apparent inconsistency in reporting is more extreme in the metalliferous sector. For example for disabling injuries, Mt Isa Mines Operations reported 75 % of the DI's yet only had 22 % of the workforce, and only contributed 16 % of the LTI's. Figure 27 in the DME report, which displays the individual LTIFR for surface metalliferous operations is distorted because one small mine (1800 man hours worked) had one LTI and thus an LTIFR of 553.

In the quarrying sector there were 21 LTI's reported, but only 5 disabling injuries. All are relatively small operations and the LTIFR is very sensitive to a change in LTI of one.

Another criticism voiced by a number of stakeholders was that the report is simply a statement of numbers with no suggestion on how to improve performance or prevent injury from occurring. No interpretation of the data is offered. For example, while there are many statements in the report about the degree of change of an indicator such as LTIFR, there is no comment on the significance or insignificance of this change. Similarly, in spite of these limitations in the data the report does not provide any qualifying statements with respect to the analysis and application of the data.

There was considerable discussion over the reporting of permanent disability. The 2005/06 report lists only 4 (3 Coal, 1 Metal) cases of permanent incapacity (note the difference in wording). Comparison with data from the NSW mining industry (MSAC), then it would be expected that there would be approximately 14 cases in coal and 200 in metals. According to the Australian Safety and Compensation Council (ASCC), in 2003/04 (the latest data available) there were 75 cases of permanent disability in metal ore mining Australia wide and 165 cases of permanent disability in coal mining, (130 being for noise induced hearing loss). The ASCC data would suggest that in Queensland there would be expected to be about 110 cases of permanent disability in coal mining (20 non NIHL) and about 11 cases of permanent disability in metal ore mining. There are additional cases classified by ASCC under services to mining and other mining that would add to these numbers, but it is not possible to easily assess this information. Both comparisons indicate that the

number of permanent disabilities reported to the DME is significantly less than the number expected. In addition, discussions with legal firms representing coal workers in processing permanent disability claims indicate that they would process more than 30 cases a year. A number of these cases would be reported to the DME as either DI or MTI not LTI, yet the workers are not at work or have been away from work for surgery.

A number of submissions were received that indicate that workers who have failed medicals due to injuries sustained at work, have apparently left the industry taking redundancy rather than be registered with Workers' Compensation as permanent disabilities. As such these persons did not appear in the DME annual report. At one mine seven persons are reported to have left the industry this way over a 16 month period and at another mine 17 over a nine year period.

Currently the reporting of incapacity to the DME is via the annual census form which asks mines to give details of all persons who ceased employment /retired/ terminated due to work related illness, disease , incapacity or injury. Thus any person who was partially disabled and still able to continue working at the mine, albeit in a different job, or who received compensation for a partial disability and was able to resume their job, would not be counted. A person who retires or takes redundancy where the reason for this is not recorded may not be included in the incapacity data reported to the DME. This is different to the definition used by the ASCC, and QCOMP and may explain the difference between the reports.

One type of injury that has the most potential to be underreported is that which is not associated with a specific event or incident. Chronic injury or incapacity due to degeneration over time is classified by WC as an occupational illness. It is possible that mine incident recording systems may not capture these injuries as they only become apparent when the injury reaches a level of incapacity and the worker may be put on Workers' Compensation without any specific incident trigger. Thus mine injury recording systems may only flag them as medical treatments and personnel are put on sick leave. This would not then appear on the DME database.

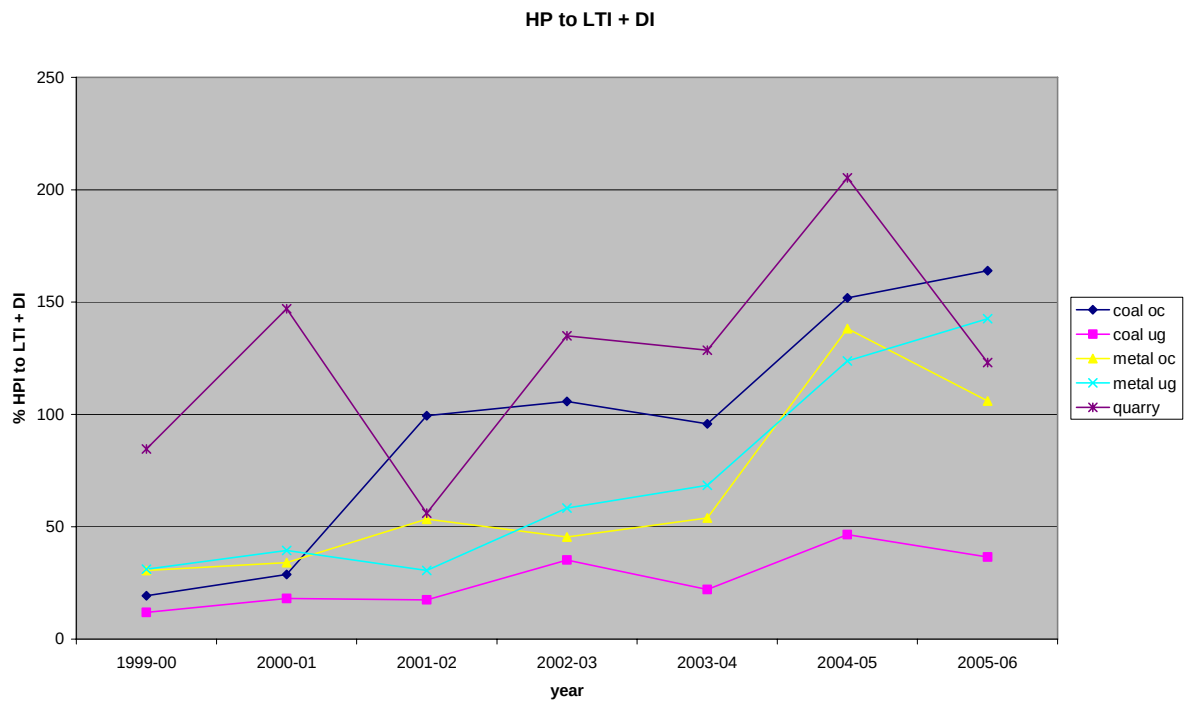
Another issue raised by some stakeholders was the incomplete capture of data at mine sites for workers not employed by the operator. In particular concern was expressed over the adequate reporting of injuries for some subcontractors and self employed persons. A number of comments were made relating to the link between contract payments and the safety performance of the contractor, as measured by reported injuries and HPI, and therefore there was an incentive not to report injuries and HPI to the operator. Other questions were raised about persons on fixed term contracts who were injured at the time of the contract ending. Evidence was presented to indicate that some of these persons do not get their contracts renewed, but are not counted as losing employment due to the injury.

It can be expected that some injuries involving persons who work across a range of industries may not be recorded as mining injuries. Some comments were made that sub-contractors, and self employed persons were not adequately monitored.

Another potential source of under reporting of injuries relating to mining would be the workers involved in mining tasks or task related to mining work on a contract basis or

as enterprises classified on basis of ANZSIC as being in non-mining industries such as engineering, construction, maintenance, transport and labour hire. A data collection system based on ANZSIC significantly underestimates the number of injuries related to mining.

There were a number of comments relating to difficulties in reporting and analysing HPI data. Mines were reporting HPI based upon the regulatory definitions and requirements for HPI reporting rather than the intent of reporting incidents with a high potential for causing fatality or serious injury. Analysis of the database also indicated that there were significant data entry issues, with inconsistencies occurring in time of day when the incident occurred, event type, incident type, injury degree and equipment type. The ICAM analysis fields showed even more inconsistency in data entry. Viewing the database data indicates wide variety in detail provided in the incident descriptions, equipment classification, incident type and event type. If the ratio of HPI to reported injuries is analysed by sector and over time (as in the figure below), with the exception of the quarrying sector, this ratio is rising in all other areas quite significantly, faster than the decrease in the injury rate. This suggests that either there are an increasing number of high potential incidents in the mining industry or that there is a higher proportion being reported. The latter is the more reasonable assumption.



An example of the emphasis the DME places on numbers and LTI is the presentation of awards to mines in 2006 who reported no LTI's. Previously these awards have been based on a subjective assessment based on accident performance and reporting, response to inspector's requirements, risk management practices and apparent improvements. DME has emphasised that no mines have been prosecuted over LTI or HPI, however it has undertaken investigations where there have been repeated LTI or HPI of the same type at a mine. On other occasions mines with a high incidence of reporting serious HPI's were asked to explain these events.

The most significant omission is the absence of any real occupational health and illness information. The coal mining sector provides the data from routine medicals to the DME but no analysis is currently done on this data. No medical information is provided to the DME by the metalliferous or quarrying sectors. The breakdown of occupational disease from QCOMP is the only data provided in the annual report currently and no analysis or interpretation is done on this data.

Incidents occurring on the way to and from work are currently not collected by the DME. There is considerable interest in these events and their potential causes.

5.3 SUGGESTIONS FOR IMPROVEMENT

The majority of mine respondents did not use the current report in any detail and it was not seen as significant in driving OH&S programs and their evaluation. They generally checked where they stood on the LTI table i.e. benchmarked against other mines. Most mines relied upon in house systems of data collection as the basis of monitoring injuries and evaluating and guiding safety performance. This was particularly evident for the larger mining companies. A number of respondents highlighted their lack of rigour in reporting data to the DME. Most did not see any value in the ICAM analysis, in part because a number of mines use different causal analysis systems that do not align with the ICAM system. In addition, a number of examples were cited where the DME report was filled out from the internal company report, by a clerk who had no ICAM training.

Few respondents consulted the graphs or analysis offered by the report. Some requested more information on root cause analysis.

The low level of response to this project was suggested by a number of respondents as being due to the lack of relevance of the current report to their management of occupational health and safety.

Many of the respondents wanted more case study information allowing for detailed dissection of causal information. These case studies would offer suggestions on how to overcome these problems and could give examples of best practice. The work carried out to reduce tyre-handling injuries is a good example of this.

