

Overcoming the Conflict between Safety and Production Using Risk Management and Behavioral Safety Principles

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Introduction

An issue yet to be fully addressed in safety management is the conflict between safety and production. The implications of this conflict are numerous in terms of management practice, organisational culture and individual behavior. Foremost, production is, in most industries, core business. This means that safety management is relegated to 'servant' to production, or at best, seen as supportive of the production function. We are yet to achieve the full integration of safety and production.

This paper presents elements of the methodology described in *Productive Safety Management – a strategic multidisciplinary management system for hazardous industries that ties safety and production together* (Mol, T., 2003, Butterworth-Heinemann, Oxford), which sets out to integrate safety and production using risk management and behavioral safety principles.

The Alignment Fallacy

Whilst many companies have a safety policy and there is a genuine commitment to employee health, safety and welfare at the corporate level, this does not necessarily translate into operational practice. This is particularly evident where risk taking behavior is found to have contributed to an incident. Clearly, in these cases, the corporate message has not been driven down the hierarchy to the operational level. This is referred to as the 'Alignment Fallacy'. In theory, company policy, goals and values translate into strategic management decisions, then middle management decisions and finally, operational decisions. It is assumed that employee goals and values are congruent with company goals and values. This is meant to result in safe behaviors at the operational level.

In reality however, there are mixed messages at the middle management level. These include the assumption that employees adopt company values and beliefs. Specifically, whilst policy and

signs may say, “Safety First”, other messages such as output graphs, management instructions, production pressures and reporting systems suggest that production is number one priority. Accordingly, despite the safety messages given, employees perceive production to take precedence.

Secondly, accounting practices work against the “Safety First” approach. There is a financial conflict between profit and the costs of managing risk. In addition, it is not possible to account for all the costs of poor risk management or the full benefits of effective risk management. Further human capital is treated as expenditure not an asset therefore the benefits of training and development are often under-estimated.

In addition, management systems often contain weaknesses in terms of non-alignment with the “Safety First” message. Examples include reward systems based on production bonuses and individual performance evaluations that are output focuses without equal weighting to management of safety.

The operational level is where the conflict between safety and production is most evident. This is particularly the case in the role of the frontline supervisor who is concurrently responsible for safety and production within management systems that do not necessarily support both roles simultaneously. For instance, if a shift supervisor fails to achieve production as a result of fixing all safety and maintenance issues that have arisen on the shift, he/she is accountable. If production is pushed to the detriment of safety and an incident occurs, he/she is also held accountable. The frontline supervisor faces a dilemma which is inherent in the role and not well supported by the management system.

The consequences of failing to address the “Alignment Fallacy” include poor risk management and an unhealthy culture. Symptoms of the latter include production centricity, risk taking behavior, poor decision making, lack of effective leadership and lack of heartfelt commitment to the safety management system.

Achieving Alignment of Safety and Production

A number of issues need to be addressed to achieve alignment of safety and production, some of which are beyond the scope of this paper. Key issues include:

1. Understanding how production environments encourage risk taking behavior and the relationship between such behavior and the culture. This will be explained using the risk behavior model
2. A shift away from ‘safety’ per se (as safety does not exist for its own sake) to managing risk for the sake of safety and production. This will be described using the risk management model.
3. Review of management systems to identify and rectify areas of non-alignment between different functions such as risk management and human resource management practices, to achieve aligned and fully-integrated strategies and practices.

4. Review of management behaviors, particularly decision-making practices, to ensure leadership behaviors demonstrate core values and that standard business practice is to manage risk to achieve safety and production concurrently.

Safety as a Value

If we are to create positive change and gain the buy-in of the workforce, which is so critical to safety performance, we firstly need to be clear about what safety means as a value. Ask your workforce for a definitive answer on what safety means to them and they often struggle to find an answer. Safety as a value is centred on the sanctity of life and the individual's right to quality of life. Safety as a company value is reflective of social values. It is both a legal and moral responsibility of each and every employee regardless of their position.

Concurrently however, employees value financial security and that is often linked to their perception of the rewards associated with greater production output. Ask them what production means and they will clearly state 'profit', 'money in the bank' etc. A further value is social acceptance. It is human nature to want to identify with the group. Herein lays a potential issue for the safety culture. Which behaviors are acceptable and which are not? That depends on the priorities that are driving the culture, specifically, production or safety and with what level of consistency.

