From Risk Perception to Safe Behaviour

Abstract

An organisation's greatest resource is its people. People can also be its greatest risk. Conventional risk management approaches focus on physical conditions and work processes, often overlooking the integral 'people element'.

Our individual differences influence how we perceive our work environment, the tasks at hand, our skills and capabilities. Based on such perceptions, we make decisions on how we are going to behave.

This paper will draw on research findings and case studies to:

examine the factors that shape our perception and tolerance of risk

explore the link between risk perception and safe behaviour

discuss the practical applications and suggest initiatives and possible solutions that organisations can adopt

Introduction

Risk management, and the identification of risk levels, hinge on the assessment of probability and consequence. Yet people, including experts, differ in their perceptions especially with regard to the probability and consequence of events. Risks are often rated inconsistently as a result. Risk assessment activities conducted in training sessions are a prime example, where participants debate whether the probability is 'very likely' or just 'likely'.

Few organisations have actively addressed the issue of risk perception. Workplace risk assessments give little consideration to the differences in how we assess exposure, probability, consequence and overall risk. Research related to OHS has focused on the management of worker safety with little concern for the subjective interpretation of safety risks and effects (Morrow &Crum, 1998).

However, the way in which people think, feel and behave in response to risk is receiving increased attention, both amongst academics and professionals involved in promoting and regulating safety.

Wilde advocates in his book, *Target Risk 2* (2001), that safety interventions need to consider risk perception and reduce the level of risk people are willing to tolerate if they are to be successful. Wilde claims that improvements in health and safety cannot be achieved through training, engineering or enforcement, stating that the extent of risk taking

ultimately depends on the values that prevail, not the safety technology available.

Shaping our perception of risks

The concept of risk has been invented to help us understand and cope with danger and uncertainty. Our perception of risk, however, is not constant; it varies with both the individual and the context. As outlined earlier, management focuses on context; improving work environments in an attempt to ensure safety. However, individual perception of risk is not solely dependent upon the physical environment. We envisage risk as a result of what we believe to be the likely outcome, the chance of the outcome actually occurring and how concerned we are if it does happen (Slovic, 2000).

Contributing factors

A number of factors contribute to how we view the work environment, the tasks to be done as well as the risks associated with those tasks. Internal factors, such as memory, experience, and stress, as well as external factors, such as the work environment, exposure and sensory information combine to influence our perception and the decisions we make.

When undertaking risk assessments and considering how to encourage safe behaviours in the workplace, we need to keep in mind these factors, some of which are discussed below.

Memory

Our ability to learn varies from person- to- person. Differences exist in our aptitude (both innate and developmentally influenced) for encoding & storing information. Some people are better at remembering names and words, others can recall numbers more easily and many people are better at recognising faces or pictures.

Theorists have been attempting to explain how the human mind and memory works since the late 1800s. One well-known and accepted model, proposed by Baddeley and Hitch in 1974, suggests that there are various 'compartments' to memory. These include sensory stores, the short term memory (where information is stored temporarily and either discarded or transferred) and the long term memory (where information is permanently retained).

However, what we recall is not always an accurate reflection of events or reality. Memory trials and research has demonstrated that:

- We can conjure up the big picture but often cannot remember the detail
- We are open to suggestion and prompting
- Poor attention at the time of the event results in poor learning and poor memory recall
- Without rehearsal our memory fades
- We have a tendency to forget unpleasant events
- Our perception of an event impacts on what we remember – our memory is biased
- Interruptions whilst learning or retrieving information can result in 'brain cramps' (a psychological term for errors in mental processing)

The relationship between memory and perception is crucial. We often rely on our memory of procedures and our recollection of how we performed tasks when we undertake work. However, if our recollection is inaccurate, decisions that we make about safety risks, based on what we remember and recognise, may also be flawed.

Experience

A large element of our memory is based on previous experience, so it is logical that our perception of risk is also influenced by prior experience. Many psychologists believe that we repress memories of traumatic experiences. It is conceivable that vital triggers or procedural information concerning risky or unsafe circumstances may also be lost with the actual memory of the event itself.

