SAFE BEHAVIOUR INVOLVEMENT: BEHAVIOURAL CHANGE IN THE MINING INDUSTRY

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ABSTRACT

Safe Behaviour Involvement (SBI) can increase the frequency of safety–related behaviours in Mining workplaces. It is well known that as the use of agreed standard practices increases, the frequency of accidents decreases. Substandard practices have a significant role in accident causation, and there is need for more effective management of the behavioural side of accident causation. However, it is the physical conditions side of accident causation that appears to have received more attention in safety management in the past. Errors are generally the result of a mis–match between a person, the task and the work environment. The best way to control errors is to discover the reasons why they are occurring, and to redesign the task to reduce the health and safety risk or provide the person with training and education where required to increase their ability to perform the task. Specific principles for the reduction of human error, by matching worker, work and work environment, form the basis of the field of ergonomics. The SBI approach has been consistently proven to be effective in producing long term changes in safety–related behaviour and accident rates, in a wide variety of industries including construction, manufacturing, transport, shipbuilding, mining and health care.

SBI uses a systematic and comprehensive **risk management** approach with 4 stages:

1. **problem identification** (identifying the critical behaviours and standard practices which need to be used more frequently);
2. **risk assessment** (analysing the reasons why these standard practices are not used, and measuring the frequency that they are used);
3. **risk control** (eg. using task redesign, positive reinforcement, information feedback); and
4. **evaluation.**

SBI's ability to measure the quality of the process, to identify when the system is outside established control parameters, and to strive for continuous improvement in performance satisfies the critical requirements of Total Quality Management/Quality Assurance, TQM/QA Programmes.

I. Introduction

Safe Behaviour Involvement, SBI, as an extension of Organisational Behaviour Modification, OBM, is an approach to human resource management that focuses on the 'human' environment which influences use of safety–, quality–, and productivity–related behaviours in a workplace. As with OBM, implementation of SBI recognises that behaviours of managers, supervisors and peers, in terms of positive reinforcement, performance feedback and punishment, have a major influence on whether agreed 'standard' or 'sub–standard' work practices,

procedures and conditions are accepted in a workplace. OBM and SBI are ergonomics–based processes because they aim to maximise the compatible matching of components of the 3 environments – worker, work and workplace.

II Overview of the OBM/SBI Processes

The overriding assumption of OBM/SBI is that behaviour depends on its consequences (eg. convenience, approval, reprimands, chance of injury). The more positive, immediate and frequent the consequences that follow a particular behaviour (eg. wearing respiratory protection or using an agreed lock–out procedure), the more likely it is that, that particular behaviour will be used again in similar situations in the future. The more negative, delayed and uncertain the consequences, the less likely it is that, that behaviour will be used in the future (Table 1).

Therefore, to increase the use of certain behaviours, OBM states that the consequences which follow the use of desired and undesired behaviours need to be examined and appropriately modified when required. In addition, the antecedents, or events that occur prior to a behaviour (eg. attitudes, training, the behaviour of role models, the triggers for the behaviour in the environment) also need to be examined and appropriately modified when required. Although early discussions of OBM emphasised the influence of consequences and antecedents external to the individual, more recent formulations have also incorporated the importance of cognitive mediating processes and covert as well as overt antecedents and consequences of behaviour (Luthans and Kreitner, 1985).

Application of OBM generally involves the following 4 steps: (Luthans, 1985; Sulzer–Azaroff, 1987):

(1) identifying the behaviours or practices that need to be used more frequently, and defining these behaviours in operational terms;
(2) measuring how often these behaviours are used when they are required;
(3) developing an intervention program to increase the use of the target behaviours to a desired level (often involving techniques such as performance feedback and positive reinforcement); and
(4) evaluating the process using the behavioural measurement system established in the second step.

Since the late 1960's, a large number of studies have reported the successful use of OBM for improving performance in such areas as absenteeism and tardiness, productivity, sales and quality control (Luthans and Kreitner, 1985). Since the late 1970's, there has also been over twenty well controlled research studies (and numerous other reports) that have demonstrated the successful use of OBM for improving health and safety performance in occupational settings (see McAfee and Winn, 1989; Petersen, 1989).

