RISK-TAKING AND ACCIDENTS

Corrie Pitzer
IOSA Pty Ltd

SUMMARY

The paper investigates the concepts of risk-taking of employees, and puts it into perspective of individual motivation, social environment of employees and the organisation's safety culture.
Risk-taking is a highly complex phenomenon of human behaviour, and defies simple explanations. The individual operator is "bombarded" daily with mixed signals from his/her supervisors, management and peers. A specific and very focus influence over his/her behaviour may develop over time, and the individual's behaviour soon becomes intuitive, habitual and automatic. Additionally, the individual develops certain "perceptions of risk" which also defies logic. In the daily presence of risk, the individual develops an acceptance of the risk and threats, to the point where these risks become unnoticed and ignored – commonly referred to as complacency. But complacency implies a negative value of laziness or deficient competence. Risk acceptance, on the contrary is a normal and very widespread phenomenon.
Finally, a number of approaches to safety management is offered.

INTRODUCTION

What causes accidents?
Accidents are symptoms of serious breakdowns in an organisation. They are the result of a series of deficiencies somewhere up the organisational ladder, deficiencies that may have existed latently, or even actively, for many years without necessarily causing an accident.
One of the most dramatic accidents in history was the Challenger disaster when the rockets and shuttle exploded so dramatically in front of millions of people. The accident analysis pinned the blame for the catastrophe on a failed "O-ring" on one of the rocket boosters. But was it really that simple? How can a multi-billion dollar project be so dependent on an O-ring? Was the O-ring really the villain?
It was not. The 1986 U.S. House of Representatives investigating committee report brought to light many other factors that contributed to the accident. These factors had nothing to do with the technical design or operation of the project, but had a lot to do with NASA's policies, practices and procedures, and a prevailing "culture" in the organisation that allowed the technical deficiency in the O-ring to occur and be overlooked.

How did this happen?
According to the official report: "The multiplicity of changes and uncertainty - transition to a single contractor, downsizing, reinventing NASA, increased workload, loss of significant personnel capabilities and low morale - have bred an environment *which is ripe for human error."*
The O-ring failure was not simply a technical failure, it was a human and organisational failure.
But worst was yet to come. Almost ten years after the Challenger disaster, technicians retrieved one of the booster rockets used to launch the Discovery shuttle, and found that the same O-ring had again failed. Fortunately this time the failure did not result in a disastrous explosion before the shuttle and rockets were separated, as had happened with Challenger. So why didn't Discovery share the fate of Challenger? Sheer luck and perhaps a few seconds in time.
Astonishingly, the same circumstances and reasons behind Challenger's misfortune still existed some 10 years later, despite the millions of dollars NASA spent after the Challenger incident on control systems that were meant to ensure reliability, effective maintenance and quality.
The technological advances in the mining industry have enabled us to control most of the "physical risks" in the organisation and our many safety rules and regulations are focussed on the "control of human behaviour."
When then do we have accidents?. Is it simply a question of breakdowns in these controls, or is it "human to err?"

WHAT ARE HUMAN RISKS VS PHYSICAL RISKS?

The definition of a human risk, for the purpose of this presentation, is as follows:
Human risk is the potential for an accident created by the actions, or inaction of people in the work environment.
Physical risk is the potential of an accident created by the deficiencies in the structural integrity of plant or equipment.
Interactive risk is a result of the interaction of people and the physical environment of plant, equipment.

FALLACY OF THE SAFE WORK ENVIRONMENT

The physical work environment is almost without exception the focus of all safety and risk management systems, while very little attention is given the most critical source of accidents, namely the social work environment. The so-called safety culture, or safety attitudes.

It is often asked: "What exactly is the "culture of an organisation?" The answer to that question is not only a very difficult one to explain, but is also a very important one - given that it is an aspect of organisations that has enormous influences on the way the company is performing and reacting to changes and forces in its environment. There are many definitions abound, but in the simplest terms possible, "culture" refers to the "unique way we do things around here" and that has a profound effect on our behaviour and "willingness to take risks".

