FROM PREVENTION TO INNOVATION

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Culvenor, J. 2000, 'From Prevention to Innovation', Corporate Risk, vol. 7, no. 6, pp. 39-44.

Why should we solve workplace safety problems? With about 500 traumatic fatalities and up to 2200 occupational disease deaths related to work each year in Australia, this question seems obtuse. Nevertheless, let's take it one level deeper. Why do we want to prevent further fatalities, injuries and diseases? What really motivates a workplace to energise its problem solving efforts in safety? The answers are usually threefold:

- ethical/moral
- legal/social
- financial

Preventing injury and ill health is motivated by a desire to prevent negative outcomes: guilt, legal sanctions, and monetary loss. There could be positive outcomes from prevention. For instance, some people would gain some satisfaction through compliance with the law and by seeing people well. However, generally the aim of prevention seems to be to achieve the absence of bad things (guilt, legal sanctions and monetary loss). These three reasons are like three stones in your shoe. If you could get rid of those stones you'd be comfortable and could forget about health and safety.

Health and safety should be something more than preventing problems. Stephen Covey wrote: "effective people are not problem minded; they're opportunity minded". We should be highlighting positive motivators to engage in health and safety – what positive opportunity does involvement in safety present? Instead of what bad things can be prevented, what good things can be created? Instead of prevention let's start thinking about innovation and achievement.

The legal requirement to be creative problem solvers

Australian workplace safety law requires various parties (mostly employers) to engage in problem solving as specific solutions to problems are usually not outlined. The scene was set for this style of regulation by the Robens Inquiry in the UK (Committee on Health and Safety at Work 1972).

The main theme of the Inquiry was that health and safety laws were overly prescriptive, impossible to keep current, too numerous, and too hard for people to access and understand. The recommended alternative was an enabling statute that described the established common law duty to maintain a "safe work system including safe premises, a safe working environment, safe equipment, training and competent personnel, and adequate instruction and supervision". The ways of achieving this were to be described in greater detail in the regulations and voluntary codes, but by and large the detail would be left in the hands of employers.

Australian legislation follows this model: thus we find that a key requirement for employers (and other duty holders) is to engage in problem solving. At one level this means engaging in a

process of hazard identification, risk assessment and risk control. On a second level, and it is here that I will concentrate, it involves applying the 'control at source' and 'hierarchy of control' models.

The model has its history in the study of occupational hygiene. In 1929, Hamilton modeled occupational hygiene in terms of the "hazard source", "pathway" and "person". Hamilton emphasized the priority of placing controls "at the source" (eg elimination, substitution) rather than "at the person" (eg personal protective equipment). We can now see that the control at source model lies at the heart of a number of Australian statutes. For instance, the *Occupational Health and Safety Act* 1985 (Vic) has as one of its five objects "to eliminate, at the source, risks to the health, safety and welfare of persons at work" (s. 6(d)).

An extension of the control at source model is the approach known as the "hierarchy of control" model, such as was described by Bloomfield in 1936:

- substitution of a non-toxic material for the toxic one
- isolation of the harmful process
- wet methods in the case of some dusty processes
- exhaust ventilation
- respiratory protection

Over time, the hierarchy became adapted to the problems of "injury" as well as "disease" and is now viewed as a general problem-solving model in occupational health and safety (see the examples in Table 1).

Table 1 Examples of the hierarchy of control problem-solving tool

OHSW Regulations 1995 (SA) r 1.3.3 "control of risk"	*WHS Regulations 1998* (Tas) r 19(2) "control of risk"
1. elimination	1. elimination
2. engineering, including substitution, isolation, modifications to design and guarding and mechanical ventilation	2. substitution 3. isolation 4. engineering
3. administrative controls including safe work practices	5. administration, including safe working practices
4. personal protective equipment	6. personal protective equipment

Why do we need to be creative to apply the hierarchy?

The priority in hazard control is always elimination of the hazard. Creativity is necessary at this point because the proposal to "eliminate the hazard" rarely makes sense on first hearing. This is because hazards in workplaces were usually put there because they served a purpose – businesses have bought and paid for their hazards. Hazards are invariably part of a system that at some time in the past were thought to be a good idea. Therefore, the idea of eliminating the hazard is confronting. It confronts the deliberate decisions of the past. It confronts the way things have always been done.

The Industry Commission's *Inquiry into Occupational Health and Safety* (1995) commented that "superior outcomes cannot simply be mandated. Rather they are to be found in the application of comprehensive quality management principles." It is therefore necessary to

engage in continuous improvement - in problem solving. But are workplaces equipped for this new-found freedom? Do they have a problem solving culture or do they remain in compliance culture?