A study with previously injured oil workers working on offshore installations found that the experience of an injury influenced their overall perception of the work environment. They felt less safe, viewed the safety climate less positively and experienced more on the job stress (Rundmo, 1995). However, personal experience of injury seems to increase an individual's motivation to work safely.

Knowledge

People who take risks are not necessarily less knowledgeable than those who do not take risks as, typically, those who know more tend to judge the risk to be smaller (Johnson, 1993). There is a correlation between perceived risk and knowledge about the issues involved with that particular risk. The correlation is quite modest in size, which means that the variance in risk perception cannot be explained by variation in knowledge.

However, we focus on knowledge and information as the core contributor to risk management and safety. A common outcome from incident investigations is to provide more training. We incorrectly assume that an organisation of experts is a safer organisation.

Mood

Our disposition affects how we function, our mental processes and our risk perception. Mood gets in the way of retrieving information; if we are feeling grumpy, we are more likely to recall negative events and situations whereas if we are content we focus on happy memories.

People in positive moods have been found to be more friendly, cooperative, and supportive of others. Good moods contribute to efficient business functioning, create a more pleasant work atmosphere, and increase the likelihood of helpful, safe behaviours (Williams, 2004).

Mood can, however, have adverse effects as well. People in negative moods use less information to make decisions, are more selective of what information they pay attention to, are less detailed in their approach and find problem solving more difficult. As a result, their ability to manage safety risks may be reduced.

Sad people are more likely to overestimate the probability of a negative consequence when conducting risk assessments. They feel that they are less able to influence risky outcomes and are less likely to enact risk-

reducing, beneficial behaviours as a result (Williams and Wong, 1999b).

Work stress

Financial worries, time pressures and work loads all influence how we perceive safety hazards. A study with farmers conducted in 1996 (Kidd), found that decisions about safety were primarily driven by the effect on production rather than the risk to health. The real or perceived pressures and occupational stressors prevented farmers from putting in place critical safety measures even though they were aware of the dangers.

The impact of work stress on employees is observable. The real or perceived pressure to perform and meet targets has been known to influence our judgements and distract us from adequately identifying and putting in place safety controls.

Group pressure

Perception doesn't just apply to individuals; it also applies when we work in groups or teams. We respond to what our peers tell us and their assessment of circumstances. If a team member that we respect and who we believe is more experienced than ourselves tells us something is safe, we tend to accept their decision. If a person of authority deems an environment or piece of equipment to be safe, we generally do not question their conclusion (Vaughan & Hogg, 1998, Geller, E.S, 2005). Most groups have a natural leader who sets the group culture, is never questioned and always has the final say.

Asch (1956) conducted an experiment with a group of male students to test conformance to group pressure. When asked questions by the researchers, a roomful of students were told to answer 'yes' regardless of what the true answer was. A single student, the 'test case', who was not aware of what the other students had been told, was then brought into the room. Three lines of different lengths were drawn on the board. Starting at one end of the room, students were asked if the lines were identical in size. One by one, students answered 'yes'. The test case initial appeared confused and uncomfortable. However, by the time it was their turn, they too answered yes.

We repeated Asch's experiment with a group of miners during a safety meeting, using the latecomer as the test case. Surprisingly, even with the latecomer knowing the others in the room, we achieved the same result.

Exposure to and control of the risk

Control over our work environment is a factor that greatly influences our perception of existing risk. We are comfortable with snow skiing, because we have control over the decisions to participate and as result, feel it is lower risk. We rate nuclear explosions as a high-level risk because we have limited control of circumstances that lead to potential incidents.

If we believe (rightly or not) that a risk is controlled, we will lower our risk rating and increase our risk taking behaviour. For example, go-kart and truck drivers report feeling safer when they buckle their seat belts, and significantly increase the speed at which they are travelling. Footballers increase their risky behaviour when wearing safety padding.

Involuntarily exposure to hazards (including hazards inherent in the work we do) increases our aversion to risk. Also, the more catastrophic the potential outcomes, the higher our levels of aversion are (Slovic, Fischhoff & Lichtenstein, 1980c).