The vast majority of people believe in sanctity of life and quality of life as highest priority, however, these are easily forgotten in a production driven environment. The tendency is that the perceived benefits of taking shortcuts outweigh the consequences of taking additional risk. The underlying cause of these behaviors is imbalanced values as explained by the Risk Behavior Model. Some of the thought processes behind this include:

- The need for financial security: If I get the job done quicker, I'll get more money. This is supported by a system in which there are production pressures and output bonuses.
- The need for social acceptance: "I'll be respected by my mates". This is encouraged by a system that provides recognition for 'just getting on with it'.
- The sanctity and quality of life are marginalized when workers believe: "It won't happen to me. I got away with it before." This is exacerbated within a system that says, "We've never had..." or has a short memory.

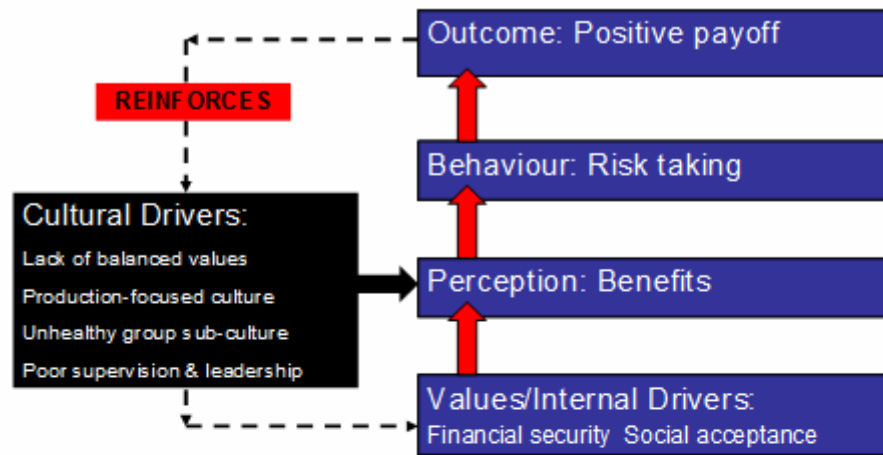
The Risk Behavior Model

The Risk Behaviour Model is used to illustrate the relationship between individual behavior and the safety culture. The model is in two parts – one on risk taking, the other on risk managing. The first part looks at the positive payoff of risk taking.

Starting at the bottom of the figure in Exhibit 1, it shows that the root of all behavior lies in values or internal drivers. Motivational theory indicates that employees expect extrinsic rewards

such as financial return for work. They also expect intrinsic rewards especially social acceptance. So relating this to safety behaviors, if employees perceive they will get more money by taking shortcuts then that will lead to risk taking. If peer acceptance results from ‘just getting on with the job’ then again risk-taking will be perceived as beneficial. These two drivers can both be present in production centred businesses. If the employee gets away with the behavior – there are no consequences – there is a positive payoff. When many employees have the same experience this reinforces a negative culture. It becomes self-perpetuating because cultural dynamics in turn reinforce employees’ beliefs that risk taking behaviour is rewarding. It can also be perceived as acceptable when supervisors fail to take corrective action. The peer group focuses on increasing rewards via collective effort to maximize production to the detriment of effective risk management.

Part 1: Positive Payoff Perspective



Concurrently:

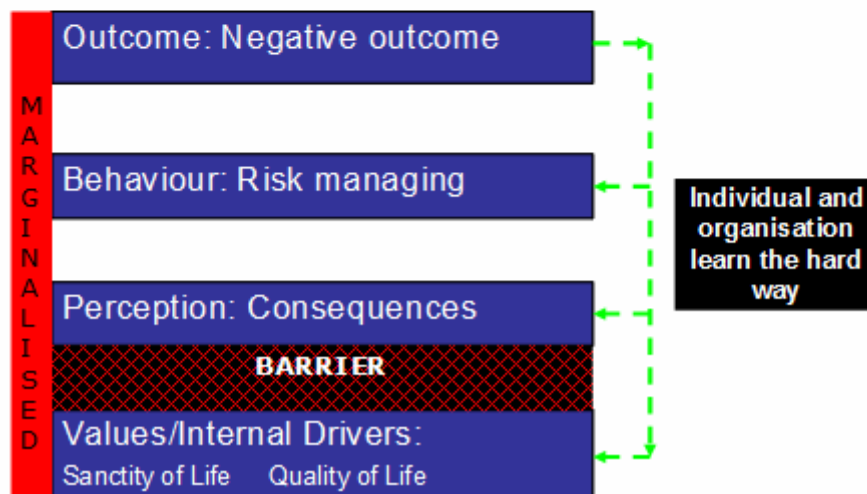


Exhibit 1. Adapted from figure on page 34, Van der Stap, T., *Safety Matters*, Dec 2006.

Exhibit 1 shows what happens concurrently to the values of sanctity of life and quality of life which are the ultimate motivators of safe behavior. Starting again from the bottom, as the positive payoff of risk taking behavior becomes entrenched, a barrier develops which prevents employees from factoring in the consequences of risk taking into their perceptions. Therefore, they do not choose to manage the risk in compliance with the safety management system. Core safety values, perceptions of consequences and risk managing behavior are marginalized, except of course when there is a negative outcome (an incident) as a result of risk taking or other causes.

This has the effect of teaching individuals and the organization the hard way. Such values, consequences and the need for risk managing are then given importance in response. It is a reactive approach that unfortunately, depending on the severity of the injury, may be a short-lived lesson. Old habits may soon re-emerge as the fundamentals of the culture and employees' beliefs and values have not genuinely shifted.

In production-centred cultures, employees fail to adequately consider consequences. They also fail to realistically relate the consequences to their own quality of life and future financial earning capacity. Another factor is that they feel a sense of powerlessness to change the 'system'. Do they understand how they personally contribute to this system? Do they understand that each behavioral choice they make as an individual either challenges or reinforces the existing culture?

So summarizing this part of the model, risk taking is chosen over risk managing where the benefits are perceived to be greater than the consequences. Risk taking provides a positive payoff in the short-term with the job done quickly with minimal effort. The reality of risk is that in most cases, employees will get away with taking shortcuts. So the very nature of risk is part of the challenge in shifting from risk taking to risk managing as a *modus operandi*.

To change employee behavior we have to provide learning experiences that lead to balanced values or internal drivers. Again on the bottom of the model (top section of Part 2, shown in Exhibit 2) there are four key values that influence risk taking versus risk managing behavior. These are sanctity of life, quality of life, financial security and social acceptance.

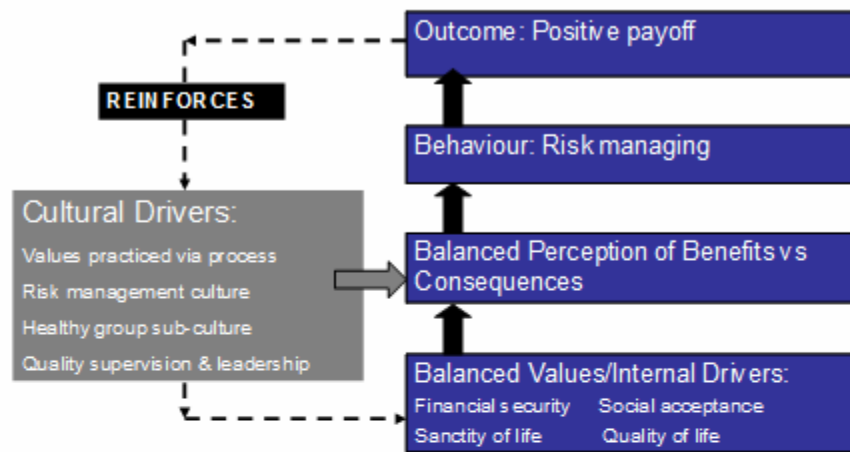
In the model, as a result of learning, financial security and social acceptance are no longer given greater weighting than sanctity and quality of life. What employees now consider is their life priorities. Most employees admit they want both money and positive relationships from work. However, their primary reason for working is to provide for life outside of work. By helping them to understand the consequences of workplace injuries on a very personal level, they are better able to realistically weigh up the benefits versus consequences of behavior.