Evidence shows that what employees perceive from their work situation will influence their productivity and safety of work more than will the situation itself. The perception of employees about the management, supervision and peers will play a major influence on the employee's day to day decisions during work performance.

Any individual employee would "organise" his perception of the "company" in a highly complex manner. People view others in terms their own attitudes, motives, interests, experience and expectations, then in terms the specific situation at hand and then in terms of the organisation itself.

It can then "trigger" several processes of perception, eg projection (projecting your own attributes to others), stereotyping ("management don't give a damn about employees") or the so-called halo-effect (management doing something unpopular in one aspect, and all their future actions are critically viewed and poorly received by employees)

The relevance of all this is that employees in the organisation make decisions all the time in performing their work. A top manager will decide on the contents of policy he/she wants issued, a middle manager will make a decision on a schedule of work activities, supervisors will decide on the best way to complete a certain job and the employee makes decisions on how much effort he/she will put into a specific task. All of these decisions are strongly influenced by each person's perceptions of what happens around him. And this is the crucial link in the accident process too: People make decisions about taking short cuts in a specific task, based on his perceptions of the organisation. In the same way a supervisor can give an instruction to an employee that results in a serious breach of safety regulations, because the supervisor "perceived" it not be an important issue. Or the manager can fail to issue a certain safety policy because he/she did not perceive it as important to the senior management.

THE SAFETY CULTURE OF AN ORGANISATION

While the topic of "culture" has been researched quite extensively for the past forty years, it is surprising to find that very little of this research was done with "safe work performance" in mind. Almost all research focus on the variable of productivity, job effectiveness or job satisfaction, but little focus on safety. It is only in recent years, the 1980's and 1990's that some attention was given to the relationship of safety culture and safe work performance.

There are only a few such models for a safety culture available. Most of these models however have been developed in non-mining industries in the USA, for example, in the railway industry of the USA Bailey and associates developed a model particular to that industry, the Du Pont model is particular to the chemical manufacturing industry.

However, these models cannot be "transferred" into any other country and expected to apply equally valid in those circumstances. It has for instance been demonstrated that countries differ significantly in terms of the culture, history and traditions, to the point where moving from one country to another, seemingly similar (eg from Australia to Canada), can result in severe "culture shock" for the individual. Similarly, one cannot transfer one model of organisation culture from one country to another or from one industry to another.

The research into the SAFEmap safety culture model extended over several years and in various mining industries internationally, including Australia's.

The first step in the research was to review all safety systems available internationally and assess their effectiveness. It was quite obvious that the so-called behavioural approaches to safety, or safety psychology, is clearly the next "edge" in the quest for zero accidents. For many years, the safety science developed through a number of approaches, often described as firstly, the traditional approach, then the procedural-engineering approach in the 1960, 1970 through to the early 1980's, and eventually the significant progress towards understanding the behavioural aspect to accidents, and the necessity of defining and quantifying the safety culture in organisations.

RISK-TAKING OF EMPLOYEES

Although it is often claimed that "unsafe acts" form 85% of the so-called "immediate causes", the more fundamental sources of that must be identified and eliminated. Why do people take risks?
Contrary to popular belief, conscious risk-taking happens only in a small number of accidents.
People take risks because of the following reasons:

- The risk or danger was not identified/recognised
- The risk was inherent in the task or procedure and the risk was underestimated
- There was no incentive to do the job safely or there was a negative result in avoiding the risk or there was an incentive to do the job in a risky way
- The risk was ignored
- The risk was "tolerated" or "accepted"

Some risk-taking behaviour can be eliminated by training to provide people with the skills to recognise dangers or to raise the awareness of people, while almost all other risk-taking can be traced back to Safety Culture. The first step in the change process is to make strategic changes to the culture of the organisation - to ensure that the social work environment of people at operator level is one of risk and loss avoidance.