Many of the respondents were in favour of reducing the complexity of routine reporting but allowing targeted investigation of types of incidents and injuries by experts. This type of investigation would identify causal factors more reliably and provide advice on management and prevention.

A number of mines noted that the report needs to be available as quickly as possible after the end of the financial year to be of any value. The report is typically produced within three months of the end of the financial year..

A number of respondents highlighted the need to focus on the severity of injuries as well as the number. Permanent disability was a category that a number felt was totally neglected and given the cost and impact of these injuries this area needed special attention.

The absence of any substantial health reporting was also commonly noted.

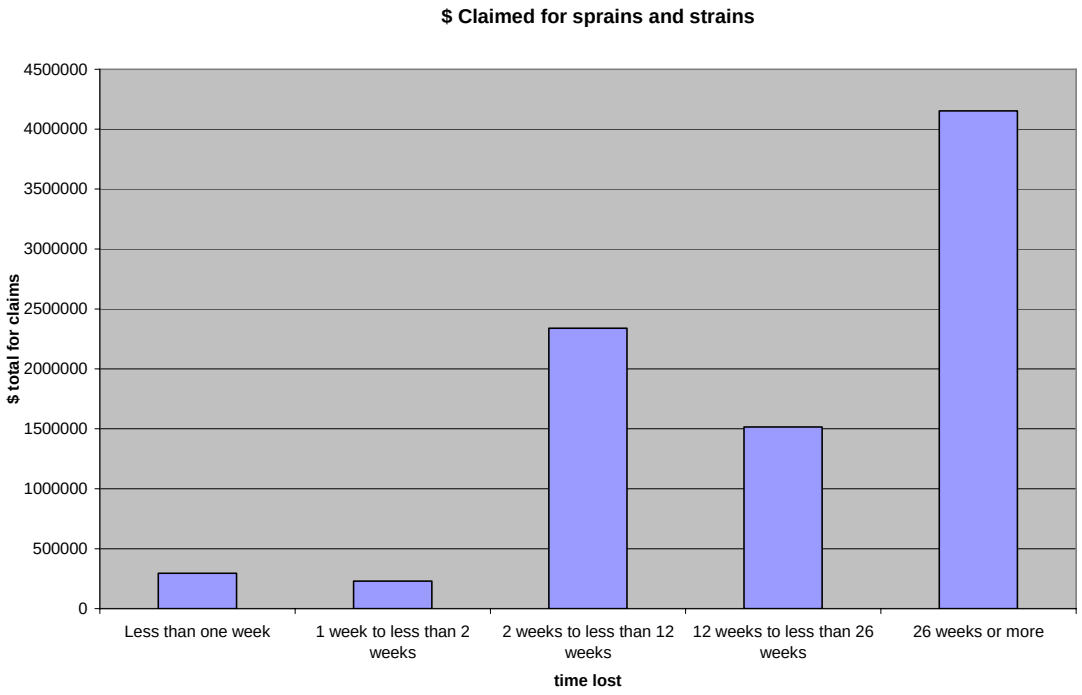
The focus on injuries is on incident based injuries, so there is inadequate attention paid to chronic injuries that are not captured in the recording of a single high intensity event generally resulting in an acute injury. In contrast they occur as a result of multiple events of lower intensity which cause gradual damage to bones, ligaments and cartilage over an extended period of exposure.

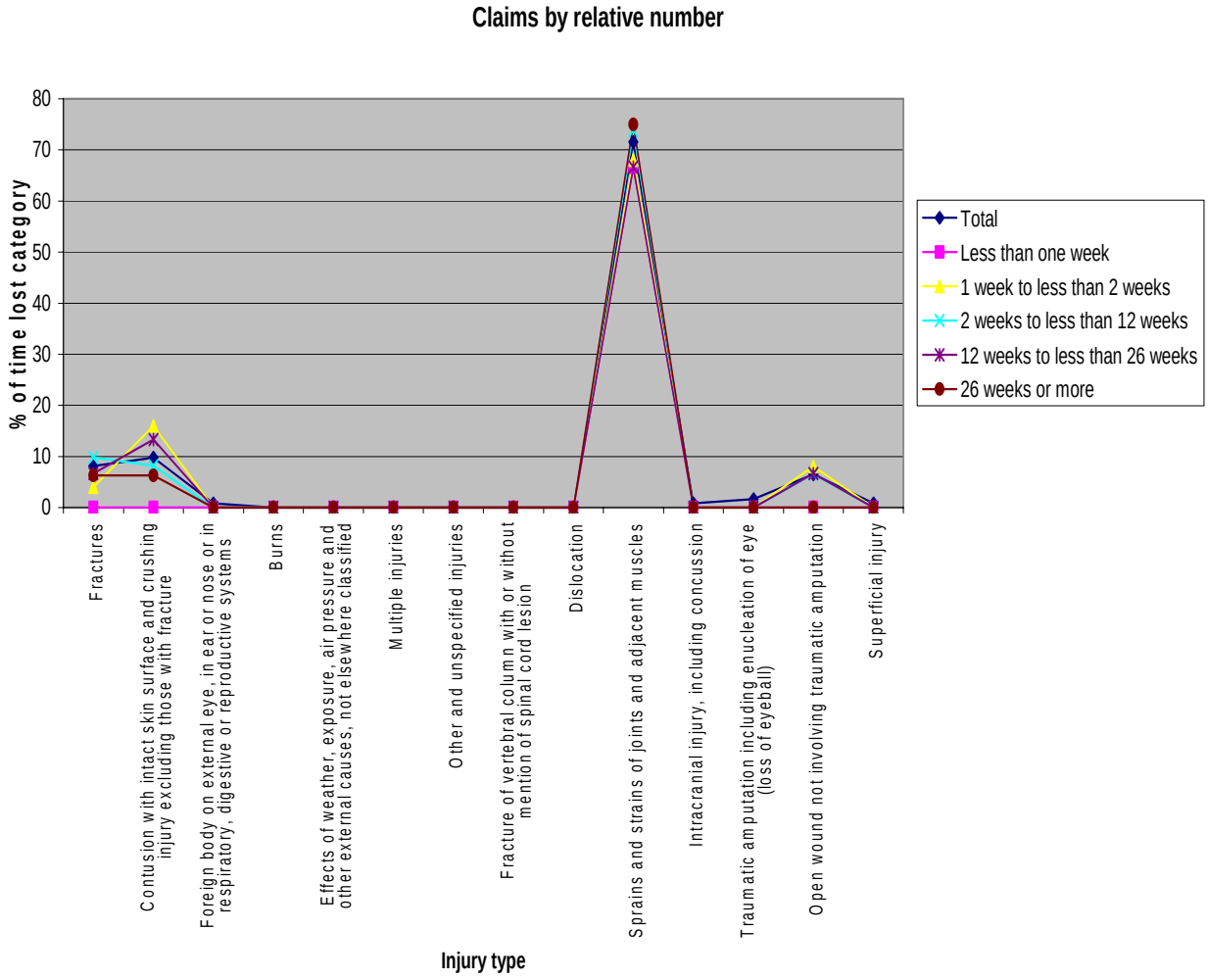
The definition of High Potential Incidents needs review to adequately reflect the intent of reporting incidents that have a high potential to cause serious injury or death. Respondents indicated that mines report those HPI that are specifically defined in the regulations. This revision is not trivial as it would be difficult to define HPI where chronic injury is potentially involved. As was reported by a number of comments HPI relate not only to the potential for multiple fatality but also single fatalities and non fatal serious injury. They may not all have the same characteristics.

There were several comments that suggested trending HPI and commenting favourably on the decline in HPI does not encourage full reporting of HPI.

The issues with the current focus on number of injuries rather than severity of injuries can be demonstrated by using the WC data from ASCC. If attention was paid to the greatest number of injuries then naturally sprains, strains and dislocations would be the main issue. However within this by far the largest time lost category is 2 to 12 weeks off work, with nearly 50 % of all sprains etc claims. However the cost of claims is dominated by sprain etc claims for more than 26 weeks as the median cost of these claims is over seven times the cost of individual claims in the 2 to 12 weeks off category. It is estimated that approximately $ 4 million dollars was paid in WC claims for sprains, strains and dislocations to coal miners in 2003-04. This begs the question: is the cause of sprains and strains for shorter periods of time away from work the same as for longer periods of time? If not is the energy being put in the wrong area? In terms of WC cost there areas of most concern are the injuries resulting in long periods of time off work rather than the highest number of claims (2 – 12 weeks category).

Each time lost period is dominated by sprains and strains. Another way of looking at it is that in 2003-04 there were 80 injuries where the worker was off work for at least six months or about 1 in 400 workers. Another 30 were permanently partially disabled or about 1 in 1000. There were 140 Claims for Noise Induced Hearing Loss at this time in addition to this; the median payment for this was only $ 3800. The potential for these statistics to be under-reported must be recognised. The dollar costs only reflect the workers' compensation costs and do not reflect the full cost of each injury, which would be much greater.


$ Claimed for sprains and strains
$ total for claims
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
Less than one week
1 week to less than 2 weeks
2 weeks to less than 12 weeks
12 weeks to less than 26 weeks
26 weeks or more
time lost


Claims by relative number
% of time lost category
80
70
60
50
40
30
20
10
0
Fractures
Contusion with intact skin surface and crushing injury excluding those with fracture
Foreign body on external eye, in ear or nose or in respiratory, digestive or reproductive systems
Burns
Effects of weather, exposure, air pressure and other external causes, not elsewhere classified
Multiple injuries
Other and unspecified injuries
Fracture of vertebral column with or without mention of spinal cord lesion
Dislocation
Sprains and strains of joints and adjacent muscles
Intracranial injury, including concussion
Traumatic amputation including enucleation of eye (loss of eyeball)
Open wound not involving traumatic amputation
Superficial injury
Injury type
Total
Less than one week
1 week to less than 2 weeks
2 weeks to less than 12 weeks
12 weeks to less than 26 weeks
26 weeks or more

RECOMMENDATIONS:

1. The annual report should include examples of good practice in the industry in health and safety performance.
2. The annual report should include case studies demonstrating how individual mines are managing specific health and safety issues
3. The annual report should reference information and practices from other countries and jurisdictions
4. The annual report should include in depth studies on particular OHS issues such as fatigue, diesel particulate matter or tyre changing.

