

THIRD GENERATION SAFETY: THE MISSING PIECE

Engaging the subconscious mind
to enable personal safety



Cristian Sylvestre

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Using neuroscience to enable personal safety

Cristian Sylvestre

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DEDICATION

To Dad:

For teaching me about generosity and a sense of family.

To Mum:

Thank you for always being there.

To Joadi, Neryse and Ethan:

For giving me purpose, love and laughs.

About the author

Cristian Sylvestre is a chemical engineer with a masters degree in environmental studies from Sydney University. He has worked in the health, safety and environment industry for 25 years, including 10 years with Shell.

His insatiable curiosity across diverse subjects colours his work as he connects ideas and insights from neuroscience, behavioural economics, technology and evolutionary biology.

Cristian is the founder of HabitSafe, a safety consultancy that uses the latest neuroscience and behavioural research to help organisations reduce incidents by targeting inattention and focussing on people's personal safety skills and habits.

He is engaged by organisations to improve their safety performance. For the past decade, he has helped organisations to:

- determine whether first-, second- or third-generation safety thinking dominates their safety culture
- identify barriers to evolving safety thinking, and
- assist leaders in removing the barriers to improve safety performance.

Cristian is also the Managing Director of SafeStart (ANZ), a third-generation safety consultancy that has been implementing the SafeStart program in Australia and New Zealand for over 10 years. SafeStart (ANZ) is the local representative of SafeStart International, a network involving over 100 professionals certified to provide third-generation safety consultancy services around the world.

Cristian's experiences in rolling out the SafeStart program to over 30,000 people in Australia and New Zealand have enabled him to evolve the program to maximise worker engagement, involvement and take-up.

His experiences have developed expertise in advising clients on strategic safety issues, and providing implementation assistance for the roll out of third-generation safety programs.

Cristian lives and works in Sydney, Australia.

Glossary

Accident: An undesirable event that occurs unintentionally and usually results in harm, injury, damage, or loss.

Adenosine: An inhibitory neurotransmitter in the brain linked with fatigue and sleep.

Cognitive Boundaries: The inherent limitations of the neural systems in the brain that result in inattention.

Complacency: A state of mind characterised by the misalignment of the conscious and subconscious mind resulting in autopilot behaviour.

Conscious Mind: The totality of mental processes of which the individual is aware.

Cortisol: An adrenal hormone that influences, regulates and modulates the changes that occur in the body in response to stress.

Dopamine: A neurotransmitter in the brain linked to motor control, addiction and reward.

Fatigue: A state of mind characterised by a decrease in cognitive or physical performance resulting from prolonged periods of cognitive or physical activity.

First Generation Safety: Thinking about safety in terms of workplace hazards and worker knowledge.

Frustration: A state of mind characterised by focussing on what is causing the frustration.

Functional Magnetic Resonance Imaging (fMRI): A neuroimaging technique that detects brain activity by measuring blood flow in the brain.

Glial Cell: Specialised cells in the brain that provide nutrients and oxygen to neurons and remove waste.

Glymphatic System: A functional clearance pathway that uses glial cells to remove brain wastes (adenosine) during sleep.

Hazard: Anything that can cause harm, not necessarily considered dangerous.

Incident: An undesirable event that could have resulted in harm, injury, damage, or loss.

Line-of-fire: Anything that can hit us when it moves or get in our way when we move.

Neurobiology: The biological aspects of the brain.

Neurochemical: See definition of neurotransmitter.

Neuroscience: The scientific disciplines that deal with the structure, configuration, development, function, chemistry, pharmacology and pathology of the nervous system, including the brain.

Neurotransmitter: A chemical substance that effects the transfer of an electrical impulse to another nerve fibre, a muscle fibre, or some other structure.

Noradrenaline: A neurotransmitter in the brain linked with alertness arousal and being ready for action.

Pattern Library: The term used in this book for the suite of skills and habits that people have established from repeated experiences during their life.

Personal Safety: The absence of harm, injury, damage or loss to an individual

Plasticity: The brain's ability to adapt by creating new or modifying existing neural connections.

Process Safety: The absence of harm, injury, damage or loss in the process industry, for example in the chemical industry (prevention of fires, explosions and accidental chemical releases).

Rushing: A state of mind characterised by doing things faster than normal or doing more than one thing at a time.

Safety Management System: A systematic approach to managing safety, including the necessary organisational structures, accountability, policies and procedures.

Second Generation Safety: Thinking about safety in terms of active conscious decisions or deliberate choices people make.

Subconscious Mind: The totality of mental processes of which the individual is superficially aware but not in full control.

Take-5: A process of hazard identification, risk assessment and control implementation carried out prior to a task commencing.

Testosterone: A male sex hormone linked to increased focus and aggression.

Third Generation Safety: Thinking about safety in terms of subconscious processes that build skills and habits.

Transcranial Magnetic Stimulation (TMS): A non-invasive technique used to stimulate or inhibit brain activity using a magnetic pulse to induce small electric currents in neural tissue.

Unconscious Mind: The deep mental processes of which the individual is totally aware.

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Executive summary

Why do workplaces still have so many injuries and safety incidents even though most organisations are investing substantially in safety? That's the key question I ask and seek to answer in this book.

To date, most organisations have approached personal safety in two ways.

First-generation safety focuses on the physical environment of the workplace or an individual's knowledge and understanding of hazards, risks and controls. It is concerned with compliance.

Second-generation safety focuses on the conscious decisions people make, or how well they keep safety front-of-mind. It is concerned with the deliberate choices that people make.

Approaching safety in these two ways has merit; they are part of the overall solution but are not enough to prevent many injuries and safety incidents, even serious ones. More of the same is not going to get us much further.

What is missing?

I propose a different way to think about personal safety. What I call third-generation safety focuses on subconscious processes and how the back-of-mind functions of the brain affect most of what we do.

Neuroscientists estimates that some 95 per cent of what we do is subconscious. In other words, almost all of our actions, even high-risk tasks performed repeatedly, are done in autopilot to some degree. We are conscious of what we are doing, but we are not necessarily making active conscious decisions about each step. This statement is not founded on modern day psychology; it is derived from the neurobiology that has resulted from human evolution.

The latest neuroscientific and behavioural research explains the large role played by inattention (such as mistakes, distraction and human error) in injuries and safety incidents. This happens when people are not looking at or thinking about what they are doing.

Research has revealed that 95 per cent of inattention is caused by one or more of these four states: rushing, frustration, fatigue and complacency. The typical result is contact with a line-of-fire hazard, a loss of balance, traction or grip, or we exceed our physical capacity.

The solution is not merely a matter of training people on how our brain works.

Rather, we need to learn how to manage our subconscious processes to help people become habitually safer. It's important to remember that we are creatures of habit.

If people can become aware of and understand (without blame or fault) how inattention comes about and how it can be minimised, they become more engaged and begin to change their awareness and behaviour. This has benefits for first- and second-generation safety, as people comply more and make safer conscious decisions, contributing to a positive safety culture. Third-generation safety also contributes in other business performance areas such as improving productivity and quality, and reducing equipment damage.

Interestingly, although third-generation safety naturally resides in the subconscious minds of individuals, whether it succeeds or not depends largely on how well managers lead the changes associated with its implementation. Because people are social creatures, the leaders in an organisation are the ones who can enable or disable the process of improving personal safety in this way.

When an organisation's leaders understand how to engage the workforce in third-generation safety, they can achieve significantly improved safety performance, with fewer injuries and safety incidents.