Exposure to infrequent large loss are more likely to make us react and feel unsafe, than exposure to frequent small loss (Slovic, 2000). This is demonstrated by the consistent disregard and lack of concern for near-hit incidents and first aid incidents in the workplace as compared to the attention and focus that a serious incident or fatality attracts.

Workplace safety performance

Enter a site or talk with a work group that have had no safety incidents over a long period of time and there is a strong belief that the work environment is safe. Ask the questions "Is this a safe workplace" and a typical response may be "we haven't hurt anyone; we must be doing something right". Even individuals who admit there is always room for improvement are more likely to be complacent if safety performance is on track.

Conversely, the study conducted by Rundmo (1995) on offshore installations found that oil workers assigned to offshore installations with high incident records reporting feeling less safe, perceived the risks as higher and were more concerned about safety.

Making a decision to be safe

The link between risk perception and behaviour

We make decisions every day; consciously or unconsciously, on how we are going to behave. Yet making a decision is a difficult cognitive process. It involves the amalgamation of various sources of information. Even when we are aware of all the contributing aspects, individual differences and perceptions influence our decision-making and the resulting behaviours (Hillson, 2004). A misjudgement of risk may lead to inappropriate decisions and an unsafe behaviour or human error – risk perception is a critical antecedent of at-risk behaviour.

The link between risk perception and behaviour is two-directional. Risk perception can influence behaviour and vice versa, risky behaviour may cause an affective reaction. For example, an employee who takes a chance to carry out a job, knows the risk is enhanced but when there is no incident, learns not to be worried or feel unsafe.

Making a risk-based decision

Decisions are often reached by focusing on the reasons that justify the selection of one option over another. There is a tendency for considerations that are out of sight to also be out of mind. This suggests that when decisions are made about risks, we do not consider all the facts available but rather, concentrate on the explicit information in front of us (Slovic, 2000).

We often undervalue outcomes which appear probable in comparison to those outcomes which appear certain. Also, our mental representation of risk controls can be easily manipulated. We vary the certainty with which safety measures prevent harm and assure ourselves the controls we put in place will definitely protect us. This phenomenon is referred to as pseudocertainty (Slovic, 2000).

Accepting risks

We accept a certain level of risk in our lives as necessary to achieve certain benefits and the higher the benefit the more likely we will acceptable the risk (Slovic, 2000).

Individuals often make calculated risks. If we do not know or understand the situation or do not have an experience base on which to make informed decisions, we may choose to take a calculated risk. If we take safety for granted, we may not stop to consider the whole picture. Sometimes, we are influenced by people around us to accept risks that we normally would not.

Groupthink and defective decision making

Groupthink, a term coined in 1953 and extensively researched by Irving Janis (1956, 1982), is a mode of thinking that people engage in when they are deeply involved in a cohesive group. The members strive for unanimity and this overrides their motivation and ability to realistically appraise alternative courses of action. Groups agree to courses of action that the individual members do not believe are appropriate.