There have been a large number of reports of the successful use of behaviour–based methods for productivity improvement. For example, see O'Brien et al (1982) and Hamner and Hamner (1976). To quote briefly from a selection of the summary Table, Komaki et al (1978) found that significant improvements in the percentage of "safe behaviours" from 70% to 96% and 78% to 99% in 2 areas of a food manufacturing plant (Figure 1). The effects were attributed to frequent low–cost reinforcement through feedback including weekly information feedback of performance charts. Zohar et al (1980) also used information feedback to particularly good effect by increasing the

use of hearing protection in an Israeli metal fabrication plant, (Figure 2). The feedback method used involved giving the workers immediate feedback on results of audiometric tests showing the extent of hearing loss when hearing protectors were/were not used. In contrast, other techniques (group lectures, poster campaigns, individual talks and discipline) had no effect on the frequency of use of hearing protectors by the control group of workers.

OBM-based studies have been conducted in a wide variety of industries (eg. manufacturing, food processing, construction, health care, transport, mining) and have focussed on many different types of safety-related behaviours (eg. the use of personnel protective equipment, housekeeping practices, manual handling techniques). In fact, it can easily be argued that the OBM/SBI approach is the most well proven behavioural approach for improving health and safety performance, if not the most proven approach of any type. While most of the studies have reported results in terms of the frequency that specify behaviours are used, many of the studies have also reported a decrement in accident/incident frequency rate. Some studies have also undertaken cost benefit analysis with favourable results (eg. Fellner and Sulzer-Azaroff, 1984; Reber, Wallin and Chhokar, 1984).

III. The Advantages of the OBM/SBI Approach

Two important advantages of OBM which make it more effective than other behavioural approaches to O.H. & S. are: (1) it emphasises the need to focus on changing behaviour rather than attitudes, and (2) it measures health and safety performance in behavioural terms rather than relying of accident/incident statistics.

A great deal of effort has been undertaken in the past to improve health and safety performance using attitude-based, educative and informational approaches. However, there is very little research to support the effectiveness of these approaches, and in fact there are many studies that have demonstrated that they have minimal if any effect (Hale and Glendon, 1987; Saari, 1990). These approaches fail because attitudes (ie. beliefs and feelings) are difficult to observe and change directly and they are often not good predictors of behaviour.

In contrast, a behaviour-based approach emphasises the need to focus on the many consequences and antecedents of behaviour (other than attitudes). These factors can be directly changed more easily than can attitudes. In addition, changing these factors appropriately also appears to be a relatively effective although indirect way of actually changing attitudes. In terms of measuring health and safety performance, the indicators commonly used are accident/incident frequency rates. Although necessary, these measures are problematic as they are unreliable indicators over short time periods (as accident/incidents are statistically rare events). Such measures also are problematic as they are negative (and focus on the failures that have occurred), and they are often subject to various reporting inaccuracies. To overcome these concerns, OBM/SBI provides an additional measure of health and safety performance termed 'behaviour sampling' or 'safety sampling'. This technique simply measures the frequency that certain safety-related behaviours are used when required relative to when they are not used when required. It generally involves an experienced person systematically observing the work activities that are occurring in a workplace, and scoring whether certain practices are or are not being used when required on a specifically designed checklist of preselected and clearly defined behaviours.

Figure 4 also shows that for the same 3 areas another standard practice regarding an aspect of housekeeping was more variable but also demonstrated positive improvement. Other users include 4 coal mining operations. They are in various stages of establishing their initial Critical Behaviour Listings and Safety Sampling of those chosen standard practices. Figure 5 shows a summary that one group uses to report on the 5 chosen standard procedures during each period as percentage success as 'positive states of safety' achievement at any one time. They do not rely on traditional injury statistics methods which are unreliable and negative measures of 'lack of safety'.

When a mining organisation regards data similar to Figure 5 as important a key performance indicator as other traditional measures e.g. production/tonnage figures, then and only then will the SBI process be judged to be successful in changing the organisations culture from an "incident/accident focus" to a TQM-based "systems focus".

High quality graphic charts like Figures 3, 4 and 5 should be on the mine manager's office walls and the mine-workers', lunchroom walls. In that way, everyone, managers and workers, derive one of the major benefits of the SBI process viz. quality up-to-date, information feedback giving a regular, accurate indicator of how the organisation is performing in risk management. The emphasis shift is away from injury statistics to quality of risk management systems and associated work procedures.

One coal mine quoted (Figure 6) a 3 month turnaround in achieving compliance with a lock-out procedure which everyone agreed was necessary to control a significant risk during a regular task in the coal wash plant. An important finding was that during the 3 months everyone knew on a weekly basis how they were progressing (or failing) in safety performance. Numbers of injuries would have been zero each week and would have given no indication whatsoever! Injury statistics alone can never give a reliable indication of safety levels. Remember the Westray Coal Mine disaster in Canada last year!