5.3.1 USING EXISTING DATA

The issue of adequately capturing injury severity can be addressed through requiring the reporting of individual disabling injuries as they occur in the same way as lost time injuries are currently reported. Each month each mine should be required to report on the status of each such injury. Analysis could then be done at the end of each financial year of injuries by severity as well as by number. The measure of severity would be the number of workdays that the injury/illness has caused the individual to be unable to carry out their normal function. In addition should injury status change this needs to be reported to the DME. Examples were given to the review of injuries that started out as medical treatments that became lost time injuries or disabling injuries but were not reported to the DME as such, nor were they registered on site correctly.

The form for filling out the incidents should be simplified by removing the causal factor data as it is currently of dubious accuracy and relevance. Basic analysis of injuries can be undertaken from the existing fields in conjunction with the narrative and descriptive details the injuries can be analysed. More detailed analysis is best done by experts who revisit the incident details and derive the causal factors themselves, augmenting the information by further investigation if required.

Detailed analysis to determine underlying causal factors is best undertaken by suitably qualified specialists such as the occupational hygienists, ergonomists and human factors personnel currently employed by the DME. This may necessitate the DME requesting additional information from the mines on the specific incidents.

More complete capture of the data would be encouraged by not reporting individual mine data publicly. When this process was initiated in the 1990's the industry culture responded positively to this public reporting of performance, however the industry culture has changed and the emphasis on the data reporting now should be to encourage benchmarking against peers. In addition the DME should undertake regular audits of incident reporting at mines to optimise the capture efficiency.

There needs to be an education process to increase the understanding of relevant industry personnel in filling out the incident forms. This would include clarification of the definitions of terms, as well as engendering an atmosphere that demonstrates that the DME does not penalise those who report incidents.

The current definition of High Potential Incidents should be revised to adequately reflect those incidents that occur that do have the potential to cause serious injury or fatality.

It will be necessary to continue to identify lost time injuries separately to disabling injuries so that historical trends can be maintained and comparison to other jurisdictions can occur.

Electronic data access would enable the mines to create their own reports focussing on issues relating to them. The data would need to be treated in confidence and anonymity protected. Electronic data entry or transfer from the existing systems at mine sites would also reduce errors and time delays. The existing database sits in the Merlin system on the DME computer network. This may not be the most suitable system to enable online interaction. An example of the level of interrogation possible is the NOSI database of Workers' Compensation Statistics maintained by the ASCC.

In conjunction with improved data entry the DME needs to introduce a process for checking data for consistency. Site personnel need to be aware of the correct data coding and entry mechanisms.

It is not clear at this stage what impact the proposed National Mine Safety Framework data collection system will have on the future of the DME collection system, the last thing industry want is duplication of data entry.

RECOMMENDATIONS:

5. Serious injury should be extended to include disabling injury as well as lost time injury.
6. Injuries should be monitored by severity (number of work days not at normal work) as well as number of injuries.
7. The definitions of what constitute HPI needs to be revisited.
8. The detailed analysis to determine underlying causal factors should be undertaken by suitably qualified specialists such as the occupational hygienists, ergonomists and human factors personnel currently employed by the DME. This may necessitate the DME requesting additional information from the mines on the targeted injuries.

5.3.2 ADDITIONAL INFORMATION

The national mine safety framework working party has recommended that the primary injury reporting parameter be the total reportable injury. This is a combination of lost time injuries, disabling injuries and medical treatments. The review authors do not support this recommendation as this reinforces the emphasis on injury number rather than injury severity, and there appears to be considerable variance in the application of TRI definitions.

5.3.2.1 LAG INDICATORS

It should be acknowledged that the ultimate measure of zero harm is the absence of illness and injury. Thus there will always be a need to report on lag indicators that directly reflect this.

In addition to the greater focus on the severity of the injury additional information on injuries can be obtained from analysing workers' compensation data. This will always be lagging due to the time taken to resolve cases of permanent disability. However it should be possible for the DME to approach QCOMP to obtain preferential access to compensation data to minimise this lag.

Workers' compensation data does capture those incidents that may escape the mine systems particularly those relating to occupational illness and chronic injury. In addition there is a greater probability of capturing contractor and self employed injuries via this mechanism. It is acknowledged that compensation data especially for permanent disability can take at least 12 months and probably several years to be defined. The limitations of WC data should be recognised, some mining incidents will not be collected by the WC system, especially for the self employed, or those who work across a number of sectors and do not relate the incident to the mining industry.

The WC data should be reconciled against DME data to ensure data collection efficiency. For example the number and severity of injuries from each database should be consistent.

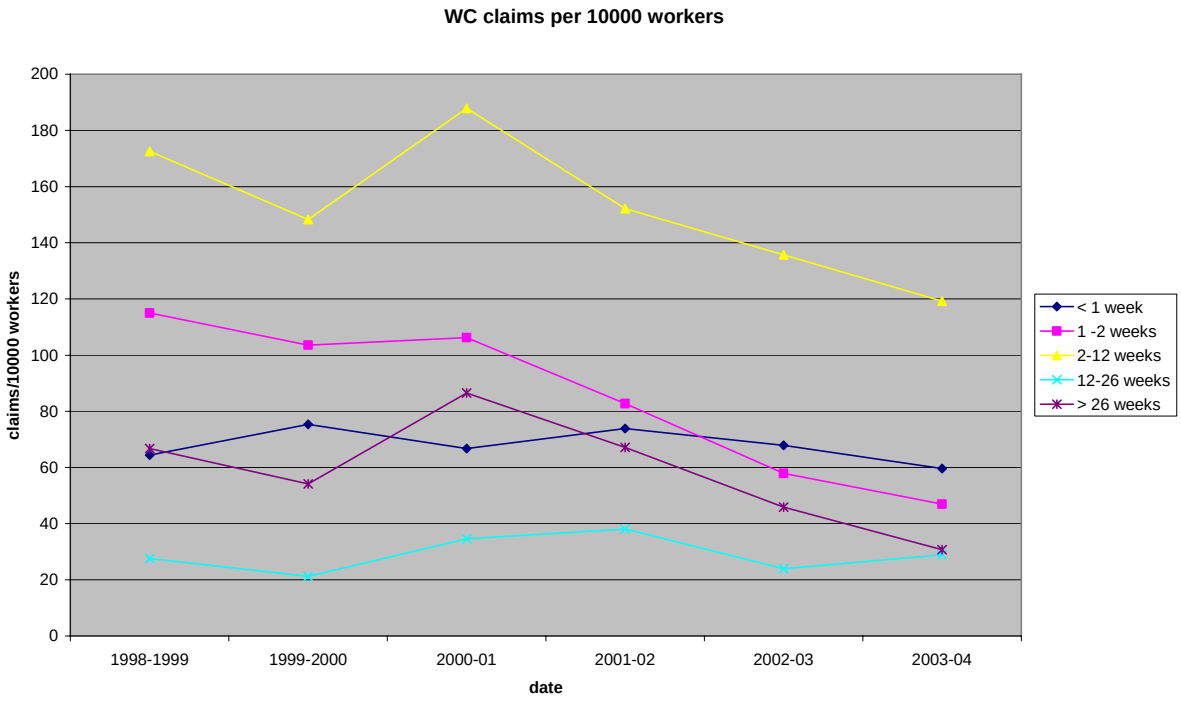
Injuries relating to travel to and from the workplace are collected by QCOMP. Although not currently reported to the DME travel incidents are a major concern to industry and the seriousness of this needs to be clarified as well as identification of the causal factors. A lot of work has been carried out by the TRAVELSAFE group that may be able to be used in the report.

Using the ASCC-NOSI database some indication of severity of injury can be obtained. This data lags by 2 years in order to get resolution of the claims.

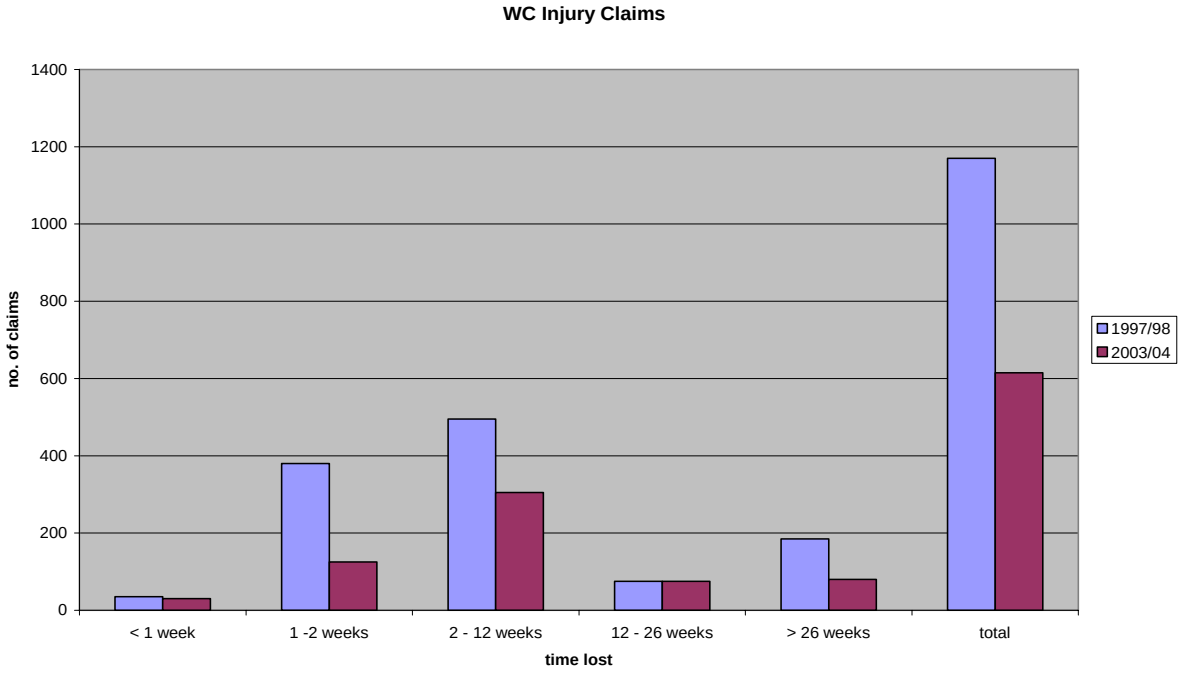
	< 1 week		1-2 weeks		2-12 weeks		12-26 weeks		> 26 weeks	
Sector	No.	Median $	No.	Median $	No.	Median $	No.	Median $	No.	Median $
Coal	165	4800	130	2300	330	9300	80	30300	85	70200
Metal	150	13100	85	2200	265	9200	75	26600	100	73000
Other	40	9600	90	1400	160	5700	40	24600	70	79600
Services	25	10500	65	2300	190	5400	40	28100	65	74500
Total	375	8200	370	2100	945	8000	235	27200	315	71600

The category of claim for < 1 week includes permanent disability claims where there has been no lost time. Looking at this data over time can also be done by sector.

