Positive Safety Culture

The key to a safer meat industry
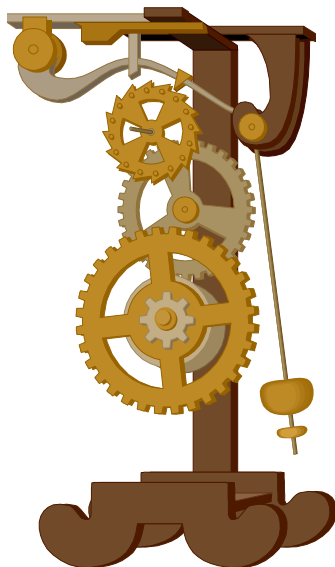
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*"…a poor safety culture will encourage an
atmosphere of non-compliance to safe operating
practices. Violations are likely to be most common in
organizations where the unspoken attitudes and
beliefs mean that production and commercial goals
are seen to outweigh those relating to safety."*

(Reason 1998, p. 297)

Safety—A General Perspective

The most obvious difficulty in the traditional pursuit of
organizational safety is that success is counted by the
absence of something—fatalities, lost time injuries, damage
to assets and other negative outcomes.

(Reason et al. 1998, p. 289)

There is a thought in the mind of every worker at every level of the
organisation, swinging backwards and forwards like a pendulum. When a
serious accident or injury occurs the pendulum swings closer to vigilance.
When this has the desired result and no injuries or accidents occur for a
while, the pendulum swings back to less vigilance and less concern for
safety.

Research (Health and Safety Executive 1993) suggests that 441 non-
serious injury accidents occur for every serious incident, and Heinrich
(1959) suggests that there is only one serious injury for every 330 unsafe
acts. Serious accidents are clearly relatively rare, and are thus a poor
driver of safety performance. The pendulum of vigilance spends a lot of
time over on the 'less' side. Rather than rely on injuries to drive safety, it
makes sense for the focus of safety performance to be on the behaviour
which leads to injuries (Marsh et al. 1995).

Occupational accidents around the world annually number
more than 125 million. Of these, approximately 220,000 are
fatal accidents! Furthermore, every year 10 million crippling
injuries and diseases add to hundreds of millions of workers
with disabilities around the world. In many of the rapidly
industrializing countries a safety culture (ILO Programme,
1997) and awareness of the positive value of a safe and
healthy working environment in terms of economic benefits
and social justice are low or non-existent.

(Takala & Obadia 1997)

In Australia, insured and uninsured cost of health and safety problems has been estimated to cost the meat processing industry $330million a year (Australian Meat and Livestock Industry Policy Council, 1998). Moreover, musculoskeletal injuries related to processing sheep and beef account for 70% of this total cost.

The *Occupational Health and Safety Performance Overview: Meat and Meat Product Manufacturing Industry Australia, 1994-95* (Meat Research Corporation, 1997) lists the clearly most common injuries as sprains and strains (42% of total) and open wounds (24% of total), most commonly caused either by body stressing (42%) or hitting an object (32%). The most vulnerable parts of the body were hands, fingers and thumbs (28%) followed by back (16%), shoulder (9%) and wrist (9%).

In this 1994-95 overview, a comparison of the meat processing industry's injury/disease rate (occurrences per 1,000 employees) shows a rate for meat processing of 191, meat product manufacturing of 154, pig processing of 108 and poultry of 83—against an all manufacturing industries rate of 47 and an all Australian industries rate of 26!

In South Australia total claims for the sector cost $3.9 million in 1998-99 (WorkCover SA Private correspondence), with the national trend of emphasis on sprains, strains and open wounds closely translated to the local industry.

Workplace injury is always a serious concern, and the Australian meat processing industry, by the evidence of the statistics, has a need to address this urgently.

Heinrich (1959) estimates that 85 per cent of accidents can be attributed to unsafe acts. Various other health and safety studies show that 85 to 98 per cent of all workplace injuries are caused by unsafe behaviour and are due to attitude, behaviour and culture (Dilley & Kliener 1996).

Many research projects and interventions address the engineering and ergonomic aspects of safety (Meat & Livestock Australia Meat Processing Research and Development Information Kit 1999). Indeed these solutions are essential—but not enough. In the last decade it has increasingly been recognised (Carroll 1998, Cheyne et al. 1998, Clarke 1999, Cox & Cox 1991, Gardner 1999, Lee 1998, Pidgeon 1998, Reason 1998, Westrum 1993, Williamson et al. 1997) that behaviour, attitudes and beliefs—in short, culture—is the most important element of safety performance. Reason (1997, 1998) points out that unsafe acts are frequently the product of a combination of organisational factors and local workplace factors (latent conditions) that predispose the worker to

act unsafely, or that remove the defences that would stop the unsafe act
leading to harm.

Davies (1993) describes the three main causes of industrial injury as
unsafe acts, unsafe conditions and attitudes towards safety, arguing that
"major improvements will only come by a change in culture and attitudes
of all persons" (Davies 1993, p. 4). Blanco et al. (1996, p. 1) also draw
attention to the 'human element', suggesting "a need to acknowledge that
human fallibility is an obstacle to reducing the frequency and severity of
incidents." and also that "concepts such as human fallibility, erroneous
actions, latent errors and organizational accidents are still relatively new
to many settings".

This is the context for this review—to examine the work and thought that
has been invested in the investigation of safety culture as the key to
improved safety performance, and to apply this insight to an examination
of safety culture within the Australia meat processing industry.

Definitions

Venturing into the areas of behaviour, attitudes, belief and culture is
necessarily a journey into imprecision. The clear, clean relationships
between problems and solutions possible at an engineering/technology
level become murky and unclear as human behaviour enters the equation.
Therefore a pause to examine some of the efforts at definition in this area
is important.

Safety

Reason (1998) refers to Weick's (1991) description of safety as *a
dynamic non-event*, observing further that non-events, by their nature,
tend to be taken for granted, particularly in the face of continuous and
compelling productive demands. Reason (1998) comments that in fact it
takes a number of dynamic inputs to create stable outcomes. Consider the
feat of standing perfectly still. This is achieved only through a process of
constant perceptual feedback and constant small, corrective muscle
movements.

What is *safe* is also very much dependent on contextual factors. Consider
the excellent illustration of this provided by Nick Pidgeon:

> Consider the problem of dealing with injured passengers
> from the scene of an accident which still poses an injury
> (e.g. fire) hazard. It may seem self-evident, from a recovery

and rescue perspective, that speedy evacuation to a place of safety, and ideally a hospital, is the first course to take. From a patient care perspective, however, moving an injured person risks exacerbating whatever injuries have previously been sustained. Insofar as different emergency services may hold differing perspectives such as these, arriving at a joint action may demand considerable amounts of negotiation (Borodzicz 1997). In sum, what we think of as 'appropriate' for safety under one circumstance may not look so good to somebody else, or in other contexts.

(Pidgeon 1998, p. 204)

A useful perspective of safety, also utilised by Reason (1997), is Rasmussen's (1986) model which describes human performance in terms of three elements:

1. *Skill-based processing*. The application of routines which are familiar enough for performance to be automatic.

2. *Rule-based processing*. The application of known rules to problems.

3. *Knowledge-based processing*. Novel problem solving, based on the individuals' mental model of the situation, in which known rules cannot be directly applied.