Another issue is for employees to understand how their behavior affects the business culture, their peer group sub-culture and supervisor behavior. A key part of the process is to bring them to an understanding of how they can contribute to positive change. This delivers a very blatant acknowledgement that each individual has the power to exercise free will and to choose their behavior. Collectively employee behaviors then define the workplace culture.

Going back to the model, the positive payoff for the individual is: preservation of life and health, financial security through the ongoing capacity to work, and social acceptance within a culture which continually activates and shares core values. This positive pay-off also reinforces a healthy

organizational culture. What the system needs to provide is communication processes where values are talked about. It needs to focus on managing risk as an organizational lifestyle – the essence of ‘how we do things around here’. It is also very important to invest in the development of supervisory and leadership skills. Middle managers and frontline supervisors can be a barrier between a ‘safety first’ policy and making that policy an operational reality. Again, it is unbalanced values and distorted perceptions of benefits versus consequences that create non-alignment and conflict.

Part 2: Risk Manager Perspective



Concurrently:

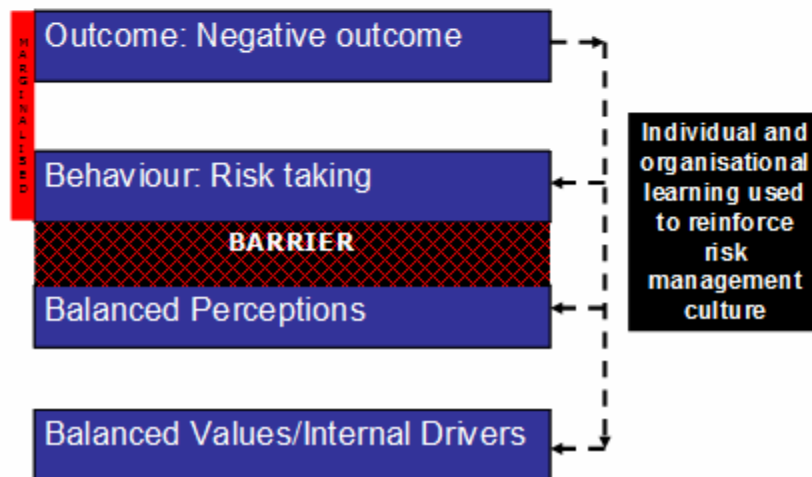


Exhibit 2. Adapted from figure on page 35, Van der Stap, T., *Safety Matters*, Dec 2006.

In the final part of the model, the impact of balanced values on risk taking behavior is illustrated. Employees now have realistic perceptions about the benefits versus consequences of behavioral

choices. There is a barrier to risk taking because through informed choice, employees now consider risk taking unacceptable. The likelihood of injuries is reduced because risk taking is marginalized. When there is an injury, it acts to reinforce the need for effective risk management. It reinforces the importance of sanctity of life and quality of life as the core values driving safety.

The key theme of the risk behavior model can be summarized using a parallel from chemistry. If culture is like chemistry then we have to acknowledge its compound nature. That means it is complex, made up of different molecules and it may be weakly or strongly bonded. The basic building block is the atom being individual beliefs and values. If you change these then you change the compound. The future of behavioral safety lies in individual beliefs and values. An emerging role of the managers and safety practitioners is to reach the hearts and minds of the people we seek to protect from harm.

Culture, Behavior and Learning to Choose

To understand the relationship between individual behavior and culture, employees must be provided with learning experiences. This is best achieved using small group workshops that have structure but also provide an open forum. It is effective to begin by leading participants to air current perceptions of workplace challenges, for example safety versus production, what drives risk taking, the benefits of risk taking, plus any cultural issues they might want to explore.

Then discuss the nature of workplace hazards. What are the inherent risks associated with the business? After all the controls are implemented, what are the residual risks? What are the potential consequences of these risks? How does behavior contribute to hazard creation? How does the current system address hazards and associated risks? The point here is to acknowledge the nature of hazards in the workplace and to highlight how important it is to manage those hazards well, not just from a systems perspective but also at the individual behavior level.