A number of submissions to the Industry Commission indicated that many businesses, especially small businesses, were having difficulty complying with self-regulation because they did not know what to do. The necessary cultural and educational change had not occurred. It seems likely that 99 times out of 100 people will say "we can't eliminate the hazard, it's part of the process". They may be right. However, I suspect that they don't know for sure because they dismiss the idea too quickly.

How to be creative with safety

There are three basic approaches to being creative in workplace safety.

- proactive thinking
- divergent thinking
- judicial thinking

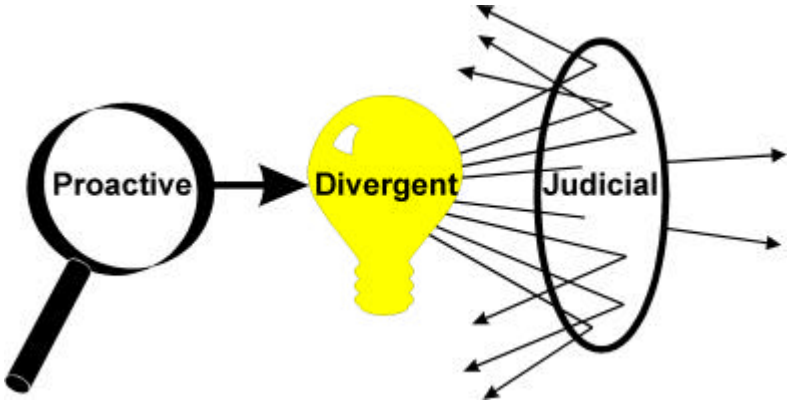

Figure 1 Three kinds of thinking to be creative in workplace safety

Proactive thinking: focusing on prevention and planning

Stephen Covey (1989) uses a matrix (Figure 3) to illustrate an approach to time management. The high-leverage activities are clearly those that fall into the 'not-urgent but important' box. Here time pressures are at a minimum. Decisions can be taken with a rational mind. However, the motivation to take action on non-urgent matters can sometimes be difficult to muster. While urgent matters usually make their presence felt, they are not always the most important problem, but will often be either a symptom of an underlying failure or a consequence of spectacular but infrequent and unlikely event. Proactive thinking requires a deliberate effort to focus attention on important issues. In safety it means hazard identification and risk assessment. **Figure 2 Three Kinds of Thinking**

	Urgent	Not Urgent
Important	Crises Emergencies	**Prevention** **Planning**
Not Important	Interruptions Some Meetings	Trivia

Figure 3 Time Management Matrix (Covey 1989)

DIVERGENT THINKING: BREAKING THE "HABIT GRAVITY"

Alex Osborn (1948) popularised the technique of 'brainstorming' – a technique that encouraged people to explore a range of solutions before committing to one particular idea. To use a metaphor, when catching a fish you would not simply poke your hand into the water and hope to pull out a fish. A better way would be to cast a net over the water and drag in a range of objects – some of which will be fish. A similar approach is needed with solutions to a workplace safety problem.

There is always more than one solution to any problem – so set big goals. There is no reason why the first solution thought of will necessarily be the best. It makes sense to explore options further – cast the net, instead of plunging one's hand into the water. What is needed is fluency; meaning a free flow of ideas and an attempt to modify and build on ideas. It is also important in safety to develop a range of solutions, as usually short-term and long-term options are needed.

Old ideas, like old habits, die hard. Habits are very useful most of the time – our lives are made possible because we can repeat activities without re-learning. Similarly, in the workplace, industrial processes are efficient because they can be repeated. But there is also a need for new ideas. We need to stop and look carefully at the way we do things. However, keep in mind that "habit gravity" is strong stuff. Covey (1989) described breaking habits as like breaking the gravity of the earth on a space mission. More energy is required to move the first few metres than for the remaining thousands of kilometres.

Many people will know the nine-dot problem (Figure 4). The task is to draw a line through each dot using four or fewer straight lines and not take the pen from the page. This classic problem illustrates the need to examine assumptions closely. The first solution, for instance, challenges the assumption that we must stay within the dot boundary. The second solution challenges the assumption that we have to go though the middle of the dots.

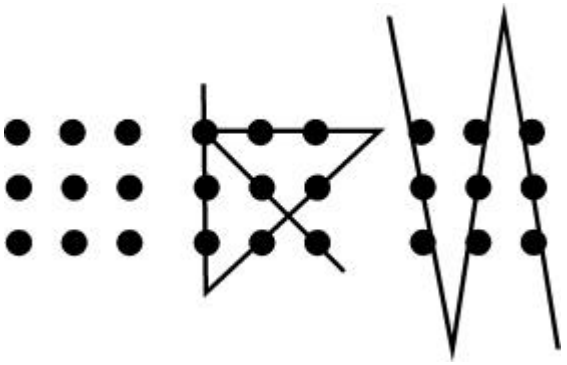

Figure 4 – nine dot problem and two solutions

Judicial thinking and "practicability"

With some creative effort at generating solutions to a safety problem, there will be a long list of potential ideas from which to choose: old ideas, new ideas, short-term solutions, long-term solutions, engineering controls, behavioral controls etc. How do we sort these out?