This framework is valuable in assessing error-based safety breaches, and in beginning to understand the underlying causes of injuries. For example, skill-based errors may relate to a problem in skill and safety training, rule-based errors may relate to problems with compliance to operating procedures (such as a cumbersome procedure, or a cultural or organisational pressure not to comply). Knowledge-based errors will indicate problems as more subtle levels, relating to safety culture, training, employee involvement in decision making and individual abilities.

Culture

Organizational culture is, by its very nature, subjective.

(Gardner 1999, p. 28)

Schein (1985, p. 8) proposes that culture is "a pattern of basic assumptions invented, discovered or developed by a group as it learns to cope with its problems of external adaptation and internal integration.". According to Kilmann, et al. (1986, p. ix), "Culture is defined as shared philosophies, ideologies, values, beliefs, assumptions and norms.".

Westrum, (1993, p. 401) addresses culture in terms of an analogy, "By the 'culture' of sociotechnical system I mean those habits, folkways, and

norms that shape action. *'Culture' is to an organization what 'personality' is to an individual* [emphasis added]…Cultures determine what tasks organizations set themselves, how they address these tasks, how successful they are likely to be in coping with them, and how they will react when things go wrong…"

Safety culture

Dov Zohar (1980), a pioneer in work on safety climate and culture, conceptualises climate in an organisation as a summary of the beliefs and perceptions of employees about safety in the workplace.

For Professor James Reason an informed culture *is* a safety culture. Reason (1998, p. 293) describes "an ideal safety culture [as] the 'engine' that drives the system towards the goal of sustaining the maximum resistance towards its operational hazards, regardless of the leadership's personality or current commercial concerns. The power of this engine relies heavily on a continuing respect for the many entities that can penetrate, disable or bypass the system's safeguards. In short, it means not forgetting to be afraid."

The Confederation of British Industry (CBI 1990) report defines safety culture as 'the way we do things around here'. In the report on their 1999 survey of safety culture in the Queensland meat processing industry, Wallace & Neal (2000, p. 3) define "Safety culture [as] the extent to which safety in the workplace is valued, and committed to by managers and employees.".

Weick (1998) suggests that safety culture is of necessity defined by *what* organisations and their members *'choose to ignore.'*

Citing Cox and Cox (1991), Lee (1998, p. 220) argues that "constructive attitudes among the workforce, because they result from all other contributory features, are probably the most important single index of the effectiveness of a safety culture".

Pidgeon (1998) proffers an anthropological definition of a safety culture.

> "…it is culture that lies at the heart of the ideal-typical pattern of events leading up to large-scale failures of foresight…provides the conceptual foundation for an anthropological definition of a *safety* culture as being the set of assumptions, and their associated practices, which permit beliefs about danger and safety to be constructed (eg Pidgeon 1991, Turner 1991, Pidgeon and O'Leary 1994). Such a culture is itself created and recreated as members repeatedly behave and communicate in ways which seem to

them to be 'natural', obvious and unquestionable, and as
such will serve to construct a particular version of risk,
danger and safety."

(Pidgeon 1998, pp. 205–6)

Pidgeon (1998, p. 207) also cites La Porte (1996), who "comments that a 'high reliability' [safety] culture comprises three components. First an organizationally defined intention to provide for reliability and the seriousness of hazards. Second, a set of reliability enhancing operations; such things as structural flexibility and redundancy, dynamic patterns of authority, decentralized decision making and negotiation over local gaols, and a continual search for improvement. Third, and overlaying all aspects, are a set of fundamental values; of élan, commitment to ownership of a problem by the person who finds it first, personal responsibility for activities, and a high value placed upon operational knowledge and experience.".

Pidgeon (1991) has indicated that a good safety culture has three main components:

1. norms and rules for effectively handling hazards;

2. positive attitudes towards safety

3. the capacity for reflection on safety practice (reflexivity).

Cheyne et al. (1998, pp. 256–7) quotes the third report of the Human Factors Study Group of ACSNI in defining "safety culture [as] the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management." (HSC 1993, p. 23).

Cheyne et al. (1998) also makes a distinction between *safety culture* and *safety climate*.

> Culture in general, and safety culture in particular, is often characterized as an enduring aspect of the organization with trait-like properties and which is not easily changed. Climate, on the other hand, can be conceived of as a manifestation of organizational culture (Schein 1985) exhibiting more state-like properties…Mearns *et al.* (1998) propose that safety culture will have an influence on safety climate and it could be argued that a 'good' safety culture will be promoted and maintained by a 'good' safety climate and vice versa. …climate can be viewed as a temporal state measure of culture, which is reflected in the shared perceptions of the organization at a discrete point in time (Cox & Cheyne 1998).

(Cheyne et al. 1998, pp. 256–7)

Cox and Cox (1991) argue that employee attitudes are one of the most important indices of safety culture and climate, as attitudes are often framed as a result of all other contributory features of the working environment. Lee (1995) also proposes that attitudes towards safety are one of the basic components of a safety culture.

Höpfl (1994) sounds a note of warning about making direct assumptions that organisational interventions in culture change will necessarily have the effect of improving safety. At the broader level, "culture change has been viewed as a means of improving corporate performance by securing greater employee commitment and identification with corporate values." (Höpfl 1994, p. 3). Höpfl (op. cit., p. 5) examines "the concern [that] the manipulation of corporate culture reduces safety issues to a declared rhetoric supported by artifacts [sic] of a 'safety culture' which may, in turn reduce a concern for safety to a cosmetic exercise. In such circumstances, the problem of safety becomes a matter of having 'appropriate' methods, manuals and messages. Safety becomes critical to the extent that what is unsafe is concealed by the pursuit of coherent rhetoric and the apparent security of quantification."

Höpfl (1994) describes corporate culture as having been reduced to:

> "an organizational variable, to be manipulated in order to:
> * increase commitment;
> * achieve standardized patterns of behaviours and style;
> * pursue "quality" and "service";
> * change customer/competitor perceptions; and
> * increase identification with the organization.
>
> However, in relation to safety, the following factors may implicitly apply to corporate culture:
> * Corporate culture seeks to order the non-rational aspects of behaviour.
> * Behavioural regularity conceals dysfunctional aspects.
> * Performance can equate with appearance.
> * Local practice may be very different from espoused cultural values and norms.
> * Culture may even induce resistance, deviance.
> * Culture may become the province of rehearsed rhetoric as opposed to practice.
> * Safety may become synonymous with safety artefacts – manuals, audits, quantifications and procedures.

(Höpfl 1994, p. 10)

"A safety culture cannot be set aside", argues Höpfl (op. cit., p. 10), "from the organizational context in which it resides. A safety culture implies some level of relationship between the corporate culture of an organization and the culture of the workplace. There are many reasons why these two cultures differ. The intention here is not to discredit the notion of a safety culture but, rather, to put forward the notion of a safety culture as an interpretative device which mediates between the espoused values of the corporate culture, that is its declared and desired common values, and the taken-for-granted assumptions of the workplace culture."

Safety in the Australian Meat Processing Industry

Significant energy and resources are being invested in researching and developing safer ways of operating, some examples being:

- researching and developing better equipment (eg assessment of cut-resistant gloves by David Capel; funded by South Australian WorkCover Corporation),

- the risk effects of working in adverse conditions (eg research by Professor Steve Cowley into the effects of work in moderate cold, funded by the Meat Research Corporation), and

- developing better administrative and safety auditing procedures (eg development of a manual handling risk assessment tool by David Nery, funded by South Australian WorkCover Corporation).