At this stage in the workshop, employees should have a good understanding of the challenges faced in the workplace. The consequences of these thus need to be personalized. This is when the discussion should go from the organizational level to the individual level. Discuss individual work/life expectations, priorities and goals. For an example, an employee's number one goal may simply be to spend quality time with children or to provide for family. What are the prerequisites for achieving this goal? What would be the impact if the employee were to have a workplace accident? What are the consequences? Once the trainees have gone through this process relate it back to the core values of safety. What is safety all about? Is it just a legislative requirement or is it also a moral obligation? Who bears the consequences of workplace accidents? Revisit the influence of financials and 'code of respect' that goes with risk taking. Challenge the trainees to reconsider the benefits versus consequences of risk taking.

The lessons learned must then be reinforced through story telling. This is a key means by which people learn and remember. The group dynamics become centred on common values when stories of workplace accidents are shared. Revisit perceptions to emphasize the power of the individual to exercise free will, to make informed decisions about workplace behaviors and to contribute to the positive changes that lay ahead. Empower. Provide ownership.

Everyone should participate in these workshops. Ownership must be encouraged amongst all individuals. This in itself is an important statement. Workers often perceive managers to be very different from them. When it comes to core safety values we are all the same. Also the reality is everyone is an employee, everyone has similar needs and everyone has a stake when it comes to safety and the future of the company.

There are some important guidelines for a successful workshop. These are:

- Facilitate for participant ownership
- All opinions are welcome. There is no absolute right or wrong
- Open differences are better than suppressed views
- Everyone is an employee, has similar needs and has a stake in the future.

Risk Management as a Life Skill

Understanding behavioral choices and their impact on the safety culture is one aspect of empowering employees to consciously manage risk effectively. The second issue is to give them effective risk management skills and specific 'rules of thumb' to apply in the workplace. These are designed not for the sake of 'safety' per se, but for the effective management of risk to achieve safety and production concurrently.

The tool used to provide this learning is the Risk Management Model. The model explains the nature of risk and how to manage it for the sake of both safety and production using a four-fold strategy. According to the model, worker exposure, particularly in hazardous industries, is not simply contact with known hazards. It is the combined effect of all the inherent dangers and sources of degradation in the workplace, as well as worker-specific risk factors. To prevent accidents and systemic failures, companies need to view risk from a wider perspective than the current approach which associates risk with specific, known hazards, and appreciate that poor management of risk is detrimental to safety, production and the longer-term sustainability of the business.

The Risk Management Model illustrated here, explains that there are two types of risk. There are residual risks (inherent dangers) which cannot be completely eliminated and degradation risks caused by the deterioration of business systems. These two risk types are found in the four system factors that combine and interface when a business activity is carried out. These are:

- processes (work practices)
- technology (plant, equipment, tools and chemicals)
- physical environment (location and structural factors), and
- human resources (people).

A business activity involves a human resource undertaking a process using a technology in a given physical environment. When a business activity is undertaken, the system factors interact and risks are combined. The impact of these risk types on the probability of an accident or systemic failure is illustrated by the Model.

It begins in section (1) by creating a business in an ideal context. This ideal consistently results in perfect safety, efficiency and quality. The accident rate and level of risk is zero. In reality, companies operate as natural systems. There are inherent dangers and systems tend to degrade. For instance, processes have residual risks because of the energy involved. Technologies with large, moving components are inherently dangerous. The level of technological residual risk depends on the energy involved and its potential consequences if released in an uncontrolled manner.

The physical environment has residual risks. For instance, in underground mines this can be attributed to unstable geological conditions, confined spaces, lack of light and other inherent hazards. Also, people with low levels of competencies are intrinsically less safe than skilled workers. These residual risks are fixed in the short-term because of economic and knowledge constraints. Companies can not make systems 100% safe and have to do what is practicable to reduce/control risk. Thus the model shows that there is always a residual risk, illustrated by the green block. This risk type causes a constant probability of an accident or failure.