THE DEVELOPMENT OF RISK PERCEPTIONS

From "Culture" to "Safety Attitude" to "Risk-taking" to "Accidents"
There are two important concepts in understanding the processes in a business, namely *upstream* and *downstream processes.*
In the context of safety management, the downstream processes are the occurrence of hazards and unsafe work activities (the exposure level) which result into accidents (the end-point). It is important to realise that the vast majority of exposures (hazards and unsafe activities) occur with *no noticeable* end-point result (accidents).
The upstream processes in a business are the management systems (or lack of) which produces or allows the exposures to unsafe work practices and/or hazards. But even further upstream in the business is the culture of the organisation. The organisation's culture is the most fundamental upstream process and has a direct and indirect influence on the organisation as a whole.
At the risk of over-simplifying a very complex and dynamic process in a business, the development of risk-taking behaviour in an organisation is not something that "happens at employee level" and that behaviour at that level should be targeted through some kind of "behavioural program". The total system, upstream in the organisation, should be managed and affected and changed where necessary. The logic of managing the safety culture in the organisation is a very sound one, as it is one which few organisations pursue in their endeavours to improve safety. And one of the main reasons why organisations do not, is because it is an inexact and esoteric subject. The average mine manager can not be expected to manage something which is not measurable. However, measurement is possible.
A diagram of these processes explains the downward effects:
Most interventions to improve safety occur at the "exposure" level, or at the "systems" level. Few organisations attempt to bring about changes at the cultural level, and the few that do often have great difficulty to understand the dynamics of the culture, or fail to bring about successful changes, despite their most committed effort.

RECOMMENDATIONS: MANAGING "SAFETY CULTURE" IN THE MINING ENVIRONMENT

Reviewing management's prerogatives
The already considerable power of unions, and the continuing power plays between management and labour and the "dig-in" mentality of management caused a minefield between management and employees. The question of what are "management prerogatives" is a perplexing one at best, while the answer depends solely on who you ask. It appears that legislation captured these answers in the Duty of Care, but is that in fact all there is to it? A "safe environment" is always in the eye of the beholder and after any event which leads to an injury, the definition changes. Management will always be guilty of not providing a safe environment if anything happens.
The only solution for management is to start sharing that responsibility for safety around. The most powerful tool in safety management, involving work teams in the management processes, is left largely under-utilised, because it infringes on management's prerogative. The culture in many organisations is one of confrontation between management and labour, if not manifested, then at least potentially.

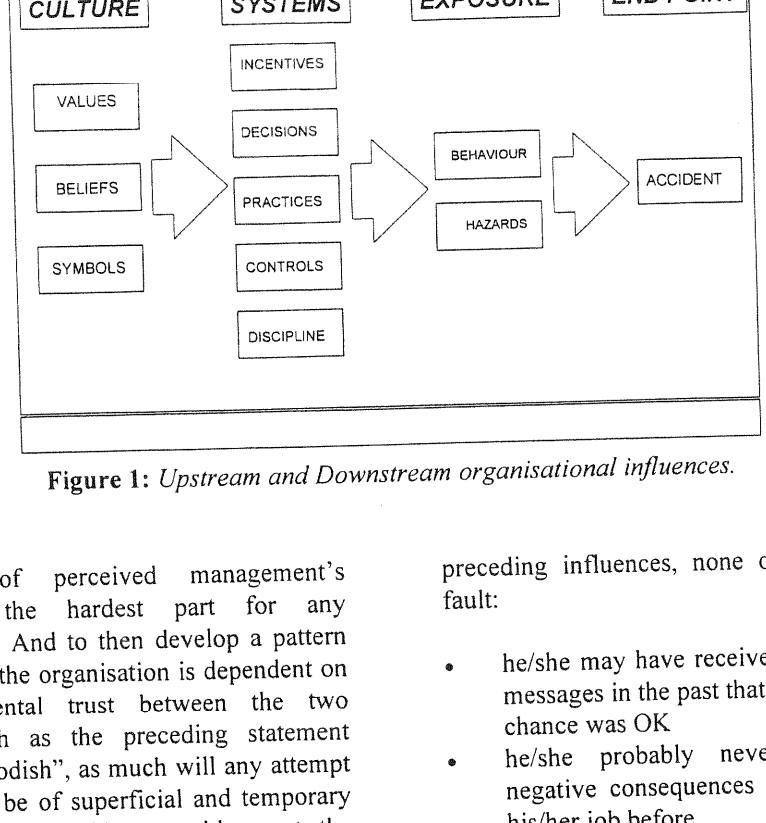

Figure 1: *Upstream and Downstream organisational influences.*

To "let go" of perceived management's prerogatives is the hardest part for any management team. And to then develop a pattern of co-operation in the organisation is dependent on building fundamental trust between the two entities. As much as the preceding statement sounds "motherhoodish", as much will any attempt to improve safety be of superficial and temporary nature, if it does not address problems at the source.