Other areas of emphasis include work redesign, noise control, effects of heat discomfort, and ergonomic management of over-use injury risks. There has also been a considerable emphasis on a best practice approach to OHS developing case study sets (*The Australian Meat Industry Occupational Health & Safety Best Practice Project: Ergonomic Best Practice Case Studies from Meat Processing Plants in Australia* (MRC 1998)) and best practice and continuous improvement frameworks (*On Strong Foundations: Meat Industry OHS Best Practice* (MRC 1996), *Towards OHS Best Practice in the Australian Meat Industry* (MRC undated)).

There has however, been relatively little investigation to date on the impact of safety culture on safety record in the meat processing industry. This is in spite of a building body of commensurate research in other industries (for example in Australia, the mining industry—Mining Safety Awareness Surveys (NSW Department of Mineral Resources 1991), Safety Culture Survey Report (Minerals Council of Australia/SAFEmap 1999) and the plastics and rubber manufacturing industry—OHS Survey

Report (Boyle 1999)). One example was noted of a safety culture survey conducted within the meat processing industry—a survey of the Queensland industry by the University of Queensland School of Psychology (Wallace & Neal 2000).

This survey involved, from 19 Queensland companies, 296 employees and 13 managers, all of whom completed a survey questionnaire. The principal inferences from their results are that:

- employees are more likely to comply with safety procedures when there is a positive safety culture within the workplace (workplaces that had a poor safety culture had poor compliance with safety procedures), and

- employees are more likely to participate in safety activities when there is a positive organisational culture within the workplace, as reflected in good work relations and morale and in level of control over work.

Wallace and Neal make a number of recommendations including to:

- include of safety objectives in managerial performance appraisals,

- showcase efforts and expenditures for workplace safety,

- conduct regular safety surveys,

- communicate safety-related information in many way including safety committees,

- given employees higher levels of control and responsibility,

- to provide effective safety training, and

- redesigned jobs so that people have the opportunity to work in teams and provide support for each other.

These recommendations reflect in general terms the frameworks that have been offered by a number of researchers in the field.

Andrewartha et al. (1996) reports findings of an analysis of management competencies and organisational culture in the Australian meat industry. Andrewartha (1996, pp. 69–70) reports that, "The findings show…that the MD or the CEO shapes the company culture." and that "most red meat processing firms tend to have an organisational culture that strongly values compliance with rules and managerial directives, status, which gives less weight to human resource management considerations and which discourages employee participation in decision-making and other forms of organisational change and innovation. The older and larger the firm, the stronger this culture is likely to be." Also, "this study also suggests that firms in this industry by and large do not possess an

organisational culture which encourages the take-up of 'high
performance' work organisation and management practices, such as
multi-skilling, employee self-management and a quality focus." These are
also important characteristics in safety culture development.

Safety Frameworks

Assuring that safety occurs is a multi-layered activity. It combines interventions in a number of distinct areas to address distinct risks. The major risks have been summarised (Davies 1993, p. 1) as:

1. unsafe acts;

2. unsafe conditions; and

3. the minds of men (ie attitudes towards safety).

In traditional engineering and administrative approaches to safety assurance, the focus has been on proscribing unsafe acts (through safety legislation, regulation and procedures) and the application of protective design in engineering and of new technologies that are inherently safer.

Increasingly, safety performance is seen as a combination of individual fallibility and organisational factors. In particular, Reason (1997) presents a compelling framework for considering vulnerability to workplace accidents (Figure 1).

Figure 1

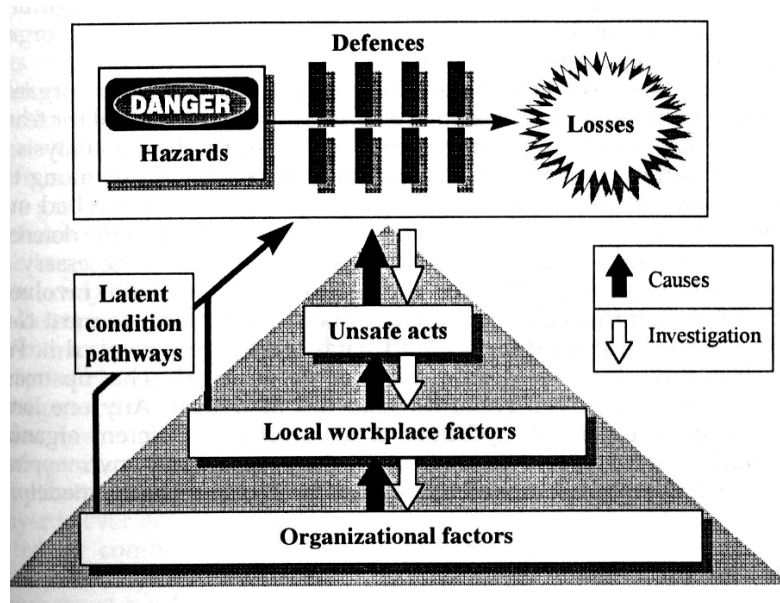There are two aspects to this framework. The first (in the box at the top of the figure) is what Reason describes as the 'Swiss Cheese' model—the ever-present hazards inherent in a particular industry are prevented from resulting in losses (injury, death, damage to property) by a series of defences. These defences are, for the most part, either technology/engineering based (better designed equipment—*what* the job

is done with) or administrative (better policies, procedures, QM and audit processes—how the job *should* be done).

However the most pervasive defence is the cluster of attitudes, beliefs and values the individuals of the organisation hold, the *safety culture*, and how these govern compliance and violations of procedures—how the job *is* done!

These defences constantly develop 'holes', or weaknesses through which hazards can penetrate (hence 'Swiss cheese'). Most of the time the multi-layered nature of defences means that if one defence fails another will prevent the hazard from causing damage. However, if there are many holes, a hazard will penetrate.

The second aspect of the Reason model is the hierarchy of factors that contribute to defence breaches. The event that precipitates the 'losses' is an unsafe act—an active failure (a violation or an error). However, Reason has described his research over many years that clearly indicates that in most cases, the unsafe act is influenced by local workplace factors and by organisational factors (latent conditions). "The organizational model views human error more as a consequence than as a cause. Errors are the symptoms that reveal the presence of latent conditions in the system at large." (Reason 1997, p. 226).

Organisational cultures (safety cultures) are pervasive in their influence on human behaviour within the organisation. Safety culture will mediate failures (poor decisions and poor choices of action) at organisational, local workplace and individual operator levels. An effective safety culture will result in few and temporary holes in the defences. A poor safety culture will result in many more holes, as well as holes that remain unaddressed. Safety cultures evolve gradually, in response to local conditions, past events, the character of the leadership and the mood of the workforce (Reason 1998).

There are at least two ways of treating safety culture suggested by the literature, (eg Bate 1992, Thompson *et al.* 1996):

- as something an organization *is* (the beliefs, attitudes and values of its members regarding the pursuit of safety), and

- as something that an organization *has* (the structures, practices, controls and policies designed to enhance safety).

Reason (1998) argues that both are essential for achieving an effective safety culture. Safety culture can therefore be measured as some combination of both of these aspects—for example through attitude and climate surveys on one hand, and safety audits and safety performance statistics on the other hand.