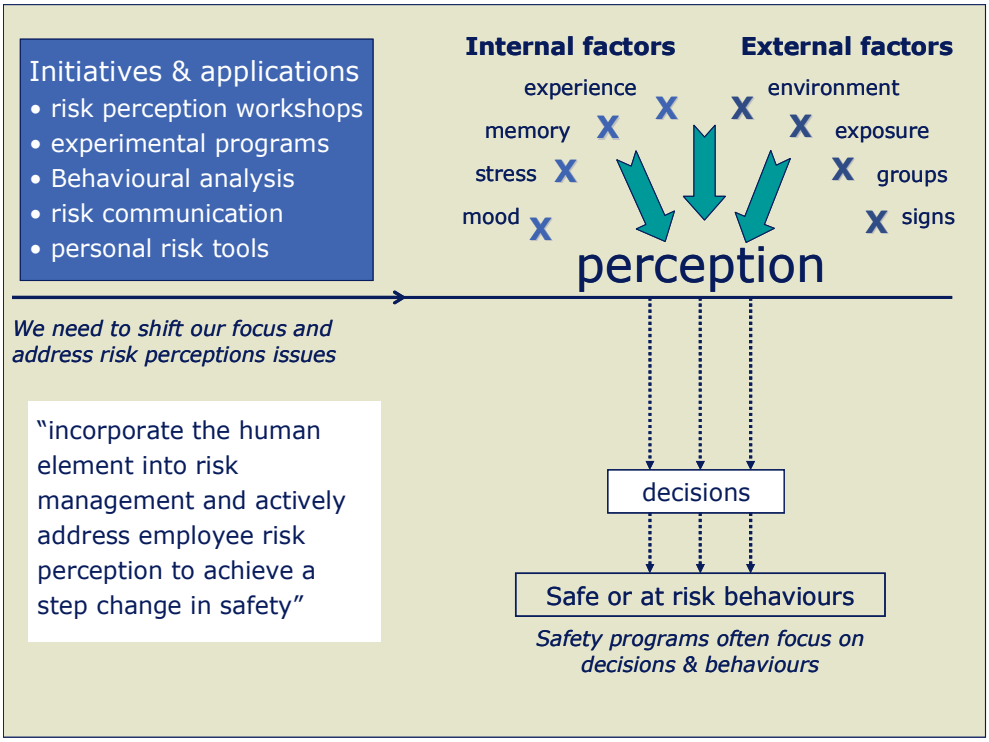
One of the most famous cases of groupthink was the infamous Challenger incident, where NASA sent seven crew members into space, only to have the rocket explode shortly after launch due to defective decision-making processes within the agency's leadership.

When we make decisions in groups about hazards, risks and most importantly, risk controls, we need to keep in mind group processes so that we can avoid dysfunctional decision-making. Direct pressure, high stress, persuasive leaders, cohesiveness, shared stereotypes can encourage groupthink and can lead to a failure to examine risks, poor information gathering, bias in information processing and perception.

Initiatives and practical applications

The recent research and information available necessitates a shift in our focus. By incorporating the human element into risk management and actively addressing employee risk perception, we can make a step change in safety.

There are a number of approaches to engaging the workforce in confronting and changing their perceptions of risk. These include risk perception workshops, experiential workshops and behaviour analysis, to name a few. However, the chosen initiative must suit the organisation; its safety leadership and culture, safety incentives workplace morale and motivation.



Conducting risk perception workshops

Building on what Wilde stated in his book, *Target Risk 2* (2001) we need to align work groups' judgements and tolerance of risk if we are to address risk-taking behaviour and improve safety. A risk perception workshop aims to do exactly that – align perceptions. It is an introspective session that focuses on how we assess risks, why we choose to behave in certain ways and how we can influence each other's decision making. By providing an up-stream approach and a different way of looking at behaviour, the workshops provide an additional avenue that can improve safety in the workplace. With a deeper understanding of their own and others' behaviour, employees are better equipped to change and improve their own safety and the safety of their peers.

Risk perception with drill & blast crews

The production engineer and supervisor of a drill and blast crew wanted to take a different approach to safety with their team. A risk perception workshop was developed with the aims to explore 'why we do what we do' and to create an impetus for change.

The session examined the role of memory, risk perception, behaviour analysis, the power of control and teamwork. After the session, the managers lead by example, discussed risk perception and behaviour with employees, recognised safe behaviour and focused on motivating safe work practices. Following up with the group after six months, they had only experienced one medical treatment injury, and that operator had not attended the workshop. The safety culture of the drill and blast crew had improved; employees took action and rectified problems and safety standards had risen significantly.

Running experiential programs and setting goals

Monteressi (1998) developed and facilitated an experiential program with the aim of changing their response patterns and risk-based decision making processes. The program was reality based and focused on nine modules; individual qualities, attention development, emotions and safety, habit learning, value identification, problem solving and perception, communication, individual responsibility and social support.

At the completion of the program, the participants identified actions that they most needed to take to reduce the risk of being injured or killed and to avoid being 'hijacked' by time pressures and stress. After a few weeks, the group had significantly improved their safety performance. They had accepted the goals that they had identified as their own personal behavioural goals. They were more conscious of their decision making and behaviour and identified similar improvements in their peers' behaviour.