The DME needs to audit mine sites to ensure that injury reporting is rigorous. The DME can reconcile mine site records with those reported to the DME and QCOMP. This may require additional resources and training. The annual report could then report the degree of agreement between the three sources.



The above graph shows the number of claims in each time period category for the past six years of data on the NOSI database for Coal Mining. There has been a clear drop in the number of claims in the 1 to 2 week period and a drop in the 2 to 12 week period claims, but the other categories do not show any marked decrease. The slight drop in > 26 week claims should be tempered by the fact that this category may be incomplete with a number of permanent disability claims still to be finalised for 2003-04. Permanent disabilities where there is no lost time feature in the < 1 week category and this shows no decrease. This suggests that management of LTI where there is a short term loss of work of less than 2 weeks is being handled better now than in the past but not other categories. A comparison of 1997-98 and 2003-04 can be seen below.



This same level of breakdown can be done within a sector to look at nature of injury or disease. In 2003-04 the only significant numbers of claims for injury or disease were for: diseases of the central nervous system (135 cases) - all being for deafness and resulting in permanent disability with no lost time, Sprains, strains and dislocations (440), contusions (~65), fractures (~50) and open wounds (~45). It should be noted that over this period of time there has been a significant increase in open cut workers (+35 %) and a decrease in underground workers (-14 %), which may affect these statistics. Publicly available NOSI data does not split open cut and underground coal workers. . The top four claim categories are listed below.

	< 1 week		1 -2 weeks		2 – 12 weeks		12 – 26 weeks		> 26 weeks	
Injury	No.	Median $	No.	Median $	No.	Median $	No.	Median $	No.	Median $
Fractures	< 5		5	1500	30	8100	5	18600	5	94400
Contusion	< 5		20	1300	25	5800	10	33300	5	63600
Sprains. Strains dislocations	20	14700	85	2700	225	10400	50	30300	60	69200
Open wound	< 5		10	1600	20	9300	5	16300	< 5	
Total	30	11400	125	2300	305	9400	75	29000	80	70100

Sprains, strains and dislocations dominate all time periods, including permanent disability with no time lost. Other categories such as open wound do not contribute to permanent disability. The data indicate that in 2003-04 there were 80 cases where a worker was off work for more than six months and another 30 where there was a permanent disability other than hearing loss in the Australian coal mining industry.

RECOMMENDATIONS:

9. Workers compensation statistics should be included for comparison and data verification as well as providing some occupational illness information
10. The definition of incapacity should be amended to industry accepted phraseology that enables capture of permanent partial disability
11. The annual report should contain current data where possible from other states and countries for benchmarking
12. The practice of reporting the data for individual mines should be discontinued
13. The incident reporting form should be simplified and the ICAM fields removed.
14. Routine analysis of injury data should be rationalised and more detailed analysis restricted to identified specific areas of interest or concern where considered appropriate. This may require additional investigation and data collection by specialists.
15. Options for collecting statistics on work related travel incidents should be investigated.

5.3.2.2 LEAD INDICATORS

5.3.2.2.1 SAFETY PERFORMANCE

Much has been written in the technical literature about lead indicators. Most can only be applied within companies and relate to monitoring the progress in implementing specific programs. As such they cannot be used across a whole industry and have no meaning beyond the program.

Many attempts have been made to introduce targeted measures such as number of job safety observations. These suffer from the same criticisms that affect the traditional measures; there is a focus on number, meeting targets independent of the quality and no link to actual safety performance. They can be validly used to assist in the improvement of a safety culture. For example if the number of HPI are tracked is an increase in number a good thing – indicating perhaps an increase in reporting efficiency or a bad thing indicating perhaps an increase in the potential to cause harm?

In 1998 the Minerals Council of Australia introduced a practical guide to Positive Performance Measures. This document looks at PPI in three different ways, as input measures (focussed on safety commitment and effort on safety management), process measures (focussed on upstream aspects of processes in the main areas of risk) and output measures (focussed on business/safety plans for operation). The document is aimed at site use rather than across all of industry and builds on the MINEX model of intent, approach, deployment, results and improvement. As such it is hard to recommend any of the suggested PPI for use by the DME, other than those outlined below.

The Australian Safety and Compensation Commission have issued a guidance note on the use of positive performance indicators. The focus of this document is the application of PPI within an organisation to encourage good OHS performance. The document outlines a process to follow in developing PPI's. A number of the PPI suggested relate to attitude and consultation. These can be assessed using industry wide surveys and trends in behaviour can be reported. For example, in WA there have been two safety behaviour surveys of the industry, one in 1998 and one in 2003. These give a qualitative indication of trends in safety culture and safety behaviour. Other areas suggested in the ASCC guidance note that could be applied across the whole industry include:

- Percentage of workplace inspections completed – planned against actual;
- Extent to which health and environmental monitoring is undertaken;
- Employee assessment of management commitment;
- Percentage of employees who have received safety training; and
- Percentage of incidents reported that do not result in an injury compared to those that do.

Step Change in Safety (an initiative of the UK Oil and Gas Industry) have issued guidance for the effective use of Leading Performance Indicators. This document highlights the variation in LPI used with the safety culture of the organisation. At the first level where compliance is the focus, LPI are focussed on assessing compliance and thus can be quantitative with numerical targets set. As an organisation

progresses up the culture maturity ladder the LPI become monitors of effectiveness of management systems, assessing commitment, and effectiveness of communication at the top end the LPI become very localised and are based around workforce selected issues.

Comments from industry personnel suggested a number of possible PPI including:

- % of training completed against planned;
- % of emergency exercises and training of personnel carried out against planned;
- Lodgement time of claims;
- % of people returning to work following an injury;
- % compliance to permit systems;
- % of incident investigations completed within the due date; and
- % of risk assessments completed vs planned.

Thus if the DME report identifies OHS issues and mechanisms to manage these issues LPI could be introduced to monitor industry effectiveness in introducing the management tools.

One area with potential is reporting on the number of non conformances per DME safety audit. Trending on this could indicate improvement or decrement in the quality of safety management systems.

Other indirect indicators of safety quality could include:

- Pass rates for candidates sitting for statutory positions.

There is no magic way of assessing overall safety performance. The MINEX process as implemented by the MCA is the closest thing to this. The main drawback with implementing such a comprehensive assessment process is the time and resources required to do such assessments. It would not be practical to do this for every mine every year in Queensland.

RECOMMENDATIONS:

16. The department should develop in consultation with industry a list of lead occupational safety indicators from which individual mine sites can choose an appropriate sub-set.
17. The annual report should include the outcomes of generic and operational lead indicators for safety effectiveness and occupational health.

5.3.2.2.2 HEALTH PERFORMANCE

In terms of lead indicators for Health, Step Change again recommends different types of indicators depending on the safety culture of the organisation. At the lowest level assessment is based upon compliance – medicals carried out, training done, health surveillance in place, etc. The second level includes measures of process, communication and commitment as for safety. The third level is again focussed on the individual workplace with specific targets differing from one workplace to another depending upon the issues faced.

5.3.2.2.3 OCCUPATIONAL HYGIENE

There are a number of lead indicators that can assist in the promotion of good health performance that mines currently collect. These relate to the monitoring of occupational exposure. Mines currently assess the occupational exposure risk of their workers. These data could be reported to the DME and collated and reported on a similar exposure group basis. Collecting the data across the whole industry would allow for large datasets to be collected and meaningful analysis to be undertaken. This would enable mines to assess how their exposures compare to the industry generally and the relevant occupational exposure standards.

These indicators could include:

- Respirable coal dust
- Respirable silica
- Noise
- Respirable dust (not coal)
- Diesel particulate matter
- Heat stress precursors – temperature, wet bulb globe temperature, etc.
- Exposure to specific chemicals such as cyanide
- Ionising radiation measurements
- Exposures to physical and psychological demands of work.

RECOMMENDATIONS:

18. (a) The report could include data on occupational hygiene exposure of workers to the various common hazards:
    - Respirable dust
    - Respirable silica
    - Noise
    - Diesel Particulate Matter
    - Heat Stress
    - Chemicals such as cyanide or lead
    - Ionising radiation

    (b) These data could be reported by similar exposure groups to allow mines to benchmark against the industry norms.

5.3.2.2.4 OCCUPATIONAL HEALTH

Current reporting of occupational health is dependent on lag indicators such as LTI's, LTIFR, permanent and non-permanent disability and health disorders. As indicated earlier, the reliability, accuracy and timeliness of this information is problematic and the representation of health information is limited. Additionally these measures relate to past activity and indicate negative rather than positive performance in OH&S programs. No medical assessment information is provided from the periodic Coal medical assessments and none can be provided from the metalliferous or quarrying sector as no medical information is currently provided to the DME by these sectors, or is required to be submitted.