However, it is difficult to intervene at the level of changing beliefs, attitudes and values. Reason (1998, p. 294) argues, "it is hard to change the attitudes and beliefs of adults by direct methods of persuasion.", so that intervention is best directed at changing structures, practices, controls and policies, which "can lead to [changes in] thinking and believing." (op. cit., p. 294).

There are a number of frameworks in the literature for addressing the assessment and improvement of safety. Example of these frameworks include:

- Safety Culture Engineering (Reason 1997, 1998),

- Quality Management/Safety Management (Cooper & Phillips 1997),

- Safety Management System (Waring 1996),

- Risk Management Process (Tummala & Leung 1996),

- Engineering (Hazop) (Pitt 1994),

- Behaviour Modification (Marsh et al. 1995), and

- Unintentional Learning (Dodge 1998).

It is worthwhile to briefly examine the contribution each of these can make to an understanding of influencing safety behaviour and outcomes.

Safety Culture Engineering

Reason (1998, pp. 302–3) describes a framework for engineering a safe culture. This framework is based on the need to engineer five principle characteristics into the organisational culture:

- It needs to be an *informed* culture—one "in which the members of the organization understand and respect the hazards facing their operations" (op. cit., p. 302).

   Pidgeon (1998, p. 205) supports this characteristic. "At the heart of a safety culture is the way in which organizational intelligence and *safety imagination* regarding risk and danger are deployed (Pidgeon & O'Leary 1994)."

- It needs to be a *reporting* culture—in which people are able and prepared "to confess their own slips, lapses and mistakes." (op. cit., p. 302).This aspect and solutions for it are also detailed by Harvey (1988).

- It needs therefore to also be a *just* culture—"an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information—but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour." (Reason 1997, p. 195).

- It needs to be a *flexible* culture—in which control over responses to crisis situations can rapidly shift to the people most capable to act appropriately.

- Finally, it needs to be a *learning* culture—"the willingness and the competence to draw the right conclusions from its safety information system, and the will to implement major reforms when their need is indicated." (op. cit., p. 196). This characteristic is strongly supported by the extensive literature on organisational learning and the knowledge organisation. (See Senge 1990, Dixon 1994)

This latter concept fits well with the observation of Westrum (1993 p. 402) that "For the safety of systems, one must have a culture of conscious inquiry. 'Requisite imagination' characterizes the top performers (in safety management).". Westrum (op. cit., p. 402) provides a representation of how organisations treat information (which extrapolates to how they treat safety-related information). Westrum's 'Generative' organisation correlates to Reason's learning culture.

PATHOLOGICAL	BUREAUCRATIC	GENERATIVE
Don't want to know	May not find out	Actively seek information
Messengers are shot	Listened if they arrive	Messengers are trained
Responsibility is shirked	Responsibility is compartmentalized	Responsibility is shared
Bridging is discouraged	Allowed but neglected	Bridging is rewarded
Failure is punished or covered up	Organization is just and merciful	Inquiry and redirection
New ideas are actively crushed	New ideas present problems	New ideas are welcomed

(Table 1. How organizations treat information, in Westrum 1993, p. 402)

Reason's five points of safety culture engineering are seen as a particularly important way to represent safety culture and are a major component of the current survey design.

Quality Management/Safety Management

In this framework Cooper and Phillips (1997) argue that the objectives of TQM might be better achieved by focusing on and adopting total safety management (TSM).

Cooper and Phillips (1997, p. 4) suggest that "[safety] requires that attitudes and behaviour are taken into account along with the "hard" aspects. This view is supported by established models of human behaviour derived from social learning theory (Bandura 1986), that takes account of the "reciprocally determined" relationship between situations (organization), behaviour (the job) and attitudes (the individual)."

Based on this they put forward a variant of Bandura's organising framework:

- perceptions about, and attitudes towards, organizational goals

- day-to-day goal-directed behaviour

- presence and quality of organizational systems that support goal-directed behaviour.

From this perspective, the prevailing culture of interest is reflected in the dynamic interrelationships between members' perceptions about and attitudes towards organisational goals; members' day-to-day goal-directed behaviour; and the presence and quality of organisational systems to support goal-directed behaviour. Viewing safety culture in this way makes it possible to apply a variant of Bandura's model to the whole organisation to provide an organising framework for implementation and analyses.

Safety Management System

Waring (1996) describes a Safety Management System (SMS) framework that includes:

Policy, strategy and objectives

Long-term, permanent objectives might include:

- continuous improvement in the health and safety of employees and others who might be affected;

- minimization of accidents and maximization of avoidable loss;

- reduction in risks through improved technology;

- developing a positive safety culture.

Organizing, planning and resourcing

The kinds of activity involved include:

- preliminary risk assessments;

- drawing up hierarchies of objectives;

- identifying the need for lower level planning;

- allocating responsibilities, accountabilities and authority;

- establishing effective communication;

- addressing information and training requirements;

- selection of contractors and arrangements for their control.

Implementation

Implementation is about ensuring that risks are adequately controlled. Control measures typically fall into the following categories:

- engineering controls (e.g. process design, exhaust ventilation);

- organizational controls (e.g. safety co-ordination committee);

- procedural controls (e.g. procedures for plant operation, PTWs);

- behavioural controls (e.g. training);

- personal protective equipment (e.g. hearing protectors).

Monitoring and measuring performance

In addition to casual observation, regular systematic monitoring of a range of performance indicators is required. There are two kinds of systematic monitoring:

1. *proactive,* which addresses the current conditions and activities;

2. *reactive,* which addresses past conditions and historical data, e.g. accidents.

Safety audits

Periodic audits are needed which seek to establish any or all of the following:

- Is the SMS as designed and, as operated, capable of delivering health and safety to required standards?

- Is the organization or a particular part of it meeting all its statutory and corporate obligations in health and safety?

- Are the organization's own safety procedures being followed?

- Are technical safety requirements being met regarding plant, equipment, structures and processes?

- Are the safety performance criteria appropriate and set at the right level?

- What are the strengths and weaknesses of the SMS?

- What could and should be done to rectify shortcomings?

Periodic reviews

Periodic reviews are an iterative process which continue throughout the lifetime of an organisation. There are no hard and fast rules about review frequency and reviews in one form or another will be going on all the time. However, a rough guide is that a formal review of the whole SMS should be undertaken once every 12 months.

Fuller (1999, p. 1) comments on the needs to ensure that the SMS is base on employee-management consensus, arguing that "performance depends not just on management policies and procedures but on the development of effective operational practices, which are appropriate to the working environment and which are also perceived to be appropriate by the workforce implementing them." Fuller describes the key mechanisms for achieving this as task/workgroups (quality circles), communication (team briefs), consultation (consultative committees) and financial (employee share schemes).

Risk Management Process

Tummala & Leung **(**1996, p. 7) describe a risk management model for assessing safety and reliability risks, consisting of:

- Risk identification—identification of potential risk factors

- Risk measurement—enumeration of the associated consequences and their severity

- Risk assessment—assessment of the likelihood of occurrence of these consequences

- Risk evaluation—evaluate several decision alternatives based on the risk profiles

- Risk control and monitoring—review of project progress; facilitate periodic communication; consider corrective actions

Within this model Tummala & Leung (1996, p. 5) describe a risk management process:

- risk or hazard identification;

- system hazard analysis;

- ranking of hazards;

- development of action plans;

- risk evaluation; and

- risk control and monitoring.