VII. Conclusion

There is a need for new, proven behaviour-based approaches for improving health and safety performance to be developed and implemented in mines particularly and all workplaces generally. One behavioural approach that has consistently proven to be successful is organisational behaviour modification (OBM). Initial experiences with Safe Behaviour Involvement (SBI), indicate the approach is proving to be effective because of its emphasis on worker involvement and quality of information feedback.

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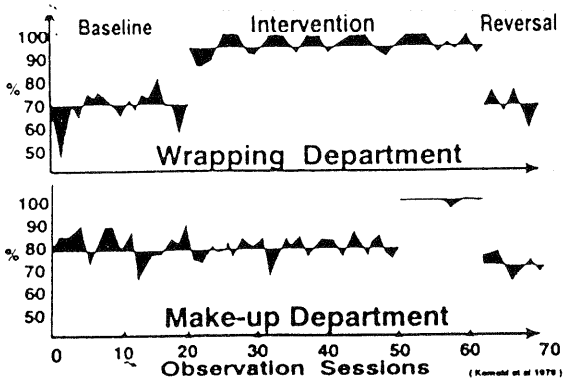

Figure 1

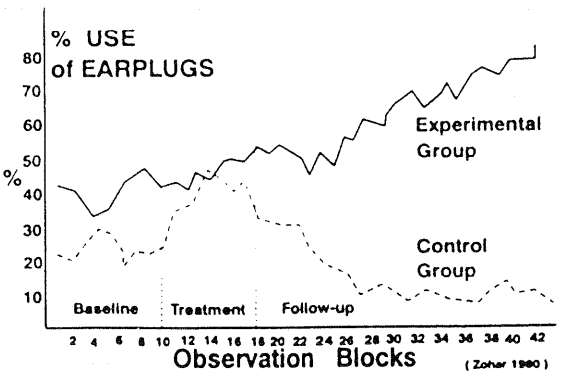

Figure 2

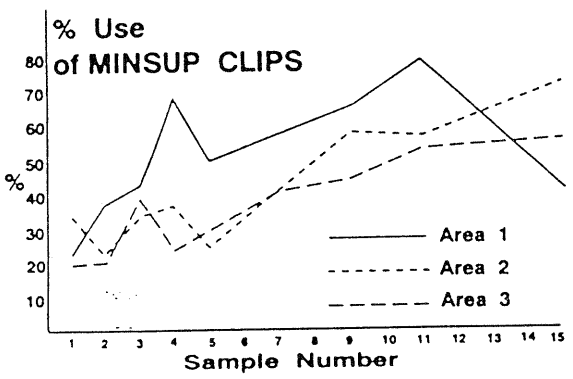

Figure 3

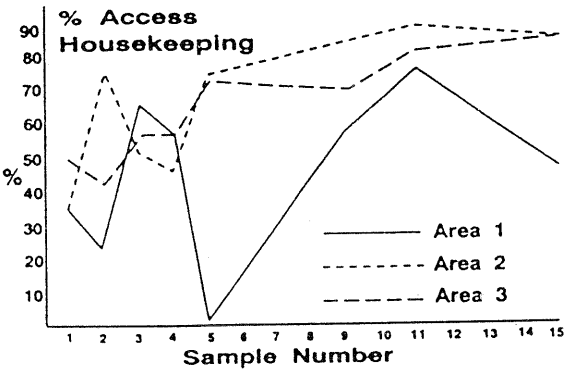

Figure 4

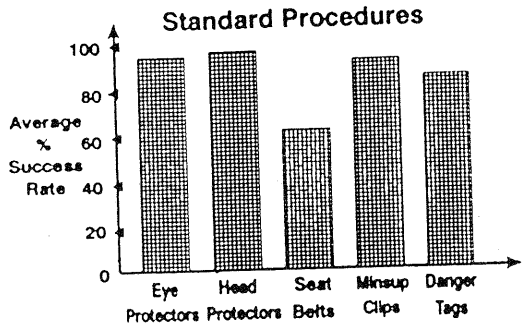

Figure 5

SBI in Coal Mining

" We thought that our workers were complying with our lock-out rules but the first "Safety Sample" found only 37% compliance !
After 3 months of SBI it is now 82 % ! "

Coal Wash-Plant Manager

Figure 6