When NOSHC issued a guideline for Health Surveillance in 1995 the issues of concern were the exposure of workers to hazardous substances. The guideline does not deal with other health issues such as fatigue or stress or psychological disorders. The DME have been collecting the medical information from the periodic examination of coal mine workers and applicants for coal mine jobs for over twenty years. Very little analysis has been undertaken of this data. This lack of analysis was commonly cited by industry respondents as a case against collecting data if nothing is done with it.

Lead indicators are increasingly used by individual companies or sites as an indicator of safety or health activity or performance. The current emphasis is on safety with a more limited approach to performance in health. They are used with the aim of being more proactive by using indicators which are positive in nature and intended to predict outcomes. They may be used to promote activities which raise awareness and implement controls before problems occur. For example, the equipment routinely maintained in given time period, proportion of workers undergoing site induction, and the use of personal protective equipment.

In their guide to positive performance measures the Minerals Council of Australia identify 3 types of indicators: input or activity type measures such as number of risk assessments covered; process measures focused on particular problems such as musculoskeletal injury in which the exposure to risk of injury is measured, together with the effects of any control measures to reduce exposure; and output or action plan measures which measure outputs in relation to goals. Using musculoskeletal injury as an example the following positive performance indicators could be used under the different headings:

- Activity measures – number of task observations analyses conducted, number of educational programs on manual handling conducted;

- Process measures – factors producing incidents associated with M/S injury, lifting exposures exceeding standard and % employees failing fitness for work tests.

- Output measures - % risk control procedures outstanding, % injured workers rehabilitated.

In the development of occupational health lead indicators engagement at all levels of the company is essential and indicators should reflect the specific priority issues identified in the consultation process. There is a danger of having too many performance indicators some of which may be unnecessary, irrelevant and redundant. Core or generic areas for the development of indicators which are commonly used in Australian and overseas and are relevant to most companies include: OH&S culture in enterprise, demography and socio-economic situation, health status, health behaviours, physical environment, work organisation, health & safety systems, prevention and health promotion, reintegration after return to work, health and safety resources and facilities, education and training, health expenditures, costs of problems, health and safety care and quality of performance.

While many groups report the number and scope of activities in occupational health it is more difficult to measure the health outcomes associated with these activities. Currently no universally accepted national or international standard outcome

measures are available to measure performance indicators for occupational health. This reflects the longer latency periods for chronic injury and disease and the general lack of longer term health surveillance information data. In addition, the general focus in Occupational, Health and Safety has been predominantly on safety rather than the overall health of the worker. The challenge remains to integrate workplace health promotion with the traditional safety strategies together with recognition that health status may have a significant impact on safety. This relationship is supported by increasing evidence of the effects of conditions such as sleep apnea on fatigue and attention to task, overweight and increased risk of musculoskeletal injury. However in the implementation of risk analysis and control systems the potential risk to safety as a function of a health problem is not generally formally considered. Changes in health status and functional capacity associated with an older workforce are also fundamental issues which may impact on safety and the relationship between work and the short and longer term health of the worker. Current reporting of health and safety information in the DME report does not account for age, gender or ethnic differences.

Many health effects are multi-factorial, but particular work-related or non-work related exposures constitute a significant component of the total picture. Long latency periods in some diseases such as cancer and musculoskeletal disorder, present difficulty in establishing cause and effect relationships, as the disorder may result from a variety of exposures involved. These difficulties and the difficulty in separating work related from non-work related issues leads to under reporting. For diseases with long latencies, incidence data may not be the most appropriate indicator of emerging trends, as reductions in exposure to disease causing agents may not lead to any reduction in incidence rate until many years later.

Musculoskeletal (M/S) disorders fall into the category of chronic injury and are one of the leading causes of morbidity and disability in the mining industry. While damage to muscle, ligament and tendons and bones may occur following a single event, progressive degradation is a function of longer term exposure to well known hazards such as repetitive movements, vibration, and over-exertion. This suggests the underreporting of the incidence of chronic injury, as reference is generally made to the more immediate or acute event associated with the injury. Considering the difficulty in identifying and documenting the progressive stages of chronic M/S injury, it may be more appropriate to use indicators based on hazard exposure or control. However, these indicators must be reliable and valid, readily available, easily collected and capable of regular updating.

An occupational physician consulted during the review, considers exposure to disease and chronic injury along an exposure continuum with initial alerts being associated with problems determined by reference to exposure monitoring and early reporting of symptoms. Later stages in the development of health problems are determined by objective health surveillance measures which may lead to treatment and rehabilitation.

In developing occupational health indicators developers of the UK Step Change program suggest that performance indicators should be developed around:

- Initial and continuing health surveillance;

- Controlling exposure hazards detrimental to health; and
- Effectiveness of return to work procedures following injury or ill health

Health Surveillance

While the maintenance of a high standard of health and fitness is desirable for all workers, in some sections of the mining workforce it is essential to minimise the risk of work related injury and disease. Evaluation of the capacity of workers to handle work demands has traditionally occurred through a medical examination which is conducted prior to employment and periodically throughout working life. Anecdotal evidence suggests that there is wide variation in the nature and extent of assessment with respect to fitness for work and the more common procedure is to adopt a minimalist approach using a traditional medical examination. A survey of OH&S officers in Queensland and NSW coal mines indicated that in over half of the mines surveyed, medicals were conducted every 5 years. Between 45 and 55% of medical assessors were considered to be familiar with underground and open cut mining, respectively, although the extent of this knowledge was not determined. This indicates the importance of ensuring medical assessors are familiar with current work demands and have a basic knowledge of the work environment and conditions, in order for them to make reliable, judgments concerning capacity for work. It was notable that when workers are medically assessed for positions, just over two-thirds of responding mines indicated that the same assessment applied regardless of the level of risk associated with the position.

New strategies are required to increase awareness of and, where possible, more successfully prevent health problems at the individual and industry level. Additionally, examination of the appropriateness of existing health surveillance systems should continue in light of the major health issues prevalent in the industry and the changing demographics of the workforce.

A ‘whole of working life’ approach to health surveillance should be adopted, requiring that evaluation of health and functional capacity be ongoing and recognising the diversity across different age groups, genders and ethnic backgrounds. When individuals are in the final years of their career, specific longer-term health information, including attrition data and exposure, should be available.

Health assessment of employees should occur at entry, periodically throughout working life, at critical junctures such as change of job or return to work following injury, and at exit from the industry. As previously stated, assessments on change of job are currently uncommon in mining. The ‘portability’ of health surveillance data throughout the industry is an important element of such an approach, so that on change of employment, this health information remains accessible.

Because of the chronic nature of many injuries and illnesses it is important to track these conditions over time. This would allow clearer analysis of trends and form a basis for evaluation of the effectiveness of interventions which also have a long latency in impacting on health issues.

The DME collects medical information on workers in the Queensland coal mining industry. However this information is not included in the annual report and similar information is not collected for the metalliferous sector. Given the appropriate resources to adequately maintain and analyse this information, this data set would constitute an important component of health surveillance and provide useful health performance data. In addition it would allow analysis of trends and change in health status over time. However for consistency and comparative purposes it should be collected for both coal and metalliferous sectors of the industry.

Other information would also assist the health surveillance process, such as that collected regularly or periodically using surveys which are reliable and valid. For example, the Finnish Institute of Occupational Health developed a work ability index (WAI) which estimates the extent to which an individual's capacity matches the demands imposed by work tasks.

The WAI measures the workers own perception of work ability and this qualitative measure has been shown to be well correlated with more objective measures derived from medical examinations. It is frequently used in conjunction with the medical examination to provide a baseline and longitudinal record of health status. These measures are of value in designing the most appropriate interventions to maintain work ability and to provide useful information on changes in work ability over time at the individual and group level. Data from WAI survey and other measures can be used to evaluate the efficacy of interventions at the work organisational, work environment and individual worker level.

Use of a survey tool such as the WAI also provides a composite measure of health status, such as the number of medical conditions and their impact on individual work ability. The WAI has been shown to be a useful means of matching workers to appropriate jobs, as well as for monitoring functional capacity over time. Work ability should be monitored across working life, from pre-employment to post-retirement.

Using a modified version of the WAI in conjunction with medical examinations to allow longitudinal data collection on the work ability of individual workers would provide industry-wide knowledge of the work ability status of the workforce and for benchmarking with other industries.

RECOMMENDATIONS:

19. A more holistic approach to health care should be supported and encouraged through inclusion of information in the report which recognises the extent of health promotion activity, the quality control procedures in place and the impact of such activity such as participation rates, and changes in health status and behaviour.
20. In relation to the previous recommendation:
    a It is recommended that the type of health surveillance carried out in the coal sector be investigated for expansion across the other sectors.
    b Review the current health surveillance practices within the mining industry with the aim of developing a more preventative and proactive approach to health management and to provide opportunities for evaluating the outcomes

of quality interventions with respect to prevention of work related injury and disease.

c Provide appropriate resources to maintain and analyse the DME health data bases to provide short and longer term trends in injury and medical disorders for inclusion in the DME annual report. This should include information from all sectors of the industry.

21. The analysis of existing industry data sources should be enhanced to include information on injury, illness or disorder rates according to demographic characteristics, (age, gender, and ethnicity) particularly age.
22. The report should include health information incorporating levels of psychological and sleep disorders and strategies in place to address these issues.
23. Information should be included which identifies opportunities or barriers to effect appropriate rehabilitation related to the availability of resources for preventive health, rehabilitation processes and early return to work. This would include for example, number of personnel involved in immediate treatment and rehabilitation process, access to medical and allied health specialists, expenditures on prevention and rehabilitation, opportunities for alternative duties and reintegration following injury.
24. The use of survey instruments should be encouraged to provide additional data to identify the status of safety and health performance in the workplace. Selected results could be reported as case studies within the annual report.
25. The use of a modified version of the Work Ability Index (WAI) developed at the Finnish Institute of Occupational Health is recommended. The WAI provides a composite measure of health status, such as the number of medical conditions and their impact on individual work ability. It may be used in conjunction with medical examinations to allow longitudinal data collection on the work ability of individual workers. The information would also provide industry-wide knowledge of the work ability status of the workforce and opportunity for benchmarking with other industries. This would allow the mining industry to compare its performance against general international practice.