Analysing behaviours

Behaviour analysis involves an in-depth look at 'safe' and 'at risk' behaviours in the workplace (Geller, 2005). Similar to the investigative processes applied during the analysis of incidents, behaviour analysis identifies the underlying motivations and triggers that lead to an individual or group behaviour.

The process is particularly useful for determining improvements and actions to take, when a recurrent undesired behaviour is observed in the workplace. Also, when trying to encourage a safe or desired behaviour, the analysis can highlight what initiatives or programs to set.

Behaviour analysis in nursing

A group of nurses applied the behaviour analysis process to a specific behaviour that concerned them - dispensing the wrong medication to patients.

A number of contributing factors that lead to the behaviour were identified. Nurses were often distracted during medicine rounds by other nurses interrupting or residents chatting. Also, medication was often dispensed in the morning just before tea. The nurses admitted that by 9am they were ready for a rest. When handing out medication they were often thinking ahead about the cup of tea they would shortly receive.

As a result of the analysis approach, the nurses found simple solutions to their recurring behavioural error. A white and red coat was supplied to nurses to wear during medication rounds, to deter other nurses from interrupting them. Medication rounds were also delayed by half an hour, to allow for a tea break before hand.

Upgrading risk management processes

Incorporating what we know about risk perception and individual behaviour into how we manage risks is critical. Risk assessment methodologies and tools should be redesigned in a way that considers internal and external factors that influence our decisions on probability and likelihood.

Enhancing risk communication

We need to target cognitive, emotional and motivational levels when we inform people of relevant hazards and risks in the workplace. Imagery that relates directly to desired behaviour is important when communicating information. Simple, positive and concrete messages are more effective at changing behaviours.

Not only must the message be clear, the communicator can also influence how people receive and respond to information. If we believe the speaker is an expert, trustworthy, altruistic, open and likeable, we will accept and react to the information they are portraying (Flin et. al., 1996).

Improving personal risk tools

A number of organisations introduce the five minute, pre start risk assessment, commonly referred to as a Take Five, to increase safety awareness prior to commencing work. We need to build on this existing process by incorporating the people elements.

It is not enough to ask what the physical, observable hazards are in the workplace. We must also ask what the psychological hazards are. Are we in the right state of mind to be undertaking this task? By focusing employees' attention on internal and external factors before commencing high-risk work, we are influencing behaviours up stream, during the cognitive, thinking and decision-making stages.

Influencing change

Most humans will not change their behaviour, beliefs of habits unless motivated to do so. Most will not change even if the change is for the better, unless there is a compelling reason to do so. Ingrained beliefs and behaviours need some help to shift.

Motivation

Risk perception workshops, behaviour analysis and other initiatives enhance the understanding and ability of people but do not motivate them to apply their understanding of risk perception on a daily basis.

We have to persuade people to adopt new practices. We need to understand the external motivators (what our leaders motivate us to do) and internal motivators (what we motivate ourselves to do) that will encourage the use of risk perception tools.

Drawing on internal needs and desires; improving job satisfaction, creating feelings of success, building expertise and giving autonomy can lead to successful, long-term motivation. External motivators can also encourage desired behaviours and performance. Incentives such as recognition of achievements, increased responsibility, training, positive feedback and encouragement are effective and may even create self-motivation, longer-term behavioural change (Geller, 2005).

Conclusion

OHS risk management remains a key ingredient of a proactive safety program and plays a vital role in the prevention of incidents and injuries at work. However, research has shown that risk assessments are subjective and risks are often rated inconsistently

If we are to continuously improve our safety performance, we need to focus on the human aspect and individual differences. The internal and external factors that combine to influence our perception and decision-making must be considered when undertaking risk assessments and encouraging safe behaviour in the workplace.

The aim is not to build new systems and processes but rather to revisit our existing safety programs and inject them with a people element. This paper outlines a selection of initiatives and practical applications that have been shown to address the issue of risk perception. However, there are a number of ways to skin a cat, and in deciding how to move forward organisations should keep in mind its safety leadership and culture, current safety incentives and consequence management processes as well as workplace morale and motivation.

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