

HOW HEALTHY IS YOUR SAFETY PERFORMANCE?

Brian Lyne BE.(Mining)

Department of Mines and Energy

SUMMARY

The focus on mine safety throughout Queensland has been intensified during recent years, and in particular since the Moura No 2 accident in 1994. Queensland is about to introduce new mine safety legislation at a time when the industry is experiencing unprecedented cost pressures. Most, if not all mines have made considerable efforts to improve mine safety and statistical results confirm a measure of success. Overall statistical trends indicate a plateauing in the figures applying to the mining industry.

In an effort to understand how the health of mine safety can be improved to that of the general community, the paper developed a comparison between the two groups.

A number of the safety related issues that have been evident in our mines since 1994 are identified and interpreted as **symptoms** of mine safety. The symptoms are neither mine nor person specific. A process logic utilising **active** and **latent** failure concepts was used and in turn subjected to a Fault Tree Analysis. The results of integrating what appear to be unrelated symptoms are challenging.

A number of 'symptoms' relating to mine safety 'culture' were identified and some of the characteristics supporting the informal existence of a THREE WISE MONKEYS CLUB. People who belong to this club will be the slowest to improve their safety performance

Mine operators and Senior Site Executives under the new legislation may find value in considering some of the concepts included in this paper.

INTRODUCTION

Numerous conferences in recent years have debated the best method to measure a mines safety performance. To some, such debates have proven to be less than productive and serve to perpetuate the much-quoted proverb "some cannot see the wood from the trees"

The purpose of this presentation is to momentarily get off the treadmill of change that has such a stranglehold on the mining industry and take the time to look at the lessons from the world around us. This paper challenges the paradigm that "mining is different" and purposefully avoids any reference to the most common safety measure of Lost Time Injury Frequency Rates.

By paralleling the health symptoms of a person with the safety symptoms of the mining industry and then analysing the symptoms systematically, a picture emerges out of what are usually seen as unrelated events. In other words it allows us to distinguish the 'wood from the trees'

The paper also introduces a profile of workplaces that belong to the THREE WISE MONKEYS CLUB. Membership of this group is not recommended, however, by identifying its characteristics, it may assist mine operators avoid major failures in their safety performance

AN ALTERNATIVE VIEW

In order to develop an understanding of "how healthy is your safety performance?" there is value in reflecting on the lessons to be learned from looking at the management of health in the society at large and also the individual.

The health of a society is very dependent upon people having sustained access to uncontaminated air, water and food. In addition, the society needs protection from the threat of exposure to external viruses and climate extremes. History records the fact that plagues and flu epidemics have caused more casualties than world wars. A similar situation can also be found in natural disasters such as floods, tornadoes, earthquakes etc. These external influences must be under some form of control in order to provide the environment for the general health of an individual.

For an individual, unless they have a family history of ill health, it is common for that person not to visit a medical practitioner until there is some evidence or symptom of an illness. When in fact this does occur, it is normal practice for the person undergoing a medical examination to be checked for symptoms such as:

- . Pain
- . Temperature
- . Muscular / skeletal indicators
- . Blood pressure
- . Digestive / elimination system indicators

These are what we could call '**active symptoms**'.

Active Indicators are defined as those matters that an individual can directly observe on their body

The second stage of the medical evaluation may include providing information or personal health history on:

- . Work habits (long shifts; shiftwork)
- . Work environment (noise; chemicals; atmosphere; pollutants; stresses such as job security and production pressures)
- . Family history (heart disease; cancer; mental disease; arthritis)
- . Lifestyle (smoking; drinking; sleep patterns)
- . Exposure to external influences at home (air pollution; contact with other illnesses eg. hospitals and travel)

This list is not exhaustive, but serves to illustrate what can be termed '**latent symptoms**'.

Latent indicators may be defined as those matters that can be instrumental in bringing about one or more symptoms of an illness. Broadly they provide the environment for a medical condition to develop

During epidemic illness events, or the potential for them to occur, both the active and latent indicators become of significant importance. Evidence of this was clearly demonstrated following the recent outbreak of typhoid among tourists returning to Australia from the Kokoda Trail in Papua New Guinea. Individuals sought and received immediate medical support and government medical authorities acted to quarantine the virus to prevent it spreading into the community.

OUTCOME OF IGNORING SYMPTOMS

Fortunately, not all symptoms relate to terminal illnesses, however they almost invariably result in a drop in activity and work performance. Symptoms of terminal illnesses, if ignored, can have a very predictable outcome. Clearly, the more competent the medical examination conducted is, both in personnel and technology involved, the better the potential outcome.

Consider, for example, the circumstances of a typical 50-year-old man whose family has a history of heart disease and he:

- . Makes no attempt to keep fit;
- . Continues smoking;
- . Continues a high fat diet;
- . Has a high stress job;
- . Does not report chest pains to a doctor or family; and
- . Takes no preventative medication.