Risk Management Model

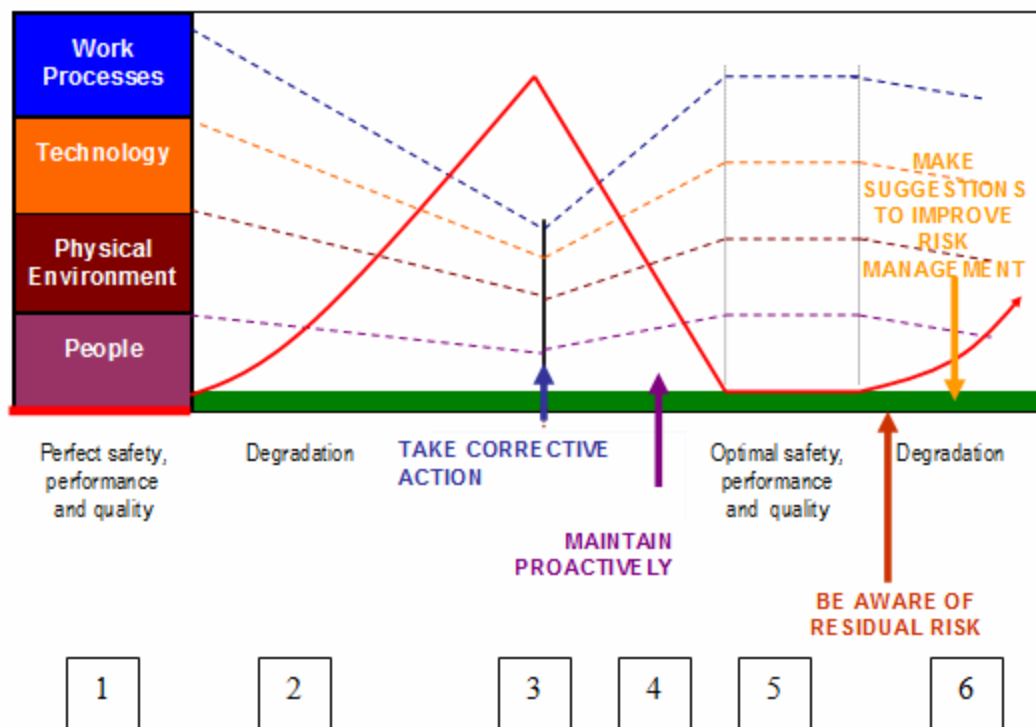


Exhibit 3. Adapted from Figure 1.5, page 13, Mol, T., *Productive Safety Management*, Butterworth-Heinemann 2003.

In addition, the four system factors have a tendency to degrade. For example, equipment suffers wear and tear, the physical environment erodes and workers suffer from physical and mental fatigue (human resources degradation). Degradation is shown in section (2) as the downward dashed lines for each system factor. This degradation is accompanied by a rising probability of an accident shown by the upward red line. These risks affect the company's efficiency as well as safety. For instance, people who are tired, and equipment that is badly maintained, are less safe and less efficient. The model shows that residual and degradation risks have a negative impact on both safety and production.

At (3), when it becomes apparent that degradation risk is rising, immediate correction action is required. This is important from a systems management and also an individual behavior perspective. Next, future recurrences of this risk have to be prevented using a program of maintenance, shown in section (4). Maintenance strategies include developing safe work procedures, proactive upkeep of technologies and the workplace and employee training. Effective maintenance lifts the company to a state of optimal safety, performance and quality as shown in section (5). If maintenance is not ongoing, degradation occurs again in section (6), thus pushing the probability of an accident upwards again.

Four Simple Steps for Risk Management

The model provides a strategic approach to manage risk in the short- and longer-term. This methodology is called the 'Four-Fold Strategy'. The strategy involves the four steps:

1. Take corrective action when degradation is identified
2. Help to maintain systems and people (to prevent future degradation)
3. Always be aware of residual risks
4. Make suggestions to improve risk management

This strategy can be applied from a systems perspective, at the macro level, to achieve a fully-integrated approach drawing on multi-disciplinary competencies and input. It also applies equally at the micro level, as a driver of individual behavior. Imagine a workplace where every individual took immediate corrective action, contributed to maintenance through good operating practices and compliance, was constantly alert because of residual risks, and made suggestions to improve risk management. What impact would this have on safety and production if this level of ownership and discipline was applied?

Worker Exposure

The model also provides a detailed understanding of worker exposure to risk as it relates to the business activity they are undertaking at the time. The total risk profile is a combination of factors, specifically:

Worker exposure at a given time
= levels of residual risk in system factors
+ levels of degradation risk in system factors

The residual risk above includes the level of worker specific competencies and the competencies of their workmates. The degradation risk includes the worker's level of degradation and that of their workmates.

Example: Worker exposure when returning home after a shift

The formula can be used to illustrate the exposure of the worker under different circumstances and conditions such as travelling to or from work.

