

Improving workplace safety through increased engagement with BHP Billiton's Take-5 process

Marty Bertuleit

Mark Griffin
School of Psychology

Martha Cavanagh
CEED Client: BHP Billiton Iron Ore

Abstract

Keeping employees safe at work is a high priority for BHP Billiton. As part of their push to achieve Zero Harm, they have initiated this research into improving the effectiveness of their "Take-5" initial task risk management (ITRM) process. Take-5 involves encouraging employees to pause before beginning a task, take a few minutes to identify any potential hazards, and ensure that the appropriate controls are in place. Unlike other safety behaviour such as wearing protective clothing, ITRM is only effective if an employee is engaged in the process. As such, simply changing some rules, or designing a new booklet, is unlikely to achieve a significant improvement. An employee survey was developed and distributed at two worksites, gaining 374 responses. Five categories of factors that influenced the effectiveness of the Take-5 process were investigated: The Organisation, The Supervisor, The Peers, The Person, and The Tool. Within these categories, the 'ITRM regulations' and 'peer attitudes toward ITRM' seem to be the most influential factors. However, it is the combined effect of a range of factors that needs to be considered when developing ITRM improvement strategies.

1. Introduction

Mining is dangerous work. In Australia there were 12 mining industry fatalities in 2008/9, giving it the third-highest fatality rate of any industry (7.4 deaths per 100,000 employees). In addition, an average of seven mining employees *per day* required one or more weeks off work due to work-related injury or disease that year (Safework Australia, 2011). As a result, mining companies invest a great deal of time and resources into workplace safety to minimise the risks that employees face in their day-to-day work. One of the methods commonly used is to encourage workers to pause and think about the potential dangers of performing a task, then take steps to minimise the risk before they begin. In fact, all mining companies in Australia are required by law to have this type of initial task risk management (ITRM) system in place. In most cases, employees are supplied with a "tool" such as a pocket-sized booklet containing safety hazard information and a checklist which helps them to identify potential hazards. Whilst this seems like an effective way of helping employees to keep safe at work, there has been very little research into this specific area of safety.

Initial task risk management processes such as BHP Billiton's "Take-5" are common throughout the mining industry, and most organisations use their own version which they have either developed themselves or adapted from one that has already been in use. The tools that are used in this process are designed to encourage employees to be continually aware of ways in which they could be injured, so that they will take steps to reduce the likelihood of

this occurring. There are subtle differences between the tools being used by each organisation, but there has been no published research into whether or not these differences have any impact on the effectiveness of each tool. In many cases, they have been modified over time without reference to empirical data, and without a specific, underlying developmental strategy (Borys, 2009).

An important difference between ITRM and other safety behaviour such as wearing personal protective equipment (PPE) is that workers have to *believe in* ITRM for it to be effective. If an employee wears safety glasses he/she is protected, but little is gained from ticking boxes on an ITRM form unless the user is actively engaged in the process. As such, increasing the effectiveness of tools such as the Take-5 cannot be achieved through changes to regulations or booklet design; it also requires the development of certain attitudes and beliefs in its users. By identifying the factors that contribute to these beliefs, and the strength of their influence, it should be possible to make purposeful, effective changes to the way in which ITRM is accomplished. BHP Billiton has a goal of “Zero Harm” for its employees, and this project is an example of how they are trying to make it a reality.

1.1 Background

For a safety system to be effective it needs to generate the performance of a desired behaviour by its users. Knowing *how* to be safe, and actually *being* safe, are not the same thing. So what makes us decide to behave safely at work? According to Rotter’s (1954) social learning theory, People are likely to perform behaviour that will produce the greatest amount of benefits with the least penalty, depending on their expectancy that the behaviour will lead to a desired outcome, and the extent to which that outcome is valued. Therefore, making the Take-5 more effective requires strategies that take all of these factors into consideration.

ITRM is designed to raise employees’ awareness of potential hazards by getting them to pay attention to their work environment. As such, the process can be simple and quick, which minimises the perceived “penalty” of taking too much time or requiring too much effort. Whilst the “benefits” of performing this process are a reduction of accidents and injuries, these outcomes are not conspicuous and, as such, they are generally not an effective form of motivation (Borys, 2009). Ideally the benefits should be tangible, immediate, and valued, such as encouragement, rewards, or peer recognition. In addition, workers need to *truly believe* that performing these informal risk assessments will lead to the desired outcomes.

