Queensland Mining Industry
Health and Safety Conference 2003

"Using Data to Identify Risk to Improve Safety and Health Performance"

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Issue

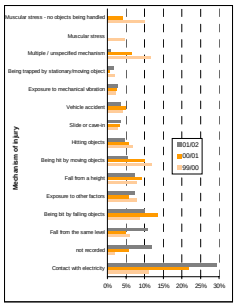
- We collect a lot of data/information.
- What do we do with it.
- How can it be used to improve mine safety.

Road to Analysis

- Mine Safety Review 1997
- Wide suite of industry performance measures adopted. ie medical treatment, total recordable injuries, severity and duration rates.
- Establish own data base called COMET which captures data on mines, events, personnel.
- Move to Positive Performance Measures ie risk assessments completed. DMR looking at completeness of Mine Health and Safety Plans assessment of consultative processes.

- Development by DMR of Performance Reports by use of COMET and Workers Compensation data on trends and comparisons.
- Engagement of NSW Injury Risk Management Research Centre to analyse data.
- Looked at types of events, types of injury, characteristics of person injured, the agent mechanism nature of injury etc.
- This started to show particular categories and trends.

For example
Figure 2 Trends in mechanisms of injury



As a result of indepth analysis five areas identified for detailed analysis:

- electrical energy incidents
- mechanical equipment incidents
- work environment incidents
- accidents/incidents involving contractors
- hours worked

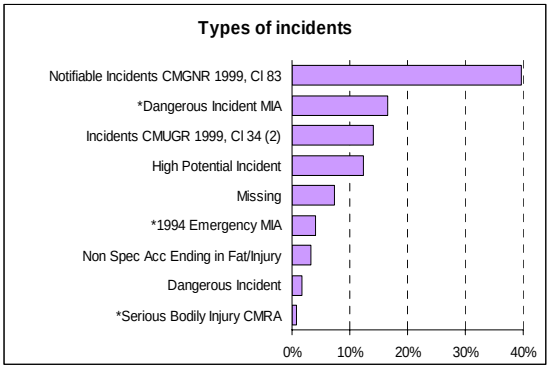
Electric Shocks Analysis

Purpose and design of study

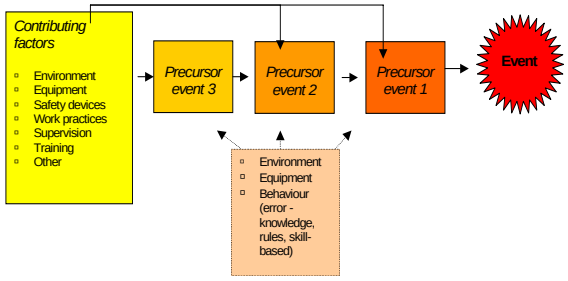
- Aim = to understand better the circumstances of electrical energy incidents in the mining industry.
- Sample = 122 cases involving electric shock identified by Electrical Inspectors.
- Each case coded and classified using systematic framework.

Characteristics of cases

- Most cases resulted in minor injury.
  - Around 40% were Notifiable Incidents CMGNR 1999, Dangerous Incidents, Incidents CNUGR or High Potential Incidents
  - More than 80% involved electric shock or electrical energy
  - Very few involved serious bodily injury or even lost time.



Framework for in-depth analysis of electrical events in mining

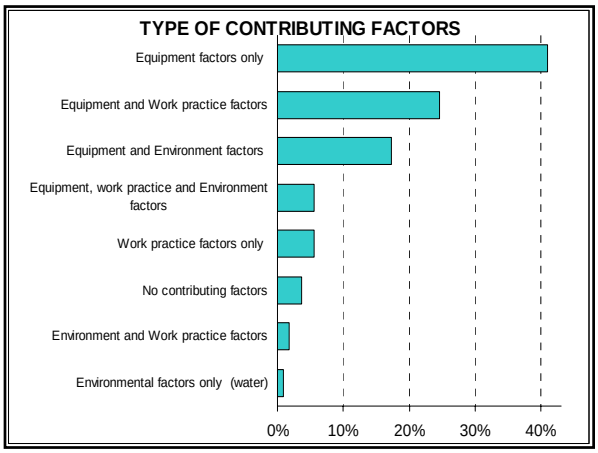


Patterns of occurrence-Contributing factors:

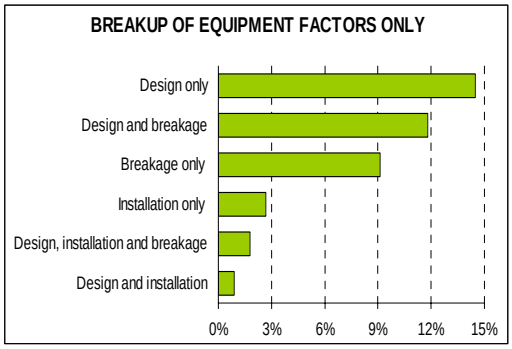
- Equipment factors
  - 90% cases involved equipment factors.
  - Nearly half only involved equipment factors
  - Poor/inadequate design in half of cases
  - Equipment breakage in nearly half of cases
- Work practice factors
  - One-third cases involved WP factors
  - Mainly unsafe or inadequate standard operating procedures

Patterns of occurrence-Contributing factors:

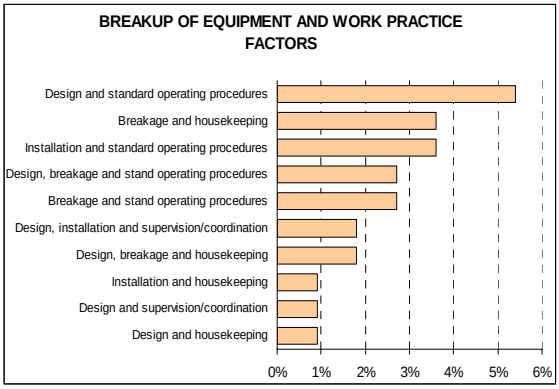
- Work practice factors
  - One-third cases involved WP factors
  - Most involved unsafe standard operating procedures
  - Mostly occurred in combination with other factors
- Environment factors
  - Occurred in 25% cases
  - Almost always with other factors



Types of Contributing Factors:

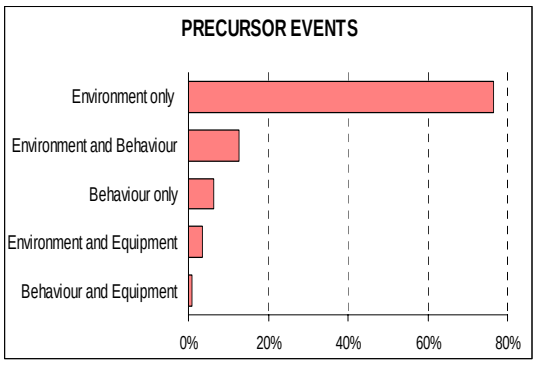


Types of contributing factors



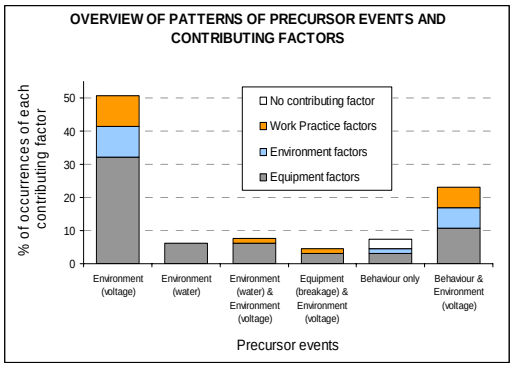
Patterns of occurrence-Precursor events:

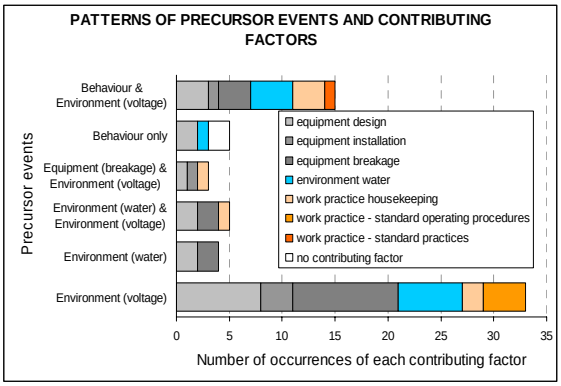
- The location of the person (Environment) led most immediately to the incident (76%)
  - mainly due to electrical energy, some to water.
- Behaviour - error occurred in only 20% cases
  - mainly rule-based error (usually not isolating equipment), skill-based error not common.



Patterns of occurrence-
Contributing factors ⟶ Precursor events

- Most common pattern was Equipment factors leading to person making inadvertent contact with electrical energy
- Unsafe work practices less common but no particular pattern of relationships with precursor events





Findings

- Main causes of electric shock incidents:
  - Pre-existing equipment problems NOT equipment breakage just before the incident
  - Person's contact signalled electrical problem NOT person's immediate actions caused the incident.
  - Behavioural involvement mainly in poor or inadequate work practices including housekeeping/maintenance.
  - No link detected with particular types of equipment
  - No specific patterns for different types of mine operations

What can we learn from this?

- Prevention of electric shock incidents
  - auditing of equipment to locate design problems
  - redesigning problem equipment
  - maintaining malfunctioning equipment
  - Motivating employees and contractors to isolate electrical equipment and test before working on it.
  - Additional training of staff would not have an impact on these types of incidents.

IMPLEMENTATION

- A communication strategy was developed to communicate the recommendations of the electrical shock report to target industry groups including Electrical Consultants/Contractors, Local Supply Authorities, NECA, Regional Seminars, Workcover, Dept. Fair Trading, HEISN (Hunter Industrial Electrical Safety Network), NECA (National Electrical Communications Association), seminars, conferences and district inspectors. A safety alert will also be issued.

- There will be a review of the data capture and recording processes to be more closely aligned with precursor events and contributing factors.
- Impact upon legislation to be considered as far as applying a "Industry Code of Practice".
- Monitoring of the implementation of the recommendations from the electrical shock report by safety operations.
- The development of a "Factsheet" to highlight the learnings and recommendations of the report.
- Next analysis of Mechanical equipment is now underway.

Conclusion

Considerable effort put into development of set of performance measures.

Unless the data/information is used to change systems procedures, equipment or behaviour, one has to benefit the value of the data.

We consider this type of analysis does achieve this and can be improved upon.