A worst case scenario is:

| Worst Case Scenario | Residual Risk | Degradation Risk |
|--|---|---|
| Processes | High speed | Long trip |
| Technology | Motorbike | Worn tyres, faulty brakes |
| Physical environment | Unsealed road looking into a setting sun | Recent flooding causing washouts and potholes |
| Human resources: other drivers Human resources: driver specific | Other drivers using the road have low competencies Inexperienced rider | Other drivers are not alert Fatigued from working a long shift |

The best case scenario is:

| Best Case Scenario | Residual Risk | Degradation Risk |
|--|---|--|
| Processes | Low speed | Short trip or trip broken by rest breaks |
| Technology | Constant 4-wheel drive with airbags | Well-maintained vehicle |
| Physical environment | Sealed, well-designed road | Well-maintained road |
| Human resources: other drivers Human resources: driver specific | Other drivers are competent Experienced driver | Other drivers are alert and well Driver is alert and well |

Simple examples such as this can be used to help workers understand their total risk exposure. If there are changes in the degradation level in one system, behavioral adjustments are needed to keep the total risk low. For instance, if the driver comes to a badly maintained section of road, then the speed needs to be lowered and the level of alertness heightened. This teaches workers to be constantly aware of changes in conditions and to adjust behavior accordingly. Rather than being told to 'drive to conditions' they develop an understanding of personal risk management so appropriate behaviors are consciously chosen.

In addition, the total risk profile shows workers how their behavior affects others. For instance, if a truck driver operates plant in a rough manner, this increases the rate of degradation which in turn, increases the total risk profile. This becomes potentially problematic for the maintenance department and with time, may lead to plant failures. Key messages to convey as part of this learning include: "Workplace standards are set by the 'lowest denominator'" and "Your peer group has the power to define standards of acceptable behavior." The learning methodology is to consistently empower the workforce to manage risk for the sake of safety and production.

Workers are also able to draw parallels between the example given and company practices such as speed controls, purchase of equipment with safety features, workplace design, maintenance practices, recruitment and selection practices, employee training, pre-start checklists, toolbox talks and the like. They can see how company practices are directed at minimizing the workers' total risk exposure and also up-skilling workers with competencies to manage risk effectively. Knowing 'why' not just 'what' leads to employee buy-in.

Concluding Comments

By teaching managers and workers about behavioral choices and how to manage risk, the facilitator is sowing the seeds of appropriate behavior. The outcomes can be likened to the Parable of the Sower (Mark 4: 13-20)

"Behold, a sower went out to sow. And as he sowed, some seed fell by the wayside; and the birds came and devoured them. Some fell on stony places, where they did not have much earth; and they immediately sprang up because they had no depth of earth. But when the sun was up they were scorched, and because they had no root they withered away. And some fell among thorns, and the thorns sprang up and choked them. But others fell on good ground and yielded a crop: some a hundredfold, some sixty, some thirty. He who has ears to hear, let him hear!"

There are a number of lessons herein. The first is to prepare fertile ground for learning by reviewing current management systems and practices to ensure the messages conveyed are consistent with those provided in the training environment. The overarching messages must be values-driven and workers must consistently see that managing risk for safety and production is standard practice. Concurrently, it is therefore important to build the leadership and risk management skills of supervisors and managers.

With reference to the 'birds' and 'thorns', there will be some workers who are resistant to change. Develop strategies to encourage positive peer pressure. Provide forums for open communication and continuous learning to enable employees to overcome cynicism. Celebrate successes, provide positive feedback and recognition for efforts and achievements.

Much has been achieved in safety management in recent decades. Many companies have developed sound management systems and have begun the journey into behavioral safety. The opportunities that lay ahead are two fold. The first is to achieve full integration of safety with production through risk management and behavioral safety principles. The second is to further behavioral safety to achieve employee empowerment through supportive management systems, knowledge and adoption of risk management as a life skill for both the individual and the organization.

References

Van der Stap, T., "Using Values to Modify Behaviour: How to replace the positive payoff of risk-taking with risk-managing", *Safety Matters*, December 2006.

Mol, T., *Productive Safety Management – a strategic, multi-disciplinary management system for hazardous industries that ties safety and production together*, Butterworth-Heinemann, Oxford, 2003.