1.2 Key findings of literature review

Whilst there is an abundance of literature on workplace safety, there is surprisingly little research into initial task risk management. This is of particular concern considering that this process is a compulsory component of safety systems for mining companies operating in Australia. However, because of the need to take a holistic approach to ITRM, much of the research in other aspects of workplace safety is relevant. Human behaviour is complicated and everyone is different, but there are several behavioural theories that can be used to guide the development of an effective improvement process. For example, social exchange theory (Blau, 1964) suggests that if workers believe management is truly concerned about their safety, they will develop an innate obligation to reciprocate by complying with safety procedures and participating in safety activities. This highlights the importance of achieving a level of organisational commitment to safety that goes beyond rhetoric and regulations.

According to Vroom's expectancy-valence theory (1964), workers are more likely to adhere to safety rules and regulations if they believe this behaviour will result in valued outcomes. This means that employees need to see appropriate behaviour being rewarded with something that they find appealing. Additionally, for this to be effective it needs to occur consistently over time and across worksites. Consideration was also given to what Hollnagel (2009) calls the efficiency-thoroughness trade-off (ETTO) principle, which suggests that people performing a task will routinely choose some sort of compromise between efficiency and thoroughness based on their perception of each factors' importance in a given situation. This affects the amount of engagement a worker will have with the ITRM process on two levels: Its perceived value in terms of the expectation that it will keep them safer, and its perceived value in terms of potentially competing factors such as production pressure and peer influence.

If employees don't believe that the ITRM process will make them safer it is unlikely that the process will be effective. For example, in his study of a large contract maintenance organisation, Borys (2009) identified a potentially dangerous disparity between the attitude of management toward the ITRM process compared to that of the workers. He found that management tended to focus on the completed paperwork and regarded this as evidence that workers were behaving safely, whereas workers preferred to rely on common sense to keep them safe. For them, ITRM was simply a ritual designed to appease management, so it had little influence on their safety behaviour. Similarly, Hopkins (2006, p. 590) found that without feedback, the ITRM process would "rapidly degenerate into an ineffective ritual".

2. Process

In addition to a review of the literature, information was gathered from a wide range of industry-related sources including attendance at seminars and workshops, interviews with safety professionals, discussions with representatives from regulatory bodies, examination of organisational standards and procedures, and conversations with academics in the field of workplace safety. In addition, visits were made to three mining and processing sites to get a first-hand look at how the ITRM process was working in the field. These site visits included dozens of informal interviews with employees involved in a wide range of tasks and occupations to gauge the opinions of the people who actually use this process every day.

This information was used to develop a survey which was distributed to employees at two worksites. Data from the 374 completed surveys was analysed using SPSS statistical software, and consideration was given to the qualitative data from interviews and survey comments when interpreting the results.

3. Research findings and recommendations

The factors influencing the effectiveness of ITRM processes such as BHP Billiton's Take-5 have been grouped into five categories: The Organisation, The Supervisor, The Peers, The Person, and The Tool. Whilst each is important in its own right, it is the combination of all five that is required for ITRM to be effective. For example, the perfect Take-5 tool (if there was such a thing) would not help workers to be safer if they had no desire or requirement to use it. The tool would need to be supported by an appropriate organisational culture, along with the favourable attitudes and beliefs of its intended user.

3.1 The Organisation

Management commitment to safety has a considerable impact on the effectiveness of ITRM. If employees have a general perception that safety is truly a priority at their organisation they are more likely to engage in safe behaviour (Zohar, 1980). Therefore, for safety rhetoric to be effective it needs to be backed up by supportive deeds and actions that are consistent over time and across worksites. This means making safety a priority regardless of production pressures. According to the survey results, management commitment to safety has a significant impact on the perceived value of ITRM, even when the influence of the strongest factors from each category was allowed for.

Safety communication should be free-flowing; both up and down the organisational structure (Zohar, 1980). Communication quality also refers to the accessibility of safety information, the safety dialogue between workers, the feedback given to employees by management, and workers' belief that their comments will receive a considered response. The method and source of safety communication is also important, as several studies have found that mine workers have a preference for verbal communication, and look to their supervisor as their primary source of safety information (ACARP, 2007). Analysis of the survey data revealed a relationship between communication quality and the perceived value of ITRM, but it was not as strong a predictor as management commitment to safety.

3.2 The Supervisor

Supervisors are probably the most important people in the organisation when it comes to improving the effectiveness of safety initiatives (ACARP, 2007). As the figure of authority that workers come into contact with most often, they have a key role in safety communications, from the top down and the bottom up. Additionally, in many cases in the mining industry, supervisors have been promoted from within workgroups, which means that they still share strong bonds with their team members. Two areas of supervisor influence were examined; the quality of the relationship between the supervisor and workgroup members, and the supervisors' ITRM attitudes and behaviour.