Injury prevention & rehabilitation

The coal industry has invested heavily in improving safety in the workplace and is genuine in its attempt to provide a better understanding and safer working environment for all employees in the industry. Yet, despite these efforts musculoskeletal injuries remain at high levels and new strategies are required to address this problem.

Injury causes are mostly multi-factorial and multiple strategies are required to prevent them. In the survey of OH&S officers, mines considered the most important contributing factors to workplace injury were: lack of fitness, work environment, total exposure period and lack of skill and stamina. Other issues such as psychological stress, age, shift length and fatigue were believed to contribute to a lesser degree. It is notable that the highest ranked contributing factors are all amenable to intervention to varying degrees to minimize the contribution to workplace injury.

It is notable that access to specialised professionals was considered by 60% of responding mines as a barrier to rehabilitation, with travel distance and program adherence also noted. To a lesser degree time taken to gain treatment, mining

industry culture and a lack of knowledge of the rehabilitation process were considered by a lower percentage of mines to be barriers to effective rehabilitation.

Participating mines indicated that when chronic injuries were diagnosed several strategies were used. These included providing alternative duties (light duties, office duties, record keeping) within the injured workers capabilities and in accordance with the injury rehabilitation plan, and medical restrictions applied to the injured worker. In some instances mine sites indicated chronic injury can require job reclassification. Alternative duties included a changed work environment, roster or shift pattern. There was an indication that periods on alternate duties ranged from 3 to 6 months; following this period a phased return to the original job classification in line with medical advice and safety considerations would normally occur.

The overall evidence suggests that a range of factors relating to the work environment, work tasks and practices as well as the physical preparedness of the workforce from recruitment and throughout working life present opportunities for interventions to reduce the impact of injury in coal mining.

RECOMMENDATIONS:

26. The DME should ensure that doctors carrying out medical examinations of miners have a basic knowledge of the mining environment.

Exposure

As indicated earlier, measurement of exposure to occupational health risk factors was considered an important strategy to compensate for the difficulty associated with using incidence data for diseases or disorders with long latencies. In some areas, estimating a workers occupational exposure to risk factors for injury or diseases is difficult and commonly assessed by documentation of the occupational history of subjects and monitoring and estimating the intensity, frequency and duration of the exposure.

BHP Billiton in their 2006 Sustainability report indicate the emphasis on evaluating and controlling exposures as a key approach to occupational health management. Data for exposure to diesel exhaust, noise and dust is compared with exposure standards.

While monitoring techniques to measure levels of dust, vibration and temperature, techniques to measure exposure to the risk of musculoskeletal disorder and injury may be less objective and complex. Exposure information related to manual handling, repetitive movement, vibration and other known risk factors for injury is important, in order to examine the causal pathway between these physical factors and development of MSD's. Certain psychosocial factors such as high job demands, low decision latitude, and few rest breaks have also been identified with MSD's A recent survey of coal miners in Queensland and New South Wales, indicated that those with injury, rated the intensity and frequency of some tasks higher than those without injury. Those surveyed were over 45 years and had >15 years experience in the industry. The tasks rated as more physically demanding included, manual handling; pushing, pulling and dragging; bending, twisting and stooping; prolonged work in awkward postures; shovelling; and repetitive work. Previous research has

identified these tasks as significant risk factors for musculoskeletal injury and when coupled with a higher frequency of exposure associated with some of these tasks, the results support the hypothesis that greater exposure to physically demanding work is associated with higher rates of injury. No definite cause and effect relationships can be established from this data however and a prospective study in which exposure is measured and related to subsequent injury is required.

In addition, injured workers reported greater experiences of adverse conditions with respect to the work environment, work organisation, and opportunities to enhance their work ability. The findings confirm the need for increased awareness of the age-related differences in work ability and factors which may accelerate or delay this decline.

Other health indicators concerned with management of physical and mental load might include evidence of:

- Number and effectiveness of ergonomic and job redesign measures in the adjustment of the physical requirements of work consistent with age-related changes in functional capacity.
- Effective workload distribution and monitoring strategies to reduce the physical work demands on workers while allowing longer recovery periods;
- Increasing autonomy in work to control the pace of work and work demands;
- Reductions in the duration of work in situations where it is difficult to reduce work demands;
- Opportunities for workers to exercise a degree of autonomy in the regulation of their work to modify or adjust the order of tasks, work methods and work rates and allow for adequate recovery periods.
- Number of activities/ interventions designed to enhance awareness of importance of loading characteristics, with evidence of compliance with interventions, any behaviour changes and quality of processes involved.

The potential range of indicators is large and the mix under the different categories will vary according to the particular health priority and company goals.

RECOMMENDATIONS:

27. The extent and impact of strategies to evaluate and reduce exposure to mechanical loading, and key (evidence based) risk factors for musculoskeletal injury, such as repetitive movement, awkward postures, manual handling, ergonomic interventions etc be included in the annual report.

Health enhancement/promotion

There is strong evidence to indicate that work ability can be enhanced by improved fitness and that fitness is an important factor in the decision of workers to continue in the workforce. An increasing number of mining operators are implementing fitness and lifestyle change programs with varying degrees of success. While such programs may help prevent work-related illness or injury, a ‘one size fits all’ approach has limited value. Closer integration of such programs with periodic health surveillance will allow more targeted programs which may compensate for any deficits in

functional capacity and provide a better match between functional capacity and work demands.

Similarly, any program should be considered in relation to the work schedule of workers and the difficulties they experience in complying with the more traditional exercise routines. Physical activity and other lifestyle activities should be effectively integrated into the work and home situation, and the quantity and quality of exercise that a person needs to derive health benefits and have the capacity to meet the demands of their work should be determined for each individual. In many industries, only a very small number of organisations effectively plan, implement, monitor and review the efficacy of these programs and there is a lack of accepted strategies to maintain and enhance the fitness levels of miners.

In developing indicators:

- Identify where there are potential areas for health improvement, ideally from well structured and reliable health surveillance data;

- Identify intervention strategies that have been shown to mitigate problems;

- Set performance standards for the interventions implanted which could include, quality of personnel delivering intervention, acceptable participation rates, percentage improvements in health related fitness, measures of cost effectiveness etc. ;

- Monitor performance against standards and take corrective actions to improve performance;

- Repeat process using continual improvement model;

- Emphasise prevention rather than treatment; and

- As risk is spread across all players ensure that the development and review of the occupational indicators is conducted with optimal consultation and support at all levels.

RECOMMENDATIONS:

28. It is recommended that reporting of implementation of strategies designed to communicate and increase awareness of the risks to safety associated with poor health status such as obesity, sleep apnea etc., be encouraged. Reporting of these initiatives may be progressively developed, initially using a case study approach and evaluated for inclusion in the annual report based on quality of the strategy/intervention with respect to evidence base, reliability and utility.

5.4 BARRIERS TO IMPROVEMENT

Any changes to the report and reporting process will only succeed if the DME can adequately resource the processing of the additional information.

There needs to be an education process undertaken to ensure that all relevant personnel use the same definitions, are capable of filling out the data forms correctly and recognise the importance of accurate data reporting.

More importantly the industry needs to accept that reporting incidents is not an admission that something is wrong and the DME will penalise them for it. Full reporting within mine sites can suffer from the same limits due to the setting of performance targets with rewards for achieving these targets and penalties for failing to achieve these targets. This is particularly true for contractors and subcontractors who often have injury and HPI targets in their contracts – not to be exceeded without penalty.

There is a broad spectrum of reporting rigour across the different contracting companies and it is not appropriate to assume that all contracting companies under report injuries and incidents. Many have their own sophisticated reporting systems and trained personnel to collect the data. It more likely that small subcontractors and the self employed will not report incidents and injuries, either to the mine or Workers' Compensation.

The DME must carry out audits of injury and incident reporting to encourage submission of the necessary data.

Timeliness of data entry, accuracy of data entry and access to data need to be addressed by investigating improving the current data acquisition system and automating it wherever possible. Direct electronic mine site data entry should be investigated. The ability to interrogate the datasets electronically and create custom reports tailored to the individual mine needs should also be investigated. The NOSI model is an example of this type of process.

RECOMMENDATIONS:

29. The DME needs to undertake regular and unannounced audits of mine sites to ensure that incident and accident reporting, by both operators and contractors, is being carried out according to the regulations
30. The DME needs to maintain data verification processes to ensure the accuracy of reported data.
31. Training should be provided to mine personnel to ensure uniform application of definitions relating to the reporting of accidents and incidents.
32. Training should be provided to contractors and subcontractors to ensure awareness of the need to report all accidents and incidents. DME should conduct regular audits to ensure that training is effective.
33. The DME should investigate the potential for mines to submit incident reports electronically direct from their own reporting systems.
34. The DME should explore ways of improving the accuracy of simple electronic data base for recording information included in the annual report.
35. The DME should investigate the potential for mines to interrogate the injury and HPI databases directly.
36. The DME needs provide adequate resources for the enhanced collection, analysis and reporting of information in the annual report and other media.

6. CONCLUSIONS

6.1 General

- There is no “best” practice model for reporting Safety and Health performance.
- Very few industries as a whole do any reporting of Safety and Health performance.
- Mining company Safety and Health reports are generally mainly narratives of initiatives and programs implemented to improve performance with some statistics.
- The DME report represents the most comprehensive safety performance statistical report available for an industry.
- The effort put into compiling the annual Safety Performance and Health report is not reflected in the attention industry currently pays to the document.
- In general, industry is not aware of the other reports such as HPI’s, generated by the DME through its webpage and by email.
- As measured by all of the traditional lag indicators (LTI, Fatality and WC data) there has been a general improvement in safety performance over the past decade in the Queensland Mining Industry.
- There is an attitude amongst some sections of the mining industry that they do not need to bother about reporting information accurately as the DME do not do anything meaningful with it.
- There was strong support for the DME annual report and other reports to be used to assist in improving OHS performance rather than merely reporting statistics.