Prefaces

Meeting our greatest business challenge

This book is a breakthrough. It can help us to move beyond the safety performance plateau that many organisations have reached and further reduce the incidents and injuries that are still happening.

Over 44 years, I have fostered safety at work, beginning in 1973 as a shift foreman supervising 10 employees in a plasterboard plant in New York.

In 2017, as the CEO of Boral, a multinational company responsible for the safety of some 20,000 employees, joint venturers and permanent contractors, I still face the challenge of continually improving safety.

In the industrial world, we make progress in safety, only to experience the seemingly intractable injuries or near-misses that regularly recur. Safety incidents happen despite our best efforts: we engineer hazards out of our activities; we educate and train our employees and contractors around safe behaviour and processes; and we seek to establish a highly vigilant safety culture in which everyone looks out for each other.

We target safety but the problem remains

Even after all the diligent efforts we make, safety remains our greatest business challenge.

Industry has matured significantly in the practice of industrial safety. Incidents, injuries and work-related illnesses have been declining for decades in the industrialised world, largely because of worldwide advances in safety culture. However, much more progress is required, and expected. Our present hiatus in safety suggests that we have been missing vital information and insights into human behaviour.

The task before us is a moral obligation as well as a business imperative. Improving safety leadership, better management of safety systems and more education and training of workers exposed to hazards helps the ones most at risk to be more involved and to take control for industrial safety systems and for their own safety.

Third-generation safety: the missing piece

As we keep progressing on your journey towards zero harm at work, this book

gives us a methodology based on neuroscience to involve the subconscious mind by first understanding more about how the human brain works. Cristian shows us in his book how the mind perceives risk and danger; how it can deceive us in interpreting important data inputs; and, crucially, how we can embed new patterns to more effectively build helpful personal safety habits in the long term.

Along the way, Cristian explains how we can more fully involve the workforce in what must become a self-directed effort to ensure a sustainable safety culture.

Cristian's book is comprehensive yet easily translatable to any industry context. Without giving away too much, let me end this preface with an example from my life. You will find a similar story in the book and you will probably have experienced such a situation many times in your life.

***I get in my car, preoccupied with many thoughts,
turn on the radio, and start driving.
After 20 minutes, I look up and am pulling into my driveway.
I have scant recollection of the drive home.***

Imagine you are a teenager, learning how to drive, hands gripped to the wheel as you master highway driving, three-point turns or parallel parking. Could you ever think that someday you might drive such a distance without incident and not recall what you saw and did on the way?

Knowledge and tools that can keep us safer

Third-generation safety provides the understanding that we have needed for decades. It enables us to better meet our obligations to family, friends and colleagues.

Without this knowledge and these tools, we can injure ourselves, risk the health and safety of others and never understand the process that set such tragedies in motion.

I recommend that you use the valuable advice in Cristian's book to help you stay safe at work and beyond.

Michael P Kane.
CEO and Managing Director.
Boral Limited, Sydney, Australia.
March 2017.

The essence of safety

This book and Cristian's insights go to the essence of safety. You will not find a better or more easily understood pathway to improve not only your organisation's safety, but your own personal safety as well.

Understanding how safety thinking has evolved through the years is important in realising where your organisation has come from and what is truly necessary to make positive breakthroughs in safety culture.

If you are looking for the next step change in safety performance, this book is absolutely relevant for you. Third-generation safety helps you understand how one of the four states (rushing, frustration, fatigue and complacency) could lead you to make one of the critical errors (inattention leading to personal safety outcomes). It is for everyone, from the rank and file to the CEO.

Third-generation safety has fundamentally changed our platform at Peabody Energy and has personally taken me on a safety journey both at work and just as importantly at home.

George Schuller.
President – Australia.
Peabody Energy, Brisbane, Australia.
March 2017.

Introduction.

The goal of this book
is to improve personal safety



***“There are only two mistakes one can make on the road to truth:
not going all the way and not starting”***

Attributed to the Buddha.

The missing factor that will improve personal safety

I've always been interested in solving mysteries.

A mystery is something that remains unexplained or unknown. The information needed to solve it might exist but we have not been able to see the solution.

I was encouraged to enter the safety field some 25 years ago, while I was working as an environmental engineer for an oil refinery. I remember becoming interested in the prevention of incidents at work. I had studied chemical engineering and had a background in process safety, but soon realised that it was not for me.

I turned my attention to personal safety, which my workplace was struggling to come to grips with at the time.

The site where I worked was diligent about safety; most of what we did is standard these days but was not common in the 1990s. My workplace had an externally certified Safety Management System that included Take-5s (mini risk assessments) for non-routine tasks and "Walk and Talk" interactions (a management-to-worker and then peer-to-peer observation process). These tools, however, didn't stop the site from having the worst personal safety record (measured by TRIFR, the Total Recordable Injury Frequency Rate) among Shell Oil refineries around the world at the time.

The conventional safety approach is not enough

My first thought was "We can't be doing it right". Worse, I assumed that we must be doing a lot wrong, so I checked with other industries and organisations and benchmarked our activities against comparable approaches. I found that we were doing what other reputable organisations were doing, and doing it well.

This didn't add up. We had a poor safety record, yet we compared well with other businesses on our safety management practices. At this point, I had to reluctantly consider that we just might be missing something.

Personal safety had always seemed to me to be in a black box, an unknown quantity. It lacked the complete resolution that had been present in everything else I had done professionally up to that point. For example, I noticed that the investigations conducted after personal safety incidents often returned one or more of the following three causes:

- an unidentified hazard people had managed to work around for years
- a deficiency in the Safety Management System: something to be updated;

more information to be added; more training to be provided, or

- a clown doing what clowns do.

Not surprisingly, the corrective actions typically entailed fixing the hazard, improving the system or firing the clown.

The people conducting the investigations always had the best of intentions. They wanted to find the causes and prevent a recurrence, but they conducted the investigation with a predetermined expectation of what the causes were. In other words, they found only what they were looking for. This has led to the tunnel vision that has, in my view, restricted safety thinking for decades.

Let's be clear about what we mean by personal safety

When I started researching personal safety in the late 1990s, I found that most organisations made no real distinction between process safety and personal safety. Safety, it seemed, was just safety. These days the distinction is well understood and organisations that do not deal separately with these two do so at their peril.

My research revealed that there were several approaches that could be applied to personal safety, including one or more disciplines such as engineering, management system theory and social science. Given that each approach resulted in some improvement, safety practitioners promptly concluded that the best approach was to use aspects of all these approaches. Keeping people safe, they argued, was complicated.

I don't subscribe to that view of the world. It's not that everything is simple, but so often something looks complicated only because it's not well understood. Look at so much of what we do in our daily lives, from driving a car to conducting a bank transaction: they look difficult at first, until we understand them; after that we realise that we can readily do these things.

Our first step must be to seek understanding

This is my founding proposition: Complexity is just a sign that we don't understand something well enough.

I sought to understand personal safety better in order to make it easily accessible. The best starting point was to look at possible causes not yet identified for personal safety incidents.

I started by reviewing personal safety incidents at work and away from work. The

first thing I noticed was that the causes commonly identified depended greatly on where the incidents took place.

At work, the causes were a hazard, the system or a clown.

On the road, incidents happened because of the state of the road, the safety features of the car, incompetent or negligent drivers (always other people), inadequate traffic rules or a lack of signage.

At home, disaster struck when someone failed to exercise common sense.