A reasonable prognosis is that without a change in attitude and direction he will suffer a major "event" at some time in the not too distant future. He may not be unusually ill until immediately before the event but when it happens there is often no second chance.

Perhaps there is a parallel to the mining industry here

SAFETY AND HEALTH SYMPTOMS IN THE MINING INDUSTRY

It is of use to consider a number of incidents and events that have occurred since the Moura No2 accident in 1994, and then classify them as a symptom where possible

The following events (symptoms) have been observed and continue to be repeated in our mining industry;

- . Major falls of roof and other strata
 - Maingates
 - Tailgates
 - Longwall faces
 - Development headings
 - Stopes

- . Widespread falls of ribs
- . Methane drainage pipework failure
- . Methane gas monitoring equipment taped up to be ineffective
- . Failure of mine seals
- . Major wind blast from rock falls
- . Large volume of methane gas at explosive concentration in intake airway
- . Frictional ignitions of methane gas (several)
- . Multiple electrical cable flashes
- . Sparks from cable bolts failing under load
- . Multiple conveyor fires
- . Electrical power energised into areas containing methane gas
- . Isolation of energy sources not appropriate to hazard
- . Inadequate job planning and instruction
- . Continuous miners operating in unventilated places
- . Diesel vehicles operating in unventilated places
- . Roof bolting machines working in unventilated places
- . Spontaneous combustion fires underground
- . Spontaneous combustion heating in underground goaf area
- . Explosive levels of methane gas in longwall return airways
- . High concentrations of methane gas in goaf areas
- . Loose ribs and broken roof left unsupported in hope it does not fall when people are near
- . Emergency escape exercises not conducted without "encouragement" of inspectorate
- . Slow reporting of incidents with high catastrophic potential
- . People unwilling to comment on safety for fear of job security
- . Sub-standard risk assessments
- . Internal company safety audits lack objective analysis
- . Ventilation officers not analysing the gas hazards associated with the working method
- . No formal education program for deputies, undermanagers or mine managers available from July 1999 other than the Bachelor of Mining Engineering Degree course
- . Ventilation Officer Course not run due to lack of industry support
- . Numerous occurrences of people not reporting significant events to senior levels of management
- . New mining methods introduced without any assessment or control of risks
- . Workforce numbers reduced resulting in loss of corporate memory
- . Poor management of interface between permanent workforce and contractor
- . Mine staff working excessive hours and with little or no relief for weeks on end
- . Senior mine management not aware of factors involved in accidents at their own mine
- . Fire on oil filled transformer

ANALYSIS OF SYMPTOMS

When each of these events are analysed into active and latent symptoms a picture starts to emerge. (Table 1)

By further refining these symptoms into a fault tree model, the prognosis of these events can become more apparent. Table 2 is an

example of how some of the risks that mines view as isolated events, have a dramatic potential

Where mine management persist in looking at each 'symptom' in isolation and not relate them to the other symptoms which may be present at their mine, in other words keeping a narrow focus on each issue, the prognosis for future health of safety at the mine will be most undesirable.

THE THREE WISE MONKEYS CLUB

There is one group of symptoms that identify mines that belong to the *THREE WISE MONKEYS CLUB*. Consider the following symptoms:

Speak No Evil

- Senior company officers and inspectors not immediately told about frictional ignitions
- Fear of threat to job security if one complains about safety
- Late or even non-reporting of possible evidence of spontaneous combustion
- Full extent of risks not provided to risk assessment teams

See No Evil

- Regular occurrence of failed ribs in roadways
- Machines working in unventilated face roadways
- Reluctance to admit mine is liable to spontaneous combustion
- Conveyors found working in coal spillage
- Senior management not aware of staff fatigue levels

Hear No Evil

- Senior management not making themselves aware of critical details of accidents at their mine
- Accident and incident investigations completed when blame is able to be laid

- No action taken to determine if incidents at another mine could be repeated at their mine.

Unfortunately, most of the symptoms included above have occurred within the past twelve months.

Fortunately, evidence indicates that the membership of this club is in the decline.

CONCLUSION

This paper has attempted to encourage the mining industry to broaden their understanding and become more aware of the outcomes of symptoms that may be evident at their mine. If an operating mine has at least one symptom in each section of table 2, and fails to initiate action to fully control and/or eliminate the risk, then the prognosis for that mine is likely to be different from the employees and shareholders expectations."

Equally, if the culture at the mine or part of the mine is under the influence of the *THREE WISE MONKEYS Club*, there is little hope for an improvement in the health of safety at that mine until the symptoms are cured.

It is very sobering to remember that the Queensland coal industry has a "family" history of mine disasters from Collinsville to Blackwater, Moura and Ipswich. Wardens Inquiry Reports into each disaster all record a number of 'symptoms' prior to the event. Perhaps one should regularly ask the question;

"How healthy is your safety performance?"