Engineering (Hazop)

Pitt (1994), draws attention to an existing engineering tool for assessing hazards, the tool known as "Hazop" (or hazard and operability study).

Pitt suggests that there are three main aspects to any failure, and puts the questions:

1. What can go wrong?

2. What is the chance of it happening?

3. What are the consequences if it does?

Pitt maintains that "*you can only assess and deal with those hazards you have recognized*, and sophisticated mathematical methods will only refine those assessments. The success of Hazop has been in helping to recognize hazards by applying a formal procedure." (Pitt 1994, p. 2)

Hazop is simply described as follows:

- Describe the process.

- Break it down into smaller operations for consideration.

- For each operational unit, determine its intention.

- Apply a series of guide words to see how that intention may be frustrated.

- For meaningful deviations from the intention, look for possible causes and likely consequences.

- Consider possible action to remove the cause or reduce the consequences.

Behaviour Modification

Marsh et al. (1995) Describes the development of a behaviour-based approach to management of safety, using goal-setting and feedback methods. They report that goal setting and feedback can produce large improvements in safety performance where the commitment of site management exists.

Marsh et al. (op. cit., p. 5) describe three elements to behaving safely:

1. the knowledge of how to operate safely;

2. the equipment to operate safely; and

3. the motivation to operate safely.

The authors suggest that information and motivation campaigns designed to improve safety through increased safety consciousness have not been consistently successful, and incentives have been successful but expensive, and are apt to discourage operatives from reporting accidents and near misses. The use of disciplinary action has shown limited success. They suggest instead, a behavioural approach using goal setting and feedback.

Marsh et al. (op. cit., p. 5) assert that Goal setting and feedback have already been shown to be of value in safety, citing McAfee and Winn (1989), Chhokar and Wallin (1984) and others.

Unintentional Learning

Dodge (1998) suggests that unintentional learning has practical implications in the field of occupational health and safety, that can be addressed at the level of culture change. He suggests that "a large body of 'unintentional' learning exists within the workplace which is not the result of conscious decisions and lacks critical reflection on the possible outcomes." (Dodge, op. cit., p. 1).

Unintentional learning is the continuous learning of experience of life— the child who learns not to touch things that are hot is a simple example.

> Unlike more formal learning, the lessons from our experiences are not planned or intentional. They are not the result of a well formulated learning program, yet they have a powerful, often unconscious impact on our attitudes, beliefs and behaviors.
>
> (Dodge 1998, p. 2)

When learning is inherent in the actions or statements of an individual, Dodge describes, the learning which results as a consequence may be both unintentional and unplanned. In the workplace, actions and comments of both managers and peers are a powerful learning force which may be used informally to affect behaviours. The process is not an "intentional" learning program and the learning component may go unrecognized by one or other of the parties.

What are the assumptions workers and managers make relative to health and safety in the workplace and where did those assumptions originate? Often, Dodge suggests, from unintentional learning.

Counteracting unintentional learning requires that all stakeholders take an active part in defining their planned learning activities, while also staying

alert to and seeking out the subtle contradictory learning that may exist
within the workplace or in the larger society as a whole.

> Well-intentioned learning programs must go hand-in-hand
> with critical reflection and positive cultural expectations for
> worker safety by workers, managers and the public.

> (Dodge, op. cit., p. 18)

The Reason Model of Safety Culture

Having described a number of the ways in which occupational safety has
been approached in recent years, a more specific focus is taken on the
model of safety culture described by James Reason and picked up by
others. This appears to be a very practical approach that has the
advantages of not being too deeply rooted in a specific industry, and of
taking a broad view.

Most organisations that have occupations within them that are hazardous,
develop (or are obliged to develop) multilayered defensive systems.
These are a combination of technical and engineering solutions (plant
design) and administrative solutions (policies and procedures that define
how people must behave, and audit/monitoring processes to manage
compliance).

> "Because of their diversity and redundancy, the elements of
> a multilayered defensive system will be widely distributed
> throughout the organization. As such, they are only
> collectively vulnerable to something that is equally
> widespread. The most likely candidate is safety culture. Only
> culture can affect all the 'cheese slices' and their associated
> holes."

> (Reason 1998, p. 297)

Reason (1998, p. 297) suggests that all the ways in which a poor safety
culture can adversely affect protection "stem, directly or indirectly, from
a failure to understand and fear the full range of operational hazards."
These are:

1. An increase in the number of defensive weaknesses due to *active
    failures* (through factors such as insufficient concern about working
    conditions, inadequate training, poor communication, bad
    procedures and problems with the design of the man-machine
    interface).

2. An atmosphere of non-compliance to safe operating practices (where
    the unspoken attitudes and beliefs mean that production and
    commercial goals are seen to outweigh those relating to safety) will

lead to both *active failures* and *latent conditions* (eg non-compliance during maintenance and testing, provision of inadequate equipment).

3. An unwillingness to deal proactively with known deficiencies in the defences—defensive gaps are worked around and allowed to persist.

Unlike a nuclear power station or a space shuttle, where one accident may happen in 20 years, but its effects are catastrophic, it is the repeated incidence of similar, individual accidents and injuries that is the most critical for the meat industry. Reason (1998, pp. 300–1) describes that in every *recurrent* accident scenario, there are at least three elements:

- Universals

  These are the ever-present hazards associated with a particular domain of activity. It is unplanned contacts with these universals that do the actual damage.

- Local traps.

  These are characteristics of the task or workplace that, in combination with human error and violation tendencies, lure people into repeated patterns of unsafe acts or less-than-adequate performance.

- Drivers.

  But if there is a path before me does it necessarily follow that I must go along it? I also require a motive determining my choice and, further, some force to propel me forward' (Freud 1922: 36). A similar argument can be applied to the local traps in hazardous operations. Their mere existence is insufficient to explain why people are repeatedly—but not invariably—ensnared by them. The argument to be offered here is that, in hazardous work, this motive force is derived from an organization's safety culture-or, more specifically, from an unsafe culture.

Drivers are important in the balance of risk avoidance with pressure to get the job done no matter how. Factors in this will include time pressure, cost-cutting, indifference to hazards and pursuit of commercial advantage.

Drivers will lead to the generation of violations (clear intentional breaches of procedure) and errors. Reason et al. (1998) describe errors and violations, categorising them into:

1. Unintentional Errors: caused by gaps in skill/knowledge or by distraction/lapses in concentration.

2. Culpable Errors: not intentional in themselves but the lead up behaviours are reckless (eg 'drink then drive').

3.   Routine violations: corner-cutting, often at a habitual (not conscious)
     level.

4.   Necessary violations: precipitated by inadequacies in equipment or
     workplace procedures.

Characteristics of low accident plants

Lee (1998) picks up on the direction taken by Reason, and goes on to
discuss the traditional approach to addressing safety issues. That is, the
traditional organisational solution of "devising a *regulation* if
[addressing] an unsafe act or a *technical solution* if [addressing] an
unsafe condition". Lee asserts, "socio-technical systems now change so
rapidly that precedents [prescribed regulations and technical solutions]
quickly become redundant." (Lee 1998, p. 218).

Lee puts forward an approach based on the (reasonable) assumption that
low accident plants probably also have better safety cultures. He lists
(Lee, op. cit., p. 219) the characteristics of low accident plants as having:

- A high level of communication.