This analysis was an eye-opener. Often, exactly the same incident would occur in all three places, such as a collision caused by turning without looking, yet the events would be assigned different causes. I really struggled with this.

An example from personal experience: At around the time I was doing this research, a friend fell awkwardly on a flight of stairs at work. His injuries were minor but they could have been worse. The employer, being diligent, responded by setting up a committee that met many times and implemented these corrective actions:

- All stairs were to conform to the latest Australian Standard, in the size of steps and through the installation of such precautions as non-slip strips on the edge of each step and handrails on both sides of the stairs.
- Signs were to be placed on the stairs and at all the entrances to remind people using the stairs to hold the handrails and to refrain from carrying hot drinks, talking with companions or using their mobile phones.
- Once a year, everyone was to complete a computer-based training package on stair safety.

Analysing injuries that happen at work or at home

A few months later, the same friend fell down the stairs at his home while I was visiting him. He sustained minor injuries that could have been worse. I pointed out how lucky he was that his employer had already determined what was required. All he needed to do was implement the same corrective actions at home. I even asked him whether he was going to make me do the stair safety training next time I came over for dinner. He laughed; it was all very funny; but he had no intention of implementing anything like that at home. As with most people, my friend saw the two incidents as distinct from each other; I saw them as identical.

My friend and I had known each other for more than 20 years. He was working

as the vice-president of human resources at one of the big mining companies at the time, so I can say without doubt that he is a very intelligent guy. Why did he see the two incidents so differently?

The answer, as far as I can see, is that we learn to interpret our experiences based on where they happen. Safety is no different. It's as if we've been conditioned to believe that safety at work is the responsibility of the employer, the manager, the supervisor or another person; but away from work, we focus more on our own role in causing the incident (which later in this book I call the self-perspective).

This gave me the critical insight I needed. I started reviewing all personal safety incidents at work as if they had happened elsewhere. I asked the injured workers to think about the causes of their injury and about possible corrective actions imagining the injury happened away from work. I was looking for all the causal factors, not just the ones in common use with investigations at work. What almost all injured workers told me was that inattention at the time of the incident was a significant causal factor. What they meant was the same, even though some of the injured workers used various terms for inattention, such as "not focusing", "lack of concentration", "pre-occupied thoughts", "oversight", "mistake", "mindlessness", "lack of awareness" or "distraction".

This caused a fundamental shift in my thinking. I realised the extent to which paying attention in the moment helped us avoid injury. My area of interest quickly became: "What can we do about inattention?"

Finding a solution turned out to be harder than I expected.

Increasing awareness of subconscious processes

Searching for contemporary tools to help with inattention was not a particularly fruitful exercise. I couldn't find anything, other than well-meaning suggestions by safety practitioners to direct workers to "be more careful" or "pay more attention". Although the safety practitioners and the world at large appeared to acknowledge that inattention was a common causal factor in many incidents, everyone just assumed that there was nothing we could do about it or we could just compensate for it with systems. I was told numerous times: "Some people are more accident-prone than others – that's just the way it is."

This belief proved to be a bit of a roadblock. People don't like to focus on things they can't do anything about; it feels like a waste of time. So, although inattention is a substantial problem and everyone acknowledges it, people focused on what they believed they could solve.

In the early 2000s, the standard approach to improving safety was to eliminate the hazard, fix the system or dismiss the clown. These days the approach also includes seeking to influence other people's conscious decisions. These approaches have merit, of course, but the underlying problem remains: they do nothing to help us understand inattention, so they can't help us deal effectively with that vital aspect of keeping people safe.

The most important thing I have learned over my career of working in personal safety is that when people are involved in an incident, the key causal factor was usually their state of mind, and their subsequent inattention at the moment when it happened.

Neuroscience, still in its infancy, is starting to unravel how our brain works. This field of study is providing us with the understanding that we need to design methodologies and programs that deal with inattention more effectively. The results we achieve by these means will reflect our ability to interact well with an individual's subconscious mind.

That's what I've been doing for the past 10 years. I find this study so fascinating that it's my professional priority these days, and that's where this book comes from.

In a nutshell, this book's aim is to explain people's behaviour in the moment, and how it affects their personal safety. In part, I want to explore and challenge conventional thinking. Throughout the book, I hope to show that in order to improve safety performance substantially, we first need to enable personal safety by engaging the subconscious mind. To do this requires a fundamental shift in how we think about safety; without such a change, we can only hope to improve incrementally.

The lessons presented in this book can be applied at work and at home; even more importantly, they can help reduce the annual road toll from 1200 deaths in Australia and 300 in New Zealand.

As you read this book, you will get a different perspective on personal safety. We know that doing more of the same will not improve safety substantially and that many preventable injuries will continue to occur. We need to change our approach.

I hope this book helps you to challenge your perspective on personal safety and enables you, the people you influence, and especially those you care most about, to avoid being injured.

Section I.

Providing the context:
the landscape of personal safety



***“You can’t tell where you are going
unless you know where you have been”***

Old adage.

Chapter 1

How people are injured

In this chapter, we go back to basics to understand what causes personal safety incidents. We see that they involve something unexpected happening when a person or a hazard is moving, or both are moving, and the two make contact.

The big question is, how much control do we have over such an event?

Examining how accidents happen

Consider these three scenarios:

- You're walking through a shopping centre and slip on a wet floor, twisting your ankle on the way down.
- A haul truck driver in an open-cut mine backs into a nearby maintenance vehicle, crushing its left side.
- On a commercial building site, a construction worker carrying a steel beam collides with another worker who just walked out from behind a wall.

We can be injured in so many ways. We call it bad luck, but our investigations into the real causes of injury reveal an amazingly simple and easy-to-understand pattern. Through research, we have found that this simple pattern explains more than 95 per cent of personal safety injuries in the workplace and everywhere that injuries happen.

But first I need to provide some context.

In this book, I show how current safety thinking has been useful but has stopped short of preventing many injuries. I look more deeply into recent findings about how the brain works so that we can understand why current safety thinking has had limited effect. The rest of the book then develops our model and shows how it can be used to avert up to 95 per cent of personal safety injuries.

To begin with, in this first chapter we will go back to basics to understand how and why people are injured. By doing this, we can remove many of the barriers and assumptions that we often make when trying to prevent incidents and clear the way to manage personal safety better.

The aim, of course, is to advance our organisations, and hopefully our broader lives, towards preventing harm.

Back to basics: how do injuries happen?

At its most basic level, at least three elements are required to cause an injury: a person, a hazard (that is, something that has the potential to cause harm), and contact between them.

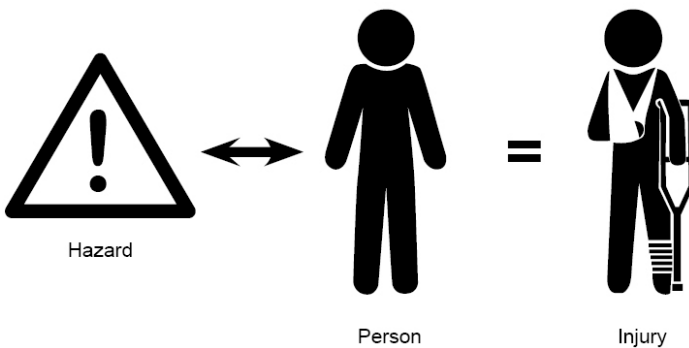


Figure 1A – Injury causation model for personal safety.

Most personal safety injuries occur when a person comes into contact with a hazard. But why do they come into contact?