Of these two factors, analysis of the survey data revealed that employees' perception of their supervisors attitudes and behavior toward the ITRM process (e.g. if they encouraged its use, and regularly performed ITRM before beginning a task) had the strongest influence on workers' perceived value of the Take-5. Surprisingly though, this influence was not significant when the other factors were taken into account. A possible reason for this is that, even though the surveys were anonymous, employees may have been reluctant to answer some questions about their supervisor accurately due to a sense of loyalty to them. The mean score for the quality of the supervisor/employees relationship was the highest of all the factors, adding weight to this theory.

3.3 The Peers

In the workplace peers can provide a source of social support and solidarity, increasing an employee's motivation to be part of the group by aligning themselves with established attitudes and behaviours. As a result, workmates have the next largest impact (after the supervisor) on an employee's attitude toward safety (Borys, 2009), although this depends on the strength of the bonds between the group members. The importance of peer safety attitudes and behaviour is particularly relevant in the mining industry where the combination of shift work and isolated locations has led to significant differences in safety attitudes across groups

(MOSHAB, 2002). If peers show little regard for ITRM, and this is not addressed by the supervisor, they will see this as the true indication of its value.

Two aspects of peer influence were investigated; peer safety attitudes and peer attitudes toward the ITRM process. Of these two factors, analysis of the survey data revealed that peer ITRM attitudes was easily the most influential of the two, and this factor also one of the two strongest overall predictors of the perceived value of the ITRM process. In other words, if an organisation wants employees to engage in the ITRM process it needs to ensure that the whole workgroup considers it to be a useful safety process.

3.4 The Person

Individual characteristics will always play a role in the effectiveness of ITRM processes such as the Take-5. Some behavioural influences are relatively stable (such as personality traits), but others come from attitudes and beliefs which can change over time. Whilst personal safety attitudes are influenced by the other factors being investigated in this research project, looking at personal safety attitudes as a separate construct seemed worthwhile. The main reason for this was, because of a current resources boom, workers tend to either be moved around within an organisation to fill skill shortages, or choose to move between organisations to improve incomes or conditions. This increases the likelihood that their attitudes toward safety processes such as ITRM have been developed elsewhere. In the analysis of the survey data, there was a significant correlation between personal safety attitudes and the perceived value of the Take-5, but it was not significant when the influence of the other factors was taken into account. This suggests that regardless of their own safety attitudes, workers perception of the value of ITRM is more likely to be the result of other factors.

3.5 The Tool

Two aspects of the ITRM tool were examined; the quality of the tool itself and workers' attitudes toward the ITRM regulations. To encourage its use, the ITRM tool should be simple, uncluttered, and easy to follow. Leveritt and Joy (ACARP, 2007) recommended that the design should flow so that it guides the user through the decision and action steps from start to finish. The information provided in the tool should also be relevant to the workers' situation. If an ITRM tool is well designed and easy to use its value increases, and the survey data revealed this to be a significant factor in the perceived value of the Take-5.

However, it is the *ITRM regulations* that seem to have a greater influence on the perceived value of the Take-5 process. At BHP Billiton, ITRM is compulsory before beginning any task, and should also be undertaken when conditions change during that task. This rule is simple and relatively unambiguous, making the use of the ITRM process easy to understand and monitor. Whilst this is preferable, simple rules do not cater for all situations and do not provide clarity (Laurence, 2005). Blanket requirements reduce worker autonomy, and can create discontent amongst employees who believe they shouldn't need to do ITRM because of their experience, or because of their familiarity with the task.

This seems to be an important issue as, according to the survey data, employee attitude toward the ITRM regulations is one of the two strongest predictors of the perceived value of the Take-5 process. The main problem is that many workers believe the ITRM process is not effective for routine or familiar tasks. As such, there is a belief for many that the regulations are only in place to cover management in the event that something goes wrong. On-site discussions with employees, along with the comments written in the space provided at the end

of the survey, support this assertion. Unfortunately, the majority of workplace accidents occur during routine tasks, generally due to a lack of attention (Reason, 2000), and this is what ITRM processes are supposed to guard against.

4. Future work

The findings in this study should be regarded as a starting point for further research. Whilst some factors influencing the perceived value of ITRM have been identified, there is still very little published data on the effectiveness of the actual ITRM process. In addition, any recommendations that result from this research should be trialled and evaluated before being introduced into the general workforce. In terms of initial task risk management, there is still a lot of work to do.

5. Conclusion

The main finding of this research project, and its most important message, is that there is no “silver bullet” that will suddenly maximise the effectiveness of the ITRM process. Whilst *Peer ITRM Attitudes & Behaviour* and *ITRM Regulations* seem to be the most influential factors in the perceived value of ITRM processes such as the Take-5, it is the combined effect of a range of factors that needs to be considered. The organisation must have a genuine commitment to employee safety that is consistent and visible, the ITRM tool should be simple and usable, and the employees need to *believe* that the ITRM process will help them to “come home safe every day”.

6. References

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