There are practical ways and means available through which this can be developed, without endangering the rights and prerogatives of employees.

Reviewing safety management systems in the production environment

If an accident happens, the "fixing of blame" is the first, immediate action taken by most managements. It is something which is part and parcel of our modern, western society that blame belongs somewhere, and the most logical place for it is with the person who "committed the crime" (of reaching into a moving machine to remove a piece of rag).

More and more, the processes of legal crucifixion are becoming part of our safety processes on a mine, just as much as the industrial relations scenario is a legal one with commissioners and laws abound. And one where the real players (the employee and his direct management) do not even feature. If we want to solve the problems of safety in our work places, I believe we should at least keep the problems on site to solve them. And we should seriously review our blame fixing practices, because the employee reaching into a dangerous piece of equipment does so because of a range of preceding influences, none of which are his/her fault:

- he/she may have received explicit or implicit messages in the past that the action of taking a chance was OK
- he/she probably never experienced any negative consequences of taking chances in his/her job before
- he/she has not seen much disciplinary actions taken against employees who do dangerous and risky things in their jobs
- he/she may even have been told by the supervisor to do similar risky things in his/her job.

If these were the type of circumstances that prevail in an organisation prior to the accident, how could the blame be fixed with the employee? It then starts to make sense when it is stated that an accident is the normal reaction of normal people to their "abnormal" (social) environments. Compare this definition of an accident with what has been traditionally available as a definition for it, and the radical difference in approaches will become apparent.

On the other hand, it is equally futile to fix thew blame for the accident with middle management or management. The culture ion the organisation has an equally powerful influence over the actions of the managers, and they are equally a victim of the cultural circumstances as the operator is.

Managing a positive safety system

Managing a positive safety system will require four essential strategies:

Positive safety leadership, which requires the total management structure to provide direction

commitment and above all, integration of safety with all activities in the organisation.

Risk Control, which should encompass structured and pro-active systems to identify and control risk in the organisation. "Behavioural risk" of employees should be "targeted" through positive and motivational systems of change. It is often felt that "forcing" safe behaviour will ensure "attitude change". This "law of attitude change" has been around for many years now, and is still not understood. The issue of attitude change is far more complex than that simple statement. The "driving force" behind all attitudes is the formation of perceptions in the human being. Therefore, the management of perceptions become the focus of change.

Worker involvement is also a very old strategy, but it does appear that worker involvement is not always accompanied by positive support by all the players - managements, employees and unions alike. There are significant gains to be made to integrate employees' continuous improvement abilities into work places and practices, but then to integrate this successfully into management systems is the difficult part.

Feedback (not communication) Communication is the other buzzword which achieved "celebrity status" in the world of management science, but in my opinion, has almost always lead to the management group of the organisation to dump more and more memos on the workforce, notice boards and company magazines. The real deficiency is mostly missed: the day to day, simple communications between supervisors and employees.

Team Exercise on Risk and Safety

The list below contains typical statements about safety and risk.
Mark the statement each with a T for "True" or F for "False".

Statement	T or F	Answer	Score
1. **A happy worker is a safe worker**			
2. **Safety is just common sense**			
3. **It is human nature to take risks**			
4. **Zero injuries is the ideal goal for a company**			
5. **All injuries are preventable**			
6. **Companies must provide a safe work environment**			
7. **Rewards for accident-free shifts motivate people to work safe.**			
8. **Unsafe acts or unsafe conditions are fundamental causes of accidents**			
9. **Safety should be the highest priority**			
10. **Accident trends are good measures of safety performance**			