6.2 Validity and accuracy of accident and incident data currently included in the annual Safety Performance and Health Report

The current data reported in the DME Annual Safety Performance and Health report is inadequate because:

- Over 50 % of injuries that result in the worker not being able to carry out their normal work on their next shift are not collected in any detail. This is due to detailed reporting being limited to LTI and not including DI or RWI.
- There is limited analysis of the severity or duration of injuries or illnesses.
- The collection of permanent disability injuries and illnesses is not adequate. This may be due in part to the definition used in the annual DME census report referring to incapacity. There were some instances reported where workers with permanent disabilities received redundancy or retrenchment payment rather than Workers Compensation.
- A number of cases of permanent disability were reported to the review that had been identified at the mine site as not LTI but either DI or MTI and as such not reported as LTI.
- Some industry personnel who fill out the DME forms are inadequately trained in understanding the definitions of the terms.
- The definition of HPI is governed by regulatory definitions rather than being for incidents with a high potential to cause death or serious injury and needs to be revised.

- The current method of reporting individual mine performance may encourage the underreporting of incidents.
- The current practice of presenting awards to mines who have no LTI may encourage underreporting of incidents.
- There is a perception that mines will be penalised by the DME for reporting too many incidents.
- The form for reporting injuries is too long and complex.
- There is little data checking and validation carried out by the DME
- The form contains no real occupational health or disease data.
- The focus on LTI and the small number of LTI per mine makes derived parameters very sensitive to small variations and encourages underreporting.
- The ability to categorise and dissect LTI is limited by the relatively small number of LTI.
- The use of ICAM incident analysis is of dubious value due to the input format of the forms, the limited training of data entry personnel in ICAM and the use by a number of companies of alternate incident investigation techniques that are not necessarily transposable into the ICAM format.
- A number of comments were made that some contractors and subcontractors were not reporting all the accidents and incidents that they were involved in. This was apparently sometimes due to safety targets being a condition of contract.

6.3 The effectiveness of the report in communicating health and safety data across the Queensland mining industry

- The low number of respondents to the review may indicate that the Queensland mining industry does not place great reliance on the DME annual report to assist them in managing health and safety. The major companies particularly focus on internal incident reporting and analysis processes.
- There is no effective communication of occupational health data in the report.
- The inconsistencies in applying incident and injury definitions by companies especially HPI and DI have contributed to the low level of emphasis placed upon the report.

6.4 The possible inclusion of other key performance indicators in relation to international best practice in this area.

- The report could include data on occupational hygiene exposure of workers to the various common hazards:
    - Respirable dust
    - Respirable silica
    - Noise
    - Diesel Particulate Matter
    - Heat Stress
    - Chemicals such as cyanide or lead
    - Ionising radiation
- These data could be reported by similar exposure groups to allow mines to benchmark against the industry norms.

- There are a number of lead indicators of safety performance that could be included. Many relate to specific processes and would suit targeted initiatives aimed at addressing specific issues. Lead indicators could be used in the areas of training, use of PPE, and audit compliance results.
- Information relating to work related travel incidents should be collected, analysed and reported. The TRAVELSAFE group may provide useful guidance on this issue.

6.5 The need to provide more proactive and preventative measures associated health and safety performance.

- Many of the respondents asked for case studies and examples of best practice to assist them in managing health and safety.
- Many respondents wanted the data that is reported to be interpreted rather than merely reported.
- A number of respondents wanted to get access to the raw data to allow them to make their own analysis and interpretation and focus on areas of concern to them.
- A number of respondents wanted more detail on coroner's investigations and the findings and recommendations coming out of them. It would be possible to report on the progress in implementing these recommendations.

7. RECOMMENDATIONS

7.1 Case studies and examples of best practice

1. The annual report should include examples of good practice in the industry in health and safety performance.
2. The annual report should include case studies demonstrating how individual mines are managing specific health and safety issues.
3. The annual report should reference information and practices from other countries and jurisdictions.
4. The annual report should include in depth studies on particular OHS issues such as fatigue, diesel particulate matter or tyre changing.

7.2 Occupational Safety indicators

5. Serious injury should be extended to include disabling injury as well as lost time injury.
6. Injuries should be monitored by severity (number of work days not at normal work) as well as number of injuries.
7. The definitions of what constitute HPI needs to be revisited.
8. The detailed analysis to determine underlying causal factors should be undertaken by suitably qualified specialists such as the occupational hygienists, ergonomists and human factors personnel currently employed by the DME. This may necessitate the DME requesting additional information from the mines on the targeted injuries.
9. Workers compensation statistics should be included for comparison and data verification as well as providing some occupational illness information
10. The definition of incapacity should be amended to industry accepted phraseology that enables capture of permanent partial disability.
11. The annual report should contain current data where possible from other states and countries for benchmarking.
12. The practice of reporting the data for individual mines should be discontinued
13. The incident reporting form should be simplified and the ICAM fields removed.
14. Routine analysis of injury data should be rationalised and more detailed analysis restricted to identified specific areas of interest or concern where considered appropriate. This may require additional investigation and data collection by specialists.
15. Options for collecting statistics on work related travel incidents should be investigated.

7.3 Occupational Safety Lead Indicators

16. The department should develop in consultation with industry a list of lead occupational safety indicators from which individual mine sites can choose an appropriate sub-set.
17. The annual report should include the outcomes of generic and operational lead indicators for safety effectiveness and occupational health.

7.4 Occupational Hygiene Lead indicators

18. (a)The report could include data on occupational hygiene exposure of workers to the various common hazards:
    - Respirable dust
    - Respirable silica
    - Noise
    - Diesel Particulate Matter
    - Heat Stress
    - Chemicals such as cyanide or lead
    - Ionising radiation

    (b)These data could be reported by similar exposure groups to allow mines to benchmark against the industry norms.

7.5 Occupational Health Indicators

19. A more holistic approach to health care should be supported and encouraged through inclusion of information in the report which recognises the extent of health promotion activity, the quality control procedures in place and the impact of such activity such as participation rates, and changes in health status and behaviour.
20. In relation to the previous recommendation:
    a. It is recommended that the type of health surveillance carried out in the coal sector be investigated for expansion across the other sectors.
    b. Review the current health surveillance practices within the mining industry with the aim of developing a more preventative and proactive approach to health management and to provide opportunities for evaluating the outcomes of quality interventions with respect to prevention of work related injury and disease.
    c. Provide appropriate resources to maintain and analyse the DME health data bases to provide short and longer term trends in injury and medical disorders for inclusion in the DME annual report. This should include information from all sectors of the industry.
21. The analysis of existing industry data sources should be enhanced to include information on injury, illness or disorder rates according to demographic characteristics, (age, gender, and ethnicity) particularly age.
22. The report should include health information incorporating levels of psychological and sleep disorders and strategies in place to address these issues.
23. Information should be included which identifies opportunities or barriers to effect appropriate rehabilitation related to the availability of resources for preventive health, rehabilitation processes and early return to work. This would include for example, number of personnel involved in immediate treatment and rehabilitation process, access to medical and allied health specialists, expenditures on prevention and rehabilitation, opportunities for alternative duties and reintegration following injury.
24. The use of survey instruments should be encouraged to provide additional data to identify the status of safety and health performance in the workplace. Selected results could be reported as case studies within the annual report.

25. The use of a modified version of the Work Ability Index (WAI) developed at the Finnish Institute of Occupational Health is recommended. The WAI provides a composite measure of health status, such as the number of medical conditions and their impact on individual work ability. It may be used in conjunction with medical examinations to allow longitudinal data collection on the work ability of individual workers. The information would also provide industry-wide knowledge of the work ability status of the workforce and opportunity for benchmarking with other industries. This would allow the mining industry to compare its performance against general international practice.
26. The DME should ensure that doctors carrying out medical examinations of miners have a basic knowledge of the mining environment.
27. The extent and impact of strategies to evaluate and reduce exposure to mechanical loading, and key (evidence based) risk factors for musculoskeletal injury, such as repetitive movement, awkward postures, manual handling, ergonomic interventions etc be included in the annual report.
28. It is recommended that reporting of implementation of strategies designed to communicate and increase awareness of the risks to safety associated with poor health status such as obesity, sleep apnea etc., be encouraged. Reporting of these initiatives may be progressively developed, initially using a case study approach and evaluated for inclusion in the annual report based on quality of the strategy/intervention with respect to evidence base, reliability and utility.

7.6 Incident and Accident reporting audits

29. The DME needs to undertake regular and unannounced audits of mine sites to ensure that incident and accident reporting, by both operators and contractors, is being carried out according to the regulations
30. The DME needs to maintain data verification processes to ensure the accuracy of reported data.

7.7 Training/Education

31. Training should be provided to mine personnel to ensure uniform application of definitions relating to the reporting of accidents and incidents.
32. Training should be provided to contractors and subcontractors to ensure awareness of the need to report all accidents and incidents. DME should conduct regular audits to ensure that training is effective.

7.8 Data collection/reporting

33. The DME should investigate the potential for mines to submit incident reports electronically direct from their own reporting systems.
34. The DME should explore ways of improving the accuracy of a simple electronic data base for recording information included in the annual report.
35. The DME should investigate the potential for mines to interrogate the injury and HPI databases directly.
36. The DME needs provide adequate resources for the enhanced collection, analysis and reporting of information in the annual report and other media.

8. RESEARCH TEAM

Dr David Cliff, Minerals Industry Safety and Health Centre, Acting Director and Director of Research, has many years experience in dealing with occupational health and safety issues in the Australian mining environment. In addition he has carried out a number of consultancies looking at analysing accident and incident statistics, occupational hygiene surveys and shiftwork. He is currently involved in preparing the annual safety performance report for the Minerals Council of Australia. His research includes developing positive and lead indicators of health and safety performance that can be applied to the minerals industry.