Movement is usually present

If nothing in the universe moved, few people would be hurt (of course nothing else would happen either, such as work or recreational activities, so it's a fair trade-off). To complete the model, either the hazard, or the person, or both, need to be moving. We can be injured in many ways, for example when we run into things, when we are hit by things, when objects fall on us, or when we move a hand into the path of a sharp object and are cut.

Sometimes the movement is not obvious, as when dealing with electricity, gas or radiation. We can't see the movement but we still contact a substance or energy that can cause harm. This is a simple principle, but it provides an important clue to managing personal safety.

The hazard side of the interaction

Most people have a preconception of what a hazard is, based on the safety training they have received, but unfortunately this preconception is too

restrictive for personal safety, as explained below.

When workers in training programs give examples of hazards, they typically cite the most common. The examples are grouped according to their dangerous (potential harm-causing) characteristics. Examples of hazards include hard or sharp objects, slippery surfaces or forms of energy (mechanical, chemical, electrical or radioactive). These are hazards, but people can be injured in many other ways.

Here's an interesting example. Ken walks out of his manager's office holding a two-page document. He looks worried. While walking back to his desk he starts reading the document, and as he reads his frown intensifies. Half-way down the hall, he walks into a partition that has been there for three years, breaking his glasses and bruising his cheek.

In this example, it was Ken's unexpected contact with a hard object while he was moving that led to the injury. Let's leave aside (for the moment) questions about why Ken was walking without looking, and simply ask "What is the hazard?".

Clearly, the partition was the hard object that hurt Ken when he hit it. In this interaction, the partition was the hazard.

This often causes people some confusion, because in everyday language we wouldn't describe such a partition as a hazard. After all, the partition was meant to be there; it hadn't been moved; and it conformed to relevant standards. There was nothing dangerous about the partition.

We must remember, though, a hazard is not necessarily something that we recognise as dangerous, but rather anything that can potentially harm a person that makes contact with it.

In this sense, just about anything around us can be a hazard if we don't see it. We could ask, for instance:

- If someone turns and hits an open door, is the door a hazard?
- If someone drives into a parked car (which happens daily in most countries), is the parked car a hazard?
- If someone trips on the gutter as they cross the road, is the gutter a hazard?

This separation of the concept of a hazard from the idea of something being necessarily dangerous is important to grasp in order to understand the personal safety risks we are analysing. Just to be clear, we're not suggesting that partitions, doors, parked cars or gutters be treated in the same way as overtly dangerous

hazards such as flammable gas or an electric socket. We could not eliminate ordinary objects: they are part of the world we live in.

Most hazards, dangerous and every day, can be avoided if seen or thought about.

Of course, there are some invisible hazards (such as electricity and poisonous gas) that can be avoided only if people are aware of them. In these instances, specific training educates workers on how to avoid contact (for example, confined space training and isolation procedure training).

The people side of the interaction

It is now time we looked at what if anything the person is doing at the moment when they contact a hazard to cause this to happen.

Safety incidents result in more than just trauma; there is also the stigma of blame or fault, and many other emotions that can cloud important issues and leave vital discussion topics off limits.

The first thing we need to do is remove blame from any of our discussions. When we talk about what a person is doing when they contact a hazard, we are not suggesting that they are necessarily doing anything wrong. On the contrary, a major theme of this book is the role of simple inattention (unintentional mistakes) in causing injuries, rather than any deliberate wrongdoing or a specific unsafe choice that a person makes.

We have found with our blame-free approach, where we focus on the simple inattention that are common to all of us, people become much more willing to engage in discussion, and help us find a solution that prevents recurrence of similar incidents. That's a win for everyone.

How someone makes contact with a hazard

We have seen first that movement is an almost universal factor in people getting hurt; and second that movement is around us all the time, although injuries are rare.

Movement is not the only factor. From our discussions with people and countless incident investigations, a common theme emerged that, in hindsight, was almost too obvious to see: people come into contact with a hazard because something unexpected happened.

This allows for a far deeper understanding of incidents. We know that sometimes things do go wrong. For example, we know sometimes tools break, or people drive through red lights, or traffic stops without warning. But we weren't expecting them to happen at that moment. If we did, we would have been on

the lookout for it and could have avoided the incident.

We say something is unexpected when it is not *immediately* anticipated, even if we should have known better.

In other words, if you are aware that the car in front might stop suddenly and you look out for it, you have a much better chance of avoiding contact with the car should it do that. You're not necessarily thinking that it will happen; you know that it probably won't happen, but you're aware that it might happen.

In Section IV, I outline several methods that can help you to anticipate possible, though unexpected, events. Anticipation is vital in avoiding injuries and safety incidents.

Here's a common example. You're cooking in your own kitchen, trying to get dinner ready on time, when without a heatproof cloth or gloves, you grab a baking dish you had just taken out of the oven, burning your hand. The difference between this incident and incidents such as a tool breaking, someone driving through a red light, and traffic stopping without warning is that you were completely in control of what you did with the hot dish.

Can we say the burn injury was unexpected? First, you knew the dish was hot because you just took it out of the oven. If you had thought about how hot the dish would be just before you touched it, you would have handled it differently. But at that moment you were thinking only about moving the dish. Even though you had all the information you needed to avoid being burned, you weren't thinking about the dish being hot, and so you weren't expecting to be burned when you touched it. That's why you felt such a shock when you grabbed it and burned yourself. The common statement in these situations is, "I just didn't think".

What does someone mean when they say they were not thinking? They mean that they didn't anticipate a problem; they believed things would proceed easily and without incident as they usually do. It's not that they were not thinking but rather they were thinking about something else instead of anticipating a potential injury.

The big question: how much control do we have?

One way of looking at injuries and the role of the unexpected is to consider the amount of control we have over the situation when it happens. After all, the injured person is always present at the incident.

Sometimes people can be injured in a situation that is completely out of their control. This might include:

- being caught up in catastrophic events such as explosions, cyclones or earthquakes
- faulty equipment, as when brakes fail on a car, a hose or coupling malfunctions, or a platform collapses, or
- another person's actions over which you have limited or no control, for example when you're a passenger in a car that crashes

At other times, people can be injured when they have at least some control over the situation; in other words, when we could have prevented the incident. Notice that I'm not using words like "fault", "blame" or "cause". The only relevant concept here is control: to what extent could they have prevented the incident and the resulting harm.

Although we always look retrospectively at safety incidents to work out what we could have done differently, it is important to appreciate that incidents only happen in the moment, which is therefore the best time to prevent them.

It is always helpful to identify hazards, risks and controls before starting a task or activity, but whether we prevent an incident depends largely on what we are paying attention to in the moment, and how much attention we are paying.

As a final step for this chapter, try this exercise to get an idea of how you are thinking about your own experiences. In a later chapter, we will return to this exercise and refine the numbers, but for now, an intuitive answer is all you need.

Exercise: Look back over all the safety incidents you've had in your life (whether they have caused injuries or not), including those at home, at work, on the road, on holidays, at a friend's house, out shopping or anywhere else. Include injuries such as broken bones, burns, sprains and stitches, all the way down to minor cuts, bumps and bruises. If you're like most people, you'll have accumulated too many to remember. That's okay, you don't need to remember and identify them. All you need to do is make an intuitive guess at the percentage of them that were under your control at least to some extent, and the percentage that were not. Remember to include things like banging your shin, stubbing your toe, cutting yourself with a knife – all the common injuries that happen to all of us.

The two percentages must add up to 100.