- Good organizational learning.

- A strong focus on safety.

- A senior management that is strongly committed to safety.

- A management leadership style that is democratic.

- More and better quality training.

- Clean and comfortable (relative to the task) working conditions.

- High job satisfaction.

- A workforce composition that includes employees who are recruited
  or retained because they work safely and have lower turnover and
  absenteeism.

Lee lists nineteen attitudes towards safety structured within nine domains
(Lee 1998, pp. 223–5):

Safety procedures

- Confidence in safety procedures

Risks

- Personal caution over risks

- Perceived level of risk at work

- Trust in workforce

Permit to work system

- Confidence in efficiency of PTW system

- General support for PTW system

- Perceived need for PTW system

Job satisfaction

- Personal interest in job

- Contentment with job

- Satisfaction with work relationships

- Satisfaction with rewards for good work

Safety rules

- Personal understanding of safety rules

- Perceived clarity of safety rules

Training

- Satisfaction with training

- Satisfaction with staff suitability

Participation

- Perceived source of safety suggestions

Control of safety

- Perceived source of safety actions

- Perceived personal control over safety

Design of plant

- Satisfaction with design of plant

Measuring Safety Culture

> *The relationship between a positive organizational
> culture and positive safety performance is unequivocal.*
>
> *(Richard Gardner 1999, p. 26)*

Organizational culture is, by its very nature, subjective. Any assessment
process must be designed with this in mind (Gardner 1999).

Measurement of safety culture mostly has relied on two measurements,
the *key performance indicator* (lost time accident rates, backlog in
technical modifications) and the *safety audit* (what elements of a safety
management system are in place). Lee (1998, p. 235) argues that *safety
surveys* should augment but not replace these.

At the heart of intervention in safety cultures, under most frameworks, is
a method for measuring and monitoring safety culture. For the most part,
this has been attempted by use of a culture survey. The nature of the
survey process has varied, and involves three approaches:

- traditional paper and pen questionnaires putting a series of questions
  or statements and requiring levels of agreement,

- a group administered verbal presentation of statements requiring a
  forced-choice button press (ie using computer technology—used by
  SAFEmap) to allow for variable literacy levels,

- an interview approach, collecting data by direct questioning.

The paper and pen questionnaires predominate in the literature. Some of
the approaches to survey construction are summarised below.

An interview survey

Gardner (1999) used a 'structured sensing interview' to collect data,
arguing that the use of face-to-face interviews result in a more
comprehensive understanding of respondents' thoughts and feelings—
interviews enable respondents to explain *why* they rate an item in a
context.

In the interview process, Gardner had each interviewee rate each assessment item on a scale of 1 to 10. Respondents were encouraged to expound upon their answers and provide illustrations to clarify their ratings.

Gardner (1999) lists a set of factors in Organisational Culture that have a positive correlation to safety performance. They are:

1. The degree to which individual employees believe themselves to be an important part of the organisation.

2. Organisational support and value for personal and professional development, education and training.

3. A safe workplace.

4. Systems and methodology for problem reporting.

5. Management/system responsiveness to reported problems.

6. Performance-based consequences: recognition and reward for positive performance.

7. Performance-based consequences: confrontation and correction of poor performance.

8. Employee involvement, participation and input.

9. Job security (mergers, takeovers, layoffs, wage reductions).

A similar list of negative correlations is:

1. The degree to which employees believe their performance to be less important to the organisation than other values such as compliance, and conformity.

2. Company behaviours that discourage flexibility, risk, innovation performance.

3. Exhortation to quality/safety improvement without concomitant support/investment.

4. Political infighting and dissent at management levels.

Modelling safety climate

Cheyne et al. (1998, pp. 263–264) describe a written 74-item questionnaire survey instrument which has five sections:

- Section 1—Demographic information

- Section 2—The physical work environment

- Section 3—Hazards checklist

- Section 4—Attitudes to safety

- Section 5—Safety activities

The data from this survey is used to generate the following five factor
model (Cheyne et al. 1998):

- Safety management

- Communication

- Individual responsibility

- Safety standards and goals

- Personal involvement

Cheyne et al. (1998, pp. 267–8) also note:

- Workplace hazards appear to have no direct effect on levels of safety
  activity.

- The better the perceptions of standards are, the easier it will be for
  workers to be involved in safety.

- Workers reporting a more satisfactory physical work environment
  also report fewer and/or less severe workplace hazards.

Cheyne et al. (1998, p. 268) identify "managers, and their actions and
commitment, as a key group in which to begin influencing and improving
attitudes to safety and, in turn, levels of safety activity." They go on to
suggest that "restructuring of safety communication systems and the
foundation of employee participation programmes would also impact on
safety climate and perhaps help to develop a participative organizational
culture for safety.".

Employee attitudes to safety

Cox & Cox (1991) identifies four different groups of objects studied in
relation to attitudes to safety:

- safety hardware and physical hazards

- safety software and concepts

- people

- risk.

From these, they a survey based on a written questionnaire in four parts is
constructed (Cox & Cox 1991, p. 102):

1. Attitudes to good safety practices

2. Attitudes to the company's safety philosophy and culture

3. Perceptions of the company's commitment to safety. Attendance at 'family safety days'

4. Suggestions for improving attitudes to safety

This survey included 22 items and a free response section (the last section).

The data from this survey yielded five safety factors (op. cit., p. 103):

- Personal scepticism

- Individual responsibility

- Safeness of work environment

- Effectiveness of arrangements for safety

- Personal immunity

Mining safety awareness survey

NSW Department of Mineral Resources conducted a series of surveys in 1991 using a written questionnaire of 105 questions. Sections included:

- Safety systems and planning for safety

- Safety and the way work is organised

- Safety and training

- Safety and equipment

- Causes of accidents and injuries

- An additional set of specific questions relating to underground mining.

The data from this study was extensive, and some of the main points of importance (NSW Department of Mineral Resources 1991, pp. 14–16) are:

- A rapid response to safety problems.

- Recognition of safe working practices.

- Senior management has a clear role in safety awareness.

- Planning of safety and other systems needs to be done by people with practical experience.

- Safety training needs to happen, needs to be practical and locally relevant, and needs to be refreshed regularly.

- Safety training needs to begin at induction and to include managers and supervisors.

- Safety audits needs to be regularly conducted by supervisors.

- Equipment design is a critical factor in safety..

- Safety committees are important.

Mining Safety Culture Survey

The Minerals Council of Australia (1999) reports a survey of 7,100 employees across 42 mines, using SAFEmap Profile-R. The Profile-R survey uses an electronic technology wherein participants attend in groups of 16 and are read a series of statements. To each statement each participant must indicate agreement or disagreement/neutrality (Kuder forced choice format).

The SAFEmap model consists of eight sections (Minerals Council of Australia 1999, p. 15):

- Organisation (the company)

- Management (senior managers)

- Supervision (the direct supervisor)

- Management systems (formal systems)

- Safety systems (issues for safety management)

- Job factors (perceptions of job related issues)

- Team factors (perceptions of peer group influences)

- Individual factors (individual attitudes and perceptions)

Across the eight sections are 41 factors, for example, *Organisation* factors include 'Commitment', 'Policy' and 'Leadership style', *Management* factors include 'Credibility', 'and 'Commitment' and *Safety systems* factors include 'Safety staff', 'Safety rules' and 'Training'.