Firstly, *thoroughly* analyzing a large list will be very tiresome and wasteful of time. Instead, employ some "red hat thinking", as outlined in Edward de Bono's *Six Thinking Hats* text (1985). Red hat thinking is emotional thinking or 'gut feeling'. Use red hat thinking (gut feeling) as a crude filter to cut down your list to the best three or four options. The best solution might be so obvious that you don't need to go further. Trust your instinct.

For some more thorough analysis, the parameters are outlined by workplace safety laws. Risk control duties are usually governed by practicability. Although the definitions of practicability vary, they generally conform to common law principles of negligence (eg OHS Act 1985 (Vic) s 4). In short, 'practicability', can be defined by:

1. **severity** of hazard (risk)
2. **effectiveness** (which I prefer to suitability) of the solution
3. **cost** of the solution
   and one more that I think should be added
4. **other benefits and opportunities**

In addition to the first three parameters (that relate directly to solving the problem) it is important to include the fourth measure. This brings us to the point made at the beginning of this article. It was suggested that there are three reasons for solving safety problems (ethical/moral, legal/social, and financial). Because the law challenges us to 'control at source', to be creative, to think outside the square, then the outcomes of such thinking have the potential to create value, not just solve problems. The key here is to look for synergies, opportunities, and other benefits.

Summary of the three steps

The steps above are summed up in Table 2.

Table 2 Three Steps for Better Creative Thinking

Step 1 – proactive thinking

Finding and prioritising problems	• Go looking for trouble • Problems that land on your desk are often 'urgent', but are they the 'important' problems? • Classify efforts in safety as urgent/not urgent and imports/not important. • Use Covey's matrix to direct efforts toward the high-leverage, 'important-not urgent' quadrant

Step 2 – divergent thinking

(a) check the boundaries	• What are the boundaries of the problem? • What are the assumptions? • What parameters are limiting the way we are thinking? • If you are having trouble doing this, try listing one or two solutions that have been around for a while but have never really been suitable. Think, "what assumptions are inherent in these solutions?" • List the boundaries/assumptions of the problem.
(b) test the boundaries	• Are the boundaries real? Overcoming an assumed boundary shifts the paradigm and opens a path to the solution. • One by one take the boundaries listed above and ask "why do we do this?", "what is this really for?" • Remember that "just because" is not a satisfactory answer. • The "habit gravity" will be difficult to break. Be persistent and insist on answers. • Be prepared to capture solutions at this stage. Make it someone's job. Some of the solutions will fall out as you are working on challenging the boundaries. Grab these ideas. • Keep asking why? why? why?
(c) brainstorm	• Set some big goals • Cast the net wide • You will already have some ideas from above but it's often productive to spend some time focussed on new ideas. Remember you need to stop and be focussed to get out of the rut • Go for a range of ideas, from short-term to long-term, etc • Sort out the fish, bottles and seaweed later

Step 3 – judicial thinking

Decisions and plans	• Use the 'red hat' filter if there are many options • Think about effectiveness (in terms of the magnitude of the existing risk) • Think about cost • Think about synergies – what other benefits does this have? • Think about solutions over time – short-term, long-term

Conclusion – the fat line

'Engineering out' safety problems is a great idea. However, 'thinking out' safety problems might be a more appropriate term as it is more liberating and has a more creative connotation. Reconsider the nine dot problem. A child wrote to James Adams after he posed the problem in his 1986 book. The young boy said he'd done it in one line. He wrote: "you didn't say I couldn't use a fat line!" (Figure 5).

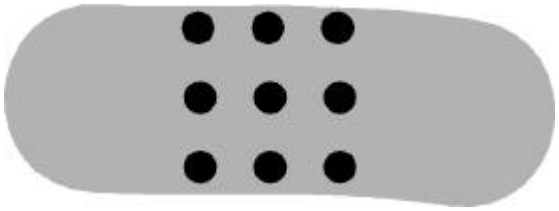

Figure 5 The Fat Line Solution

A great deal of safety improvements are locked *inside* current paradigms: engineering, administrative rules and procedures, personal protective equipment and so on can all fall into this category. Low-order controls best exemplify 'inside the square' thinking. Innovative thinking means searching for a new paradigm for an old problem. Safety will continue to be a burden, continue to be something to 'pay for', unless creative solutions are sought. Australian legislation doesn't lock us in to prescriptive solutions. It challenges us to examine what we do. It causes us to reflect. It demands creative thinking that can lead to a shift from a preventative way of thinking to an innovative way of thinking.

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