No control	At least some control
%	%

It will be interesting to see how your response to this question changes as you progress through this book.

I have been involved in safety training for thousands of people across Australia and New Zealand. The crucial insight that participants gain as they progress through our training is realising how much control they have over what happens to them. This is one of the most empowering perceptions you can have. Crucial to this understanding is the blindingly obvious: for all of your injuries large or small in every circumstance, there is one critical constant – you were there for each one.

Focusing on the hazard or on the person

With the model in mind of a hazard and a person coming into contact, it is easy to see the two basic and complementary ways to manage safety: we can focus on the hazard or on the person.

We're going to look at both in more detail in following chapters.

Chapter 2

First-generation safety

In this chapter, I review the first attempts to create a safer workplace. Those efforts sought to eliminate the hazards with the highest risks as well as providing controls, training and communication for workers to avert the remaining hazards. This is what I've called first-generation safety.

This early approach has hugely improved workplace safety by preventing many injuries, but for good reasons that we'll look into, has not prevented all injuries.

A friend of mine, a retired coal miner, told me how he arrived at one of his early career decisions in the 1960s. His first job out of high school was in the warehouse of a large paper wholesale and distribution firm, from where he would deliver paper products to printing companies. He got to know the leading hand in one of the larger print shops, who would show him some of the magic that printers perform in their daily work. Often, he would see the plain white paper he carried around all day being transformed into super-colourful posters for a travelling circus, or subtly suggesting the allure of the latest imported perfume on the back cover of a glossy magazine.

Soon he had his heart set on an apprenticeship in the printing trade. He could apply early in the following year.

As he got to know the leading hand better, he finally felt comfortable enough to ask him how he lost three fingers – the first two on his left hand, and the index finger on his right. He had been curious for some time to know what sort of incident would result in losing fingers in such an unusual pattern, especially because there didn't seem to be much damage anywhere else on his hand. The answer changed the course of my friend's career.

The leading hand told my friend that he had suffered three separate injuries on a single offset machine at the same site, within five years. But the biggest surprise was that the leading hand saw nothing unusual in any of this; in his words: "When you're a printer, it's part of the job". This was a common attitude in those early days.

Many older workers I've met have no recollection of safety at work being part of

the general workplace conversation until the 1980s. There was basic workplace legislation in place before that time, largely founded on the British model of highly prescriptive standards for a small range of specific workplace hazards. The dominant thinking at the time did not include involvement of workers, owners or trade unions in safety matters.

Safety was seen as a legislative and regulatory burden that applied only to a set of well defined, factory-based, physical hazards.

Indeed, workers who were around before the 1980s remember the prevailing attitude that factories, mines and construction sites were simply dangerous places, that a worker had to “be careful”, and that high incident rates, even for serious injuries, were not seen as unusual. In some industries, there was even the practice of paying “danger money”, whereby a worker was entitled to claim an allowance for undertaking risky activities or being in their vicinity.

The effects of the Robens Report from 1972

A turning point in approach spread very quickly from England to Australia and New Zealand following the release of the Robens Report¹, the result of an extensive committee review of workplace health and safety in 1972. Two fundamental recommendations were to:

- consolidate all workplace safety legislation into one umbrella statute, containing the power to prosecute organisations as well as their officers, and
- create organisational processes to enable workers and managers to be involved actively in managing safety.

The first Australian State to enact legislation based on these recommendations was South Australia, in 1972. All States and Territories have enacted and often refined their legislation beyond the original Robens recommendations.

Implementing a new emphasis on hazards

Through the late 1970s and into the 1980s, larger organisations began addressing workplace safety more diligently.

The first and most dramatic examples were the fitting of guards on machines, the most effective of which prevented the machine from operating when it detected any object within a certain boundary; this made it virtually impossible to trap a limb or finger.

I remember as a graduate engineer watching a demonstration in which an operator used a 200-tonne hydraulic press. He wasn't quite willing to place his

hand where the metal was going to be pressed (and I didn't blame him), but he placed all manner of objects within the detection radius and tried to pump the activation pedal, with no response from the press each time. Although it seems basic now, I remember thinking how remarkable this was. I wonder how my friend's early impression of the printing industry would have been different if this technology had been common back then.

Interestingly, this technology had been available for some time, but there had never been any imperative for most organisations to invest in applying it.

During this time an explosion of articles and research in hazard reduction made safety a more prominent part of an apprentice's training, and larger organisations began employing full-time safety practitioners. These early efforts to manage safety by focusing on the hazards bore immediate results.

First-generation safety seeks to eliminate hazards

The following graph² is from the UK (limited data was collected in Australia and New Zealand in the 1970s) where a parallel approach to safety management was under way.

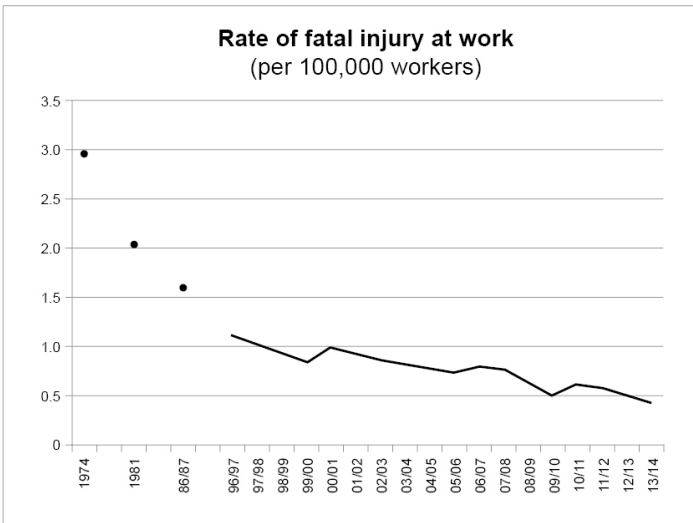


Figure 2A – Rate of fatal injury at work 1974-2015 (UK).

Before long, several methods were used to help the growing ranks of safety practitioners identify hazards and eliminate or minimise them. These methods were part of the increasingly popular Safety Management Systems approach.

Introducing Safety Management Systems

Imagine it is the mid-1970s and you are the manager of a factory. There have been several injuries to workers, some serious, over the past few years you've been employed there. Your boss is concerned and wants you to improve safety, so what do you do?

In the first instance, you realise that something must have caused the harm to the workers: that is, hazards. This is logical, because if there were no hazards then there would also be no injuries. Focusing on the hazards is a good place to start.

In the attempt to deal with workplace hazards, it quickly becomes apparent you won't be able to eliminate, substitute or engineer out every hazard that you find during the first week or month, or even a year. People realised that in a world of limited resources, some hazards were here to stay, at least for the short term. Managers therefore concentrated on the highest risks first; they calculated that over time they would cover all the risks.

But what do you do meanwhile about the hazards that remain? You inform workers about them so they can avoid contact. The reasoning is that if they know what could hurt them and what controls they need, they will do what is necessary to avoid getting hurt.

At small-to-medium-sized sites, safety could be managed reasonably well by using the two approaches informally: eliminating the greatest risks and informing workers of the remaining hazards.

However, at larger sites or in organisations with multiple sites, the informal approach did not always provide enough assurance to senior managers who were legally responsible for safety, so more robustness was needed. That was the start of the Safety Management System approach.

Managing safety systematically enabled organisations to detect deficiencies before incidents occurred. They could actively rectify the deficiencies so that incidents could be prevented at all sites.

First-generation safety was founded on two main cornerstones, as set out below.