Professor Tony Parker is Domain Leader - Injury Prevention & Rehabilitation with the Institute for Health and Biomedical Innovation at QUT**,** and is a researcher of international standing in the areas of sports medicine and occupational medicine with specific reference to the prevention and rehabilitation of injury. His research expertise includes basic research on mechanisms of skeletal injury and applied research in ergonomics and fatigue and the implications for personal health and injury. He has lead several major research projects involving several industries and has recently completed major surveys involving the Queensland and New South Wales coal mining industry in relation to the ageing workforce and sprain and strain injury. He is currently chief investigator on a five-year NH&MRC partnership grant on workplace injury.

9. REFERENCES

Australian Government (1994). Positive performance indicators for OHS - Beyond lost time injuries. Part 1 – Issues. Commonwealth of Australia, Australian Safety and Compensation Council, ISBN 0 644 35266 3.

Australian Government (2005). Guidance on the use of positive performance indicators. Commonwealth of Australia, Department of Employment and Workplace Relations.

Australian Government (2006). Report on indicators for occupational disease. Commonwealth of Australia, Australian Safety and Compensation Council, ISBN 0 642 32537 5.

BHP Billiton (2007). Sustainability report 2006 available from website: www.bhpbilliton.com.

CSMI (2007). Centre for Sustainability in Mining and Industry, University of Witwatersrand, Johannesburg, South Africa. Website: http://www.csmi.co.za/about_csmi/about_intro.htm

Coal Services (2006). NSW Coal Industry Injury and Disease Claims 2004-05. Coal Services Pty Ltd.

DME (2001). Department of Mines and Energy, Queensland Annual Safety Performance and Health Report 2000/01 available from the website: www.dme.qld.gov.au.

DME (2002). Department of Mines and Energy, Queensland Annual Safety Performance and Health Report 2001/02 available from the website: www.dme.qld.gov.au.

DME (2003). Department of Mines and Energy, Queensland Annual Safety Performance and Health Report 2002/03 available from the website: www.dme.qld.gov.au.

DME (2004). Department of Mines and Energy, Queensland Annual Safety Performance and Health Report 2003/04 available from the website: www.dme.qld.gov.au.

DME (2005). Department of Mines and Energy, Queensland Annual Safety Performance and Health Report 2004/05 available from the website: www.dme.qld.gov.au.

DME (2006). Department of Mines and Energy, Queensland Annual Safety Performance and Health Report 2005/06 available from the website: www.dme.qld.gov.au.

DME (2007). Department of Mines and Energy, Queensland Annual Safety Performance and Health Reports available from the website: www.dme.qld.gov.au.

DME (2007). Department of Mines and Energy, Queensland Annual Safety Performance and Health Reports available from the website: www.dme.qld.gov.au.

DOCEP (2006). State of the Work Environment 1988-89 to 2005-06. Department of Consumer and Employee Protection, WA.

DOCEP (2007). Safety Performance in WA Minerals Industry, Accident and Injury Statistics 2005-06. Department of Consumer and Employee Protection, WA.

DPI (2007a). Department of Primary Industries, Victoria. Mining and Quarrying Health and Safety Statistics website http://www.dpi.vic.gov.au/dpi/nrenmp.nsf/childdocs/-3C916105586C1A4F4A256A800018DB03-B23348D1D5EDEA86CA256F8F007F2627?open

DPI (2007b) Department of Primary Industries NSW Mine Safety Performance Measures website: http://www.dpi.nsw.gov.au/minerals/safety/mine-safety-results/safety-performance-measures

DPIFM (2007) Department of Primary Industreis, Fisheries and Mines NT Mining Statistics Employment and Safety website http://www.nt.gov.au/dpifm/Minerals_Energy/index.cfm?header=Mining%20Statistics:%20Employment%20and%20Safety

HSC (2007). Health and Safety Statistics 2005-06. Health and Safety Commission, UK. Website: www.hse.gov.uk/statistics/overall/hssh0506.pdf

HSE (2007). Offshore Injury, Ill health and Incident Statistics 2005/2006. HID Statistics Report HID2006-1. Health and Safety Executive (UK) website: www.hse.gov.uk.

Hulshof, C.T.; Verbeek, J.H.; van Dijk, F.J.; van der Weide, W.E. & Braam, I.T. (1999). Evaluation research in occupational health services: general principles and a systematic review of empirical studies. *Occupational and Environmental Medicine* 56:361-377.

Institution of Occupational Safety and Health (IOSH) (2002). Reporting performance -- guidance on including health and safety performance in annual reports. Available at: http://www.iosh.co.uk/files/technical/ReportingPerformance%2Epdf.

Minerals Council of Australia. (1998) Positive performance measures: A practical guide. Available at: http://www.minerals.org.au/data/assets/pdf_file/7631/PPMprac_gd21Nov01.pdf.

Minerals Council of Australia (2006). Safety Performance Report of the Australian Minerals Industry 2004-05.

MSHA (2007). Website: www,msha.gov

MSAC (2007). Mine Safety Advisory Council Industry Performance Measures Quarterly Report March 2006.

NOSI (2007). National Occupational Safety and Illness database maintained by the Australian Safety and Compensation Council. Website: www.nosi.gov.au.

Ontario Ministry of Labour (2007) website: http://www.labour.gov.on.ca/english/

Parker, A.W., Hubinger, L.M. & Worringham, C. (2004). Survey of occupational health and safety practices and issues in New South Wales and Queensland coal mines. School of Human Movement Studies, Queensland University of Technology, Brisbane, Australia.

Parker, A.W.; Worringham, C.; Greig, K. & Woods, S. (2005). Age-related changes in work ability and injury risk in underground and open-cut coal miners. School of Human Movement Studies, Queensland University of Technology, Brisbane, Australia.

QCOMP (2007). Queensland Workers' Compensation Scheme Statistics Report 2005-06. QCOMP, Brisbane, Queensland, Australia.

QDEIR (2007). Queensland Department of Employment and Industrial Relations website: www.deir.qld.gov.au.

Queensland Injury Surveillance Unit (2007). Injury Bulletin No. 97 August 2007 – Mining Injuries.

Rial-Gonzalez, E.; Copsey, S.; Paoli, P. & Schneider, E. (2005).Priorities for occupational safety and health research in the EU-25. European Agency for Safety and Health at Work, Working Environment Information – Working Paper, ISBN 92-9191-168-2

Rio Tinto (2007). Sustainabilit report 2006 available from website: www.riotinto.com.

Saiyed, H.N. & Tiwari, R.R. (2004). Occupational health research in India. *Industrial Health* 42(2):141-148.

Segal, L. (1995). Issues in the economic evaluation of health promotion in the workplace. Centre for Health Program Evaluation, Research Report 3, ISBN 1 875677 38 0.

Standards Association of Australia (1990), Australian Standard AS 1885.1-1990 *:* Measurement of occupational health and safety performance - Describing and reporting occupational injuries and disease (known as the National Standard for workplace injury and disease recording)

Step Change in Safety (2006). Leading performance indicators: Guidance for effective use. Available at: http://stepchangeinsafety.net/stepchange/News/StreamContentPart.aspx?ID=1517

The Chamber of Minerals & Energy (2004). Guide to positive performance measurement in the Western Australian Minerals and Resources Industry. Western Australia.

Tuomi, K.; Ilmarinen, J.; Jakhola, A.; Katajarinne, L. & Tulkki, A. (1998). Work Ability Index. Finnish Institute of Occupational Health, Helsinki. ISBN 951-802-202-X.

U.S. Department of Health and Human Services (1998). Leading Indicators for Healthy People 2010: A Report from the HHS Working Group on Sentinel Objectives. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion.

Xstrata (2006). Sustainability report 2006. Available at: http://www.xstrata.com/assets/pdf/x_sustainability_2006.pdf.

WorkCover (2006). Statistical Bulletin 2004/05 WorkCover NSW., website: http://www.workcover.nsw.gov.au/NR/rdonlyres/0D7B1588-1884-46AD-964E-1F683DCCF59B/0/statistical_bulletin_2004_05_4829.pdf

WRMC (2006) Workplace Relations Ministers' Council Comparative Performance Monitoring Seventh Report.
.

Appendix One. Contributors to the review

Regional Meetings

Emerald

Jeff Lyndon, Rolleston Coal
Susan Olive, Jellinbah Mine
Kevin Stockton, Gregory mine

Brisbane

Nil

Mackay

Kylie AhWong, Oaky Creek Coal
Wayne Aprato, CQ Database solutions
Adam Austin Newland Northern Underground Operations
Stuart Green Foxleigh Mining Pty Ltd
Mick Solomon, Newlands

Townsville

Nil

Mt Isa

Sergio Cespedes, DME
Phil Casey, DME
Simon Cole, DWR
Vicki Thomson, DME
Maryann Wipaki. Xstrata Copper North Queensland

Formal Submissions

Roger Kahler, The Intersafe Group Pty Ltd
Geoff McDonald, Geoff McDOnald and Associates Pty Ltd

Discussions and informal submissions

Anonymous
Estelle Abbott, DME
Adam Austin Xstrata coal
Frank Baker
Greg Biggs, New Hope Coal Australia
Roger Billingham, DME

Stewart Bell, DME
Chris Bulbrook, Goldings Contractors
Grant Cook, QRC
Dr Chris Cunneen, QCOMP
Greg Dalliston CFMEU
Jason Economidis, BMA
Phil Goode, DME
Hag Harrison, AWU
Kevin Hedges, DME
Mitch Jakeman, Anglo Coal
John Kabel, DME
Brian Lyne, DME
David Mackie, DME
Cameron McCracken, Hall Payne, Brisbane
Chris Millard, Peabody Energy
Peter Newman, EDImining
Michael Rosengren, Thiess
Greg Scanlan, Zinifex Century Mine
Stuart Vaccaneo, CMFEU
Dr Gerry Walpole, RioTinto Aluminium
Craig Worsley, Taylors Solicitors, Mackay