SAFEmap makes a functional distinction between 'safety culture' and 'safety climate', allocating the first five sections as contributing to culture and the last three to climate.

The Mineral Council (op. cit., p. 4) report suggests that responses to the safety culture factors were very positive at Manager levels, less positive but still high at Supervisor and Specialist Staff levels, but were considerably lower at Operator levels. Most of the negative responses were on issues such as Job Security, Risk-Taking and Fatalism.

Weaknesses identified within the culture/climate include management credibility, unclear responsibility for safety, lack reward and recognition for safe work, effectiveness of safety systems/programs, attitudes to risk-taking, consultation (safety committees) and fatalism (defined as the achievability of 'zero accidents').

Fatalism is suggested to "play a very substantial role in the occurrence of risky behaviour. …The full scope and impact of this factor on risk-taking behaviour is not yet fully understood and may require further and in-depth research." (op. cit., p. 37).

Safety Attitude Questionnaire Scale

Donald and Young (1996) describe a written questionnaire comprising 18 scales, in the context of a survey—a programme of safety improvement initiatives—and a re-survey and assessment of safety performance change. Donald and Young (1996) also correlate responses to the questionnaire with lost time, all accident and self-reported accident rates, reporting that, with the exception of two, all scales correlate with these accident rates at statistically significant levels.

They began with a series of individual interviews and focus group sessions, then progressed to the safety attitude survey. The scales Donald and Young employed were:

1. Management/supervisor satisfaction with the safety system

2. Management/supervisor knowledge of the safety system

3. Management/supervisor encouragement and support

4. Management/supervisor safety enforcement/pressure

5. Personal contact with management/supervisors

6. Management support for safety meetings

7. Worker satisfaction with the safety system

8. Work environment: hardware

9. Workgroup encouragement and support

10. Workforce training

11. Global self-safety

12. Meetings

13. Safe working procedures

14. Safety information

15. Safety representatives' practice

16. Safety representatives' authority

17. Section leaders' practice

18. Section leaders' knowledge and satisfaction with the safety system

The Offshore Safety Questionnaire

Mearns et al. (1998) describe a written survey conducted in 10 installations, consisting of six sections generating 176 variables. The factors of work safety measured include:

- Work pressure.

- Work clarity.

- Job communication.

- Safety behaviour—half of the respondents found it necessary to 'occasionally' commit unsafe acts and procedural non-compliance.

- Job security.

- Risk perception.
    - 'Hazards to the installation'
    - 'Occupational hazards'
    - 'Catastrophes'

- Assessment of safety.
    - 'Accident Prevention'
    - 'Incident Mitigation'
    - 'Emergency Response'

- Safety attitudes.
    - 'Speaking up about safety'
    - 'Attitude to violations'
    - 'Supervisor commitment to safety'
    - 'Attitude to rules and regulations'
    - 'OIM commitment to safety'
    - 'Safety regulation'
    - 'Cost versus safety'
    - 'Personal responsibility for safety'
    - 'Safety systems'
    - 'Over-confidence in own safety'

- Accident history.

Safety perceptions and attitudes

Williamson et al. (1997) describes a self-administered, 67 item questionnaire given to 1560 employees across seven workplaces. Factors included in the questionnaire include:

1. Safety awareness

2. Safety responsibility

3. Safety priority

4. Management safety commitment

5. Safety control

6. Safety motivation

7. Safety activity

8. Safety evaluation

As a result of this data, Williamson et al. (op. cit., p. 21) list five factors that are crucial for safety perception and attitude:

- Personal motivation for safe behaviour

- Positive safety practice

- Risk justification

- Fatalism

- Optimism

Williamson et al. report that "the strongest factor was *Personal motivation for safe behaviour*, reflecting the perceived deficiencies in the workplace which prevent respondents from acting safely." (Williamson et al. 1997, p. 24).

Changing Safety Cultures

Creating a safety culture

Development of a safety culture should not be viewed as a separate process, but one that forms an integrative part of the wider organisational culture (Clarke 1999). Rogers (1995) suggests that it takes one to five years to change a culture, so that safe behaviour becomes second nature or ingrained, but that specific behaviours can be changed in a quarter of that time through rewards and disincentives.

Pidgeon (1998, p. 205) suggests that "there is an unacknowledged paradox at the heart of many discussions of the topic, in that culture can act *simultaneously* as a precondition both for safe operations and for the oversight of incubating hazards." The implication of this is that, perhaps, it is not desirable to strive for too uniform a safety culture across the entire organisation. The existence of some safety sub-cultures may produce enough constructive tension to ensure that oversights and complacency seldom occur.

Carroll (1998) emphasises the broader role of safety culture surveys in helping to shape and sustain a healthy safety culture. By asserting "that their use for assessing and measuring safety culture, although important in many contexts, is problematic without companion activities that connect questionnaire responses to the specific context of the setting, its history and particular challenges.", Carroll flags that simple reliance on surveys will not generate cultural change. It is also necessary to build in a range of other measures and other activities that promote thinking and acting in new ways.

Employee involvement

> The single most favourable response was that 99% of respondents agreed that '*Safety and quality are as much my responsibility as anyone's*'.
>
> (Carroll 1998)

Ramsay (1991) states that greater employee involvement should provide part of a coherent and linked management program and identifies a number of important factors affecting the success of employee involvement initiatives:

- senior management commitment;

- middle and lower management support;

- definition of the initiative's objectives;

- appropriate training and time available for those involved;

- monitoring the scheme's implementation; and

- provision of information and consultation on the process.

However, Pidgeon (1998, p. 208) warns, "if the power relationships [within the company] emphasize secrecy, exclusion, and the 'need to know', (sub)cultural exclusivity and blocks to learning are the more likely result." This may have particular relevance to the meat industry, which in many cases is still reactive and closed in its management style (Andrewartha et al. 1996).

Another important cause of failure of initiatives to achieve greater employee involvement is resistance to change (Hellriegal et al. 1989). This has certainly been true in the meat industry, with 'old hands' unwilling to let go of old ways of operating (for example, knife care) even when the new procedures are safer and as efficient.

Accountability: dealing with mistakes

> 85% of respondents agreed that 'Too many people at the plant are worried about being blamed for mistakes'.
>
> (Carroll 1998)

Pearn, Mulrooney and Payne (1998) advocate an approach of accepting mistakes and harnessing their power to stimulate learning. Essentially, they are describing a learning process using mistakes as a 'frame of reference'. Pidgeon (1998, p. 212) points out that it is important not to try to create a no-blame culture, "but one which establishes the boundary between culpable and tolerable mistakes, in a way that the latter category is as inclusive as possible, and while at the same time still retaining some degree of responsibility and accountability.

Dilley & Kleiner (1996, p. 278) describe a positive approach to discipline as being essential for creating a safety culture of high trust and employee involvement. They list six key aspects to a positive discipline approach:

1. Achieving employee involvement/treating the employee with respect.

2. Objective observation of present behaviour and current issues.

3. Evaluation of current behaviour.

4. Creation of a positive plan for action.

5. Confirmation of employee agreement and commitment.

6. Realisation by the employee that an accepted agreement is not
    negotiable.

Senior management

There are two aspects to senior management involvement that may be of
importance. The first is that, although positive safety attitudes at senior
management level are essential in developing a positive safety culture, it
cannot be assumed that such attitudes will cascade through the
organisation. Senior management's attitudes and actions may be subject
to negative stereotyping by staff and supervisors (Clarke 1999).