Risk management: This progressively and systematically eliminates, substitutes or controls hazards in the workplace. The approach ensures the highest risks are tackled in order of priority.

Consultation: This keeps workers informed about the remaining hazards by providing instruction, inductions, training, competency assessment, effective

communication, procedures and guidelines.

Let's explore these two cornerstones a bit more deeply.

How risk management works in practice

The Swiss cheese model³ depicts possible lines of defence that prevent contact between a person and a hazard as slices of cheese. Each slice can be effective when implemented fully, but can also have holes, as in Swiss cheese, or deficiencies, depending on how well it is implemented.

For personal safety, this model can be adapted from its original use to show three types of controls that can help the person avoid contact with a hazard. These are outlined below:

Engineering controls: These are physical barriers that prevent contact with the hazard. Unless there is a malfunction or a deliberate attempt to circumvent the barrier, these controls are highly effective.

Administrative controls: These are procedures, rules or signage to help workers be aware of or remember the hazard and thus avoid contact.

Behavioural controls: These put the onus on the worker to act in a safe manner to avoid contact with the hazard. These controls include wearing personal protective equipment.

The Swiss cheese model is shown in the diagram below.

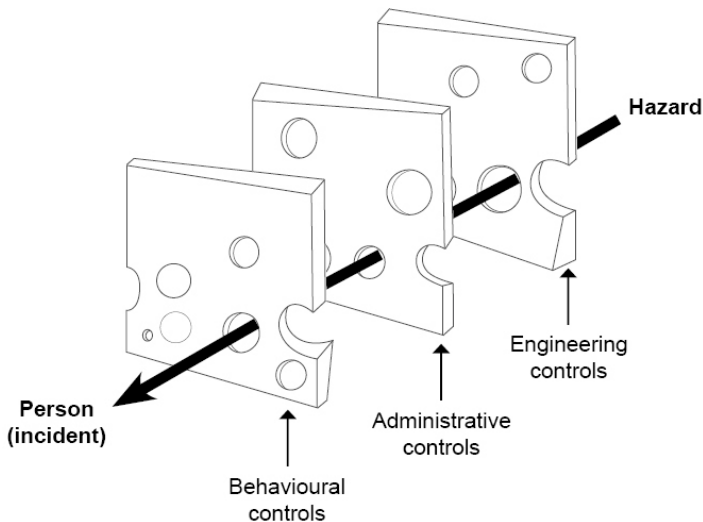


Figure 2B – Swiss cheese model for personal safety.

Incidents occur when the holes or deficiencies line up, allowing the person and the hazard to come into contact.

Because each control is less than perfect, organisations typically use more than one line of defence to minimise the chance of a safety incident occurring.

Engineering controls are less likely to be susceptible to human fallibility so are generally referred to as hard controls. Their effectiveness depends primarily on activities managed by the organisation, such as proper installation and suitable maintenance.

Administrative and behavioural controls are more susceptible to human fallibility and therefore less reliable; they are generally referred to as soft controls. Their effectiveness depends primarily on what a worker does in the moment (which can be influenced by many factors, including the organisation).

Investigations of workplace safety incidents show that two important questions are rarely asked:

- what caused the control deficiencies in the first place?
- when is each control most likely to fail?

Not asking these questions has resulted in corrective actions that can fail to address some causal factors. We will return to answer these two questions in Section III.

A big step: consultation

An important step forward in helping workers manage hazards was the introduction of communication, training and worker involvement processes.

Once workers know how to prevent contact with hazards through training, an important follow-up is to maximise communication to ensure there are no gaps. These typically include toolbox talks, safety briefings and committees, involving stakeholders, and safety bulletins or alerts.

Knowing about a hazard and how to prevent contact with it is a vital step in preventing injuries and safety incidents.

The limitations of first-generation safety

Implementation of first-generation safety is an essential first step. But more is needed. Injuries and safety incidents still happen even with the most comprehensive Safety Management System, and many organisations report marginal improvement in safety performance or none at all for their continued efforts in this area.

Below I propose a realistic review of the limitations of first-generation safety.

Once a hazard is eliminated we do not usually have to worry further about it. For remaining hazards, though, we equip workers with procedures, rules, signage and training in the belief that if they know what could hurt them and what controls to use, they will do what is necessary to avoid getting hurt. This is the premise of first-generation safety.

The main aim then becomes clarifying what workers should or should not do to avoid hazards and ensure their safety.

Providing clarity is fine but it results in a laser-like focus on compliance, an over-simplified view of safety in which a worker is safe (if compliant) or unsafe (if not compliant). This does not provide the complete solution.

Human nature can't be overcome by first-generation safety

Rules can mandate a safety harness, guards on tools or eye protection, but will workers comply with the rules? Some might refuse; others might generally comply but not for quick, simple jobs or when no-one is watching. This is clearly true of any controls that rely on individuals to implement.

It is certainly true that deliberate non-compliance (violations) can be a problem, but experience at our safety consultancy shows that most incidents involve habitual behaviour that leads to completely unintended consequences. Engineering controls can keep things from hitting people but it is difficult to keep people from bumping or running into things.

Whatever the reason, when people are involved, organisations need to do more than merely providing clarity on hazards, risks and controls.

Workers can be cynical about safety

Our experience over many years of conducting safety training is that among many workers there is a deep and abiding cynicism or resentment about the amount of training and paperwork organisations require for safety. Workers walk into our sessions and sit with arms folded; the more vocal ones protest in crude terms: "Not more safety crap!".

A familiar criticism is that with so many procedures, rules, signage and training people feel that their common sense has been discarded. Even worse, they believe that safety incidents are often caused by workers no longer feeling the need to think for themselves.

Whether this latter concern is valid (I suspect that it does have some merit), the fact that safety initiatives are now treated with such derision in some workplaces

is a real concern.

As long as safety initiatives are seen as more work rather than safer work, improving safety performance will be difficult. This stems from the view outlined above, that people are safe or unsafe based on their compliance status. We often see the all-or-nothing language in safety helping to feed that myth.

Black-and-white thinking, that you are either safe or unsafe, together with its most common use in disciplinary action, has resulted in the word “safe” becoming a de-facto replacement for the word “compliance”.

Many workers believe that approaching safety in this manner is more about managing potential liabilities for the company than anything to do with their personal safety. Although I suspect this is not the intention of management, this interpretation, even if only by a few, is not helpful.

Knowing about hazards might not be enough

Interestingly, the corrective actions following incident investigations based on first-generation safety typically include adding, extending or improving:

- induction, training or competency assessments
- procedures, rules and signage
- communication or worker involvement, or
- counselling, whereby a worker is asked to be more careful or pay more attention.

In the course of conducting numerous incident investigations at workplaces, we realised not knowing about a hazard or not knowing how to avoid contact with a hazard was not a common causal factor. Actually, it's rare. During interviews with many workers who had a workplace injury we asked them whether they knew about the hazard and how to avoid contact with it. Almost all said “yes” and their safety training records confirmed it.

This is where we make a welcome return to common sense. We know that we can trip on stairs, that the barbeque is hot and the knife sharp, yet we are often injured by these hazards. In our training, when we suggest that people tend to be injured by things they understand fully, there is universal agreement among the participants.

Why are we injured by hazards we already know about?

We know that almost all incidents take place when the person is moving or there is something that can cause harm moving around them. Rushing or inattention

can produce failure to notice something that they knew was there. This is not deliberate; it is likely to be an automatic response to a situation they have experienced previously, probably many times before, without any resulting harm.