Secondly, it cannot be assumed that senior management commitment to
safety is either present or clearly communicated to employees through
actions. Carroll (1998) finds that 50% of respondents disagreed that
'Senior Management expectations for safety are clearly stated and
consistent with performance reviews, rewards and punishments' and 50%
agreed that 'Senior Management makes workers feel uncomfortable about
raising concerns.'

Organisation level interventions

Recruitment

Recruitment is a neglected focus of safety culture development in most
industries. At the sharp end of recruitment, the sole focus is mostly on
technical or practical suitability for the work, and more often on 'fit' with
the team or broader organisational culture. However, for hazardous
industries, a greater focus on safety behaviour and safety attitudes may be
also and important selection criterion.

Andrewartha et al (1996, p. 68) makes a specific recommendation of the
use recruitment as a strategy in the meat industry to "Develop and
implement greater diversity in managers…Our study strongly
indicated…that because of the culture, it was not normal practice to
appoint managers based on informed and defined merit. Seniority,
toughness and connections are still the major variables in management
selection in most places."

Stress from inside and outside pressures

Stress responses in individuals can be physical (eg increased incidence of
common infections, allergic reactions such as dermatitis, increased

muscular tension, increased blood pressure) and psychological (eg increased distractability, inattention, preoccupation with other matters, quickness to anger, impatience). These responses can equally be brought on by work pressures (eg interpersonal conflict, production related time pressures) or outside pressures (eg family or financial difficulties).

Whatever the cause, the effect is a greater vulnerability to hazards. Therefore, addressing employee stress reactions and causes of stress is an important preventive strategy. This may include access to some form of company sponsored employee counselling.

Low literacy

Low literacy has been a major concern in manufacturing (GMHAL, private correspondence) and some service industries (Dilley & Kleiner 1996) for many years, and has been indirectly attributed to a number of workplace injuries, because of communication breakdowns and poor understanding of written hazard warnings and procedural lists.

When this is compounded by low English-speaking ability, as is the case for many employees in the poultry sector, the impact on safety risk can be significant. For these people increased literacy is an important part of creating a safety culture.

Workplace morale

There appears to be a clear association between workplace morale and safety performance (eg Ansari & Modarress 1997, Dilley & Kleiner 1996, Wallace & Neal 2000). Some authors have attributed greater workplace morale to better safety levels, others the improved safety performance to better workplace climate and morale. The reality is likely to be that each is dependent on the other in a feedback loop.

In any case, efforts to improve workplace morale are likely to be reflected in a more positive safety culture.

Claims management is also a part of this, as the way in which work injuries are handled by the company will be recognised by employees and will contribute to the overall impression of management attitude to safety, and therefore to general morale. Two key elements of claim management are the immediate stabilisation an injured employee's condition by expediting medical treatment, and regular personal contact and support by the employee's immediate supervisor and manager, and encouragement for an early return to work.

Safety values

Eckenfelder (1998, pp. 20–21) lists a set of safety values that need to be
assessed, encouraged and reinforced.

1. Do it for the right reasons

2. See it as part of the whole

3. Recognise there is no end

4. First, it is a people business; things are a distant second

5. Put the right person in charge

6. Use a yardstick everyone can read

7. Sell benefits—and they are many

8. Never settle for second best

9. Be guided by logic, not emotion

10. Empower others rather than seek after support

Eckenfelder describes a continuum of organisational practices relating to
each value, from practices representing 'dark ignorance' (eg safety driven
entirely by regulation and cost) to 'full light perfection' (eg sincere
concern for employees drives safety). The list is suggested as a trigger for
discussions about safety values that cause changed awareness and
therefore shifts in values.

Carroll (1998, p. 281) also supports the approach of using a dialogue to
create a safety culture: "if the survey is a genuine effort to reach mutual
understanding, to open dialogue among multiple levels of hierarchy and
groups of employees, and to work together for effective change, then it
can play an important role in creating and sustaining a healthy safety
culture."

Prevention

An effective approach to prevention is a central plank in any safety
culture. The main areas in which preventive strategies can occur are:

- Environmental

   This includes working conditions (heat, cold, humidity, and so on)
   and could also be extended to include peer relations, industrial
   environment and other 'social' factors.

- Biomechanical

   It is this area that most effort has been invested, from plant and
   equipment redesign (chain gauntlets, carcase lifters) to process
   redesign to reduce repetition and lifting strains.

- Safety training

   The payoff from training can be enormous. Motorola, for example,
   spends about 3 per cent of payroll costs on training. For every dollar
   invested in training programs, the company receives 33 dollars back
   in the form of better product quality, higher productivity, less waste
   and safety process improvements (Ansari & Modarress 1997)

- Policy

   Policy is the foundation of all other actions. Reason (1997, p. 147)
   presents a simple model illustrating this:

   - the *influencing* factor level: this includes the unsafe acts or
     technical failures immediately responsible for the event,

   - the *performance-influencing factor* (PIF) level—these are the
     immediate workplace conditions that shape the occurrence of
     human or technical failures,

   - the *implementation* level—these are the underlying
     organizational factors that create PIFs,

   - the *policy* level—this comprises the policy and regulatory
     factors that determine organizational processes occurring at the
     implementation level.

   A brief illustration: A policy may be (and quite often is) to use cost
   as the controlling criterion in sourcing new and replacement
   equipment. The implementation of this is that quotes are obtained
   and the cheapest quote is always accepted. As a result, workers may
   be operating with shorter gauntlets. Operator 'A' was kept awake by
   his young child and loses concentration. The knife cut his forearm,
   where a longer glove may have prevented injury.

- Legislation

APESMA has stressed the need for strong legislation to encourage
employers to treat OHS as a necessary and critical feature of doing
business (Parsons 2000), and this is undeniably true. Parsons (2000)
asserts that regulation is the single most important driver of
improved performance in OHS in the workplace:

> Some employers believe that adopting/developing,
> implementing and maintaining good OHS policy has a
> commercial benefit. Others see OHS as a cost and
> comply if/because they must.
>
> (Parsons 2000)

Reason (1997, p. 172) also recounts from history a series of
outstanding successes of legislation and regulation in improving
safety.

However, it also needs to be recognised that external regulation (for
example in South Australia, the Workers Compensation and
Rehabilitation Act, 1987 and the Occupational Health, Safety and
Welfare Act, 1986) has limits. This is particularly so in promoting a
safety culture, which implies an awareness of factors *leading to risk*,
in the face of relatively few actual injuries (which are what come to
the attention of regulators).

Conclusion

Which brings the discussion full circle. Legislation and regulation are
essential foundations to counterbalance the commercial drivers of
profitability and cost minimisation. They are not sufficient (as
demonstrated by the high injury rates in the meat processing industry)
and other approaches are also required. While excellent technology and
processes exist in many areas, as Reason points out (to quote again): "…a
poor safety culture will encourage an atmosphere of non-compliance to
safe operating practices. Violations are likely to be most common in
organizations where the unspoken attitudes and beliefs mean that
production and commercial goals are seen to outweigh those relating to
safety." (Reason 1998, p. 297).

From the research successful promotion of a positive safety culture
clearly seems to be the key to a safer meat processing industry.

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