People can easily contact a hazard anywhere, including the workplace. These incidents are completely preventable, but they do need more advanced methods than a Safety Management System can offer. These advanced controls, which are also less costly than a Safety Management System, I will cover in detail in Section IV. For now, I hope I have established that clarity about hazards, risks and controls is not enough to prevent all incidents.

In Chapter 3, I review the second great advance in safety management – influencing others to be safe. This is a set of top-down safety initiatives that call for better and more conscious decision-making.

Chapter 3

Second-generation safety

The main idea of second-generation safety is that safety is a deliberate choice; when we are injured, this approach argues, we didn't make a safe conscious decision. In this chapter I consider how safety leadership, safety observations and safety culture have all helped to shape workers' conscious behaviour and improved the choices made. Although this is a positive result, the value of second-generation safety is limited, as I explain below.

The senior safety, health and environment (SHE) manager at one of our clients told us what led him into the safety profession after 28 years as a maintenance fitter. His early experiences with safety were like those of many in his generation. In his words: "You do things quickly, you try not to get hurt, you use common sense but at the end of the day, injuries happen and you can't be a wimp about it; safety wasn't talked about, really, though when someone was injured, everyone talked about what the worker did wrong."

His history told the story: several scars and three broken bones including a fractured jaw.

He remembers the introduction of safety committees in the late 1980s and then seeing safety posters in the lunchroom. "Things did improve, but keeping production moving was the only goal that was ever really talked about. You accepted some things you do are just more dangerous than others, and you take what care you can while you're under the pump trying to get a machine rolling again."

As often happens, his employer of 28 years closed down, so he moved to a new organisation where he immediately saw that things were radically different. "Everybody wore their safety equipment, not just when they had to, but when it made sense; even senior managers wore eye protection, high visibility vests as well as the annoying foam ear plugs when they walked through the factory. We were not a site that was unionised, but if you needed help, you always asked someone, and no-one minded being asked. That was when I decided that safety would be the next career move for me."

That's a happy ending we like to hear at our safety consultancy, supporting a

trend towards safety applying equally to everyone.

How to help people to behave more safely

In the last chapter, we saw that the premise of first-generation safety is that if you ensure workers know about the hazards, risks and controls, then they will do all they can to avoid being hurt. So, if an incident occurs and they get hurt, then they must have decided consciously to do something unsafe or decided not to think about safety.

When this is the view taken, disciplinary action is the usual result. The solution is for the person to be taught to make the safe conscious decision in the future. That's what second-generation safety does by promoting the importance of our personal decision-making in keeping us safe.

Success comes from influencing others

We are social creatures; individuals are influenced by what others do, in particular by what leaders do. That's why traditional attempts to manage personal safety have fallen into the three broad approaches outlined below.

Leading: Someone gives a good example to others by demonstrating the importance of safety through his or her values, commitment or care.

Observing: One person influences others by observing what they do and discussing constructively the safety implications of their observations.

Instructing: One teaches others by telling or showing them how to do something safely.

Below I outline the basic ideas behind these important approaches, and discuss their limitations.

The value of safety leadership

We often hear statements such as "What interests my boss fascinates the living daylights out of me" to describe the influence that the significant individuals of an organisation have over the priorities and actions of the people they manage or are involved with.

Such significant individuals are usually perceived as the leaders, but who actually leads in an organisation?

People who have formal titles and seniority generally tend to exert the most influence over others. On the other hand, these people also differ in their effectiveness. Some are good leaders but some high-ranking individuals enjoy

little credibility or have limited ability to enable or inspire the people they manage.

There are also those who do not necessarily have formal rank but are long-standing employees or otherwise perceived as highly influential. These individuals have a practical rather than a formal ability to influence others. They are widely seen as opinion leaders, often with their own power-base.

Regardless of whether they have a formal title, all leaders in an organisation are integral to supporting or undermining safety; they establish the importance of safety in people's minds.

How can leaders, formal and informal, influence safety most effectively?

Leaders can reinforce the importance of safety

Traditionally, workers have believed that the organisation's primary goals are production and profitability, with safety at best a secondary consideration. Unfortunately, the goals of safety and profitable production are often seen as conflicting, with safety being unnecessarily compromised at times or allowing it to slow production down.

Nevertheless, when leaders insist production must be achieved in the safest possible way, and all safety procedures must be followed even when the rate of production is reduced, workers act more safely and there are fewer injuries and safety incidents. This accords with human nature: what we consistently see and hear, we tend to believe and follow.

Here's another proven fact about human nature: whatever is most important to us, we tend to do first. Two good indicators of what is most important to leaders are what they do with their discretionary time, and what they speak to people about.

Leaders must match actions to words

Being a safety leader involves more than just words and exhortations to be safe and follow the rules. People must see this intent translated into actions managers adhere to. After all, being a leader literally means going first.

Leaders send messages that they are not serious about safety with every exception they make, every safety issue they raise but do not follow up, and every time they walk through a warehouse without a high-visibility vest.

Implicit in this is the principle that silence is approval. If a leader, when preoccupied, walks past someone grinding without safety glasses, his or her inaction could be interpreted by workers as implicit approval. The mantra often

used is, “I accept the standard I walk past”.

To improve safety performance, workers need to understand what is expected of them. Leaders need to model, encourage and support the expected behaviour. This cannot be done remotely. Posters on the wall proclaiming that “Safety is everyone’s responsibility” or a sticker on the bathroom mirror pointing out that “The person you are looking at is responsible for your safety” do not always become a motivation to change if workers are not clear about what it means for their daily behaviour.

When a safety rule can be ignored for any reason, or when it is acceptable to compromise safety for the sake of efficiency, the meaning given to any leadership message on safety will be diluted accordingly.

Accountability for safety must extend through all levels of an organisation for safety to be taken seriously by everyone.

The surprising truth about safety observations

Safety observations first appeared in the 1980s and started to become more prominent in the 1990s. They typically targeted the positive effects of feedback and reinforcement on the behaviour of workers towards safety.

Initially, they were used by managers and supervisors but it soon became evident that the approach would be more effective and better received in a peer-to-peer format. In that way, ultimately, everyone is part of a shared process, looking out for each other.

Safety observations train people to watch the work activities of others and discuss their observations with them. The intention is to modify the behaviour before a safety incident occurs.

In addition, because this process involves independent eyes focusing on safety, the observations often produce success in three other areas:

- Hazards are identified that might have gone unnoticed.
- Safer ways of working are identified, which the person doing the task had been unaware of.
- Safer procedures are developed on the job, with the active involvement of the worker.

Naturally, these initiatives require an organisation to dedicate financial and management resources to defining the right behaviours and conducting the observations. Trust and co-operation are required at all levels for these initiatives

to produce safer behaviours.

In addition, long experience has shown that many observations are required before the number of safety incidents drops significantly. For this reason, the return on investment tends to be low, making observer burnout common.

During the 1990s, consultants working in the safety observation field reported that observers were five times less likely to be involved in a safety incident than anyone they were observing. It seems the benefit accrues to the observer, not to the person being observed.

The ultimate influencer, safety culture

When seeking to improve personal safety, first- and second-generation safety measures such as Safety Management Systems, safety leadership and safety observations can all influence an organisation's safety culture, which then drives individual behaviours. This is depicted below.

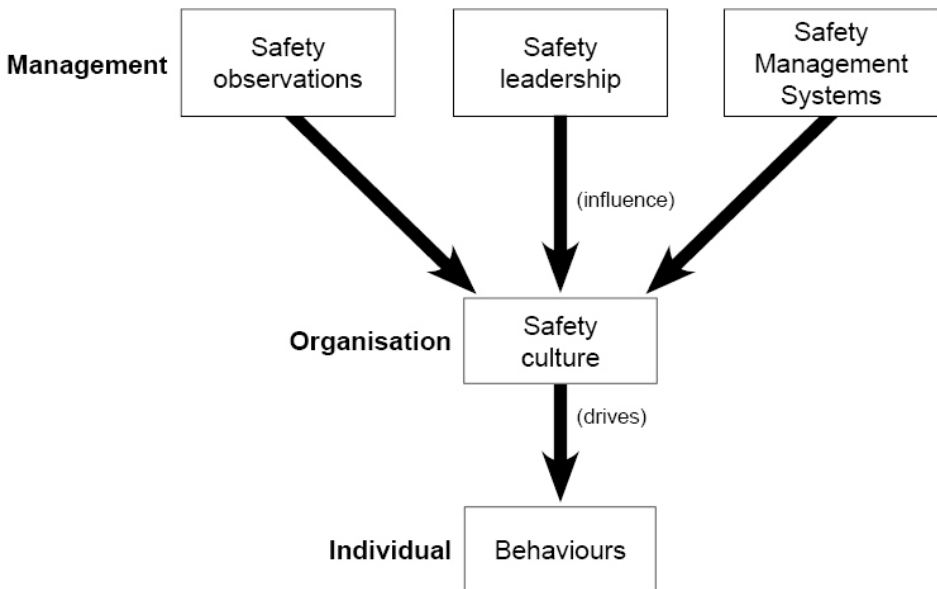


Figure 3A – The influence of first- and second-generation safety on safety culture and behaviours.

Defining any sort of culture, including culture with respect to safety, is not easy. One definition of safety culture that captures most of the essential attributes is “shared values (what is important) and beliefs (how things work) that interact

with an organisation's structures and control systems to produce behavioural norms (the way we really do things around here)"¹. It's a comprehensive definition, but it's not for daily use.

Safety culture can be more simply defined as: The explanations we give ourselves about what we do about safety, and believe.

Safety culture is also difficult to measure. However, we can measure an organisation's safety climate; that is, workers' collective perceptions of how safety has been dealt with at their workplace, based on their experiences.

Examples of important factors that have been identified in safety climate surveys include:

- management concern for worker well-being
- adequacy of training
- provision of safety equipment
- quality of communication, and
- degree of worker empowerment².

These are workers' perceptions of how well first- and second-generation safety measures have been implemented in their own areas by the organisation.

Every individual's safety-related behaviours make up the group's collective norms, which help form their safety culture.

It's an interesting paradox: although groups create collective norms, most initiatives proposed to improve safety culture focus on what leaders need to do – what we call top-down safety. In Section IV, I'll show that bottom-up safety, the habits that individuals develop through their own experience, also powerfully contributes to an organisation's safety culture.

Establishing a just culture for safety

One of the biggest barriers to managing safety is finding out exactly what led to an incident. Unfortunately, investigations often induce fear in everyone involved. When people are concerned for their own jobs, their primary focus will be to make themselves and their workmates look as blameless as possible, even if this requires concealing some relevant information.

On the other hand, when interactions about safety are primarily positive, whether during an investigation or routine discussions, more complete information results. In such an environment, the process reinforces workers'

belief that organisational leaders are serious about safety.

To create and sustain a just culture for safety, workers need to know that:

- safety affects everyone equally, regardless of title
- safe production is the aim
- safety is mandatory and universally enforceable
- they can speak up about safety issues without repercussions
- when they speak up, something positive will be done, and
- if they don't speak up, they share responsibility for someone else's incident or injury.

Naturally, such beliefs will not be generated by a single memo posted on the lunchroom wall. Rather, a just culture for safety requires consistent and visible action by leaders over months and years, especially when the decisions are hardest.

Limitations of second-generation safety

Despite the proven value of first- and second-generations safety measures, even organisations that have exhaustively implemented both approaches are still having safety incidents, some of them serious. Also, many people have observed that safety performance in most organisations has reached a plateau, somewhere above zero injuries.

The frustration of management in these circumstances is completely understandable. Importantly, though, the reasons for this roadblock are now clear.

The premise of second-generation safety

The premise of second-generation safety is that safety is a deliberate choice. In other words, it is an active conscious decision.

Safety leadership and safety observations are designed to help workers make conscious decisions with safety in mind. Originally, the activity is driven by managers and then allowed to trickle down for peers to influence each other. For this reason, we describe them as top-down initiatives.

The strategy is to influence people to keep safety front-of-mind all the time, or at least, as much as possible. As I will outline in Section II, recent neuroscientific research shows that this is difficult to sustain.

These approaches rely on maximising the number of interactions with people

– the proposition that more is always better. Every interaction lets the worker know exactly how important safety is for them and the organisation. The main aim of second-generation safety is to enrol and foster a community of enablers that emphasises the importance of safety throughout the organisation.

In other words, if everyone knows how important safety is then the reasoning here is that people will ensure they make safe conscious decisions rather than unsafe ones, and will do so reliably.

Leaders who understand the importance of safety and are willing to speak often about it to the workforce create collective norms that highlight safety more. Although this is a good thing, it is imperative not to forget that although leaders play an important role, it is individuals who change their own behaviour.

Learning from incident investigations

Bill Keane, an American cartoonist, once said: “Yesterday’s the past, tomorrow’s the future, but today is a gift – that’s why it is called the present.”

Most people do not appreciate that they only ever have a safety incident in the moment.

First- and second-generation safety activities cover what we do *before* an incident (such as risk management, induction, training, consultation and observation) and *after* an incident (investigation and analysis). Although it is always good to plan so that incidents can be avoided, things don’t always go to plan. The problem is that there isn’t much advice available to help with safety in the moment, although this is when incidents happen.

Taking corrective action after an incident

The corrective actions resulting from workplace incident investigations depend largely on the investigators’ understanding of incident causation.

From a first-generation safety point of view, corrective actions include:

- re-inducting or re-training the person who had the safety incident, or re-assessing his or her competence
- re-familiarising the person with risk assessments, procedures, rules, signage or instructions
- introducing more rules or strengthening risk management, or
- consulting more widely or effectively.

From a second-generation safety point of view, corrective actions include:

- counselling, if the perception is that the incident was caused by unintentional action
- disciplinary action, if the perception is that the incident stemmed from a deliberate choice, or
- training to improve the person's decision-making framework, typically focused on values, commitment, care, strength of relationships or a sense of belonging.

There are other corrective actions, most not particularly helpful. They include urging workers to be more aware, take more care, be more alert, pay more attention or “become more aware of their situational surroundings in the future” (the last is my personal favourite from among many incident reports I have read).

Understanding the vital role of inattention

The most fundamental problem with second-generation safety when used alone is that it is founded on the premise that safety is a deliberate choice. This tends to assume that safety incidents are caused by the failure of workers to follow procedures, respect rules, take note of signs or adhere to safe behaviour. The assumption is that they might commit such lapses through ignorance or, more likely, through self-directed decisions or actions.

I will show that most common safety incidents cannot be explained by assuming that the injured person made a conscious decision to be unsafe (or did not make a conscious decision to be safe). Rather, many incidents are more readily prevented when they are understood to result from simple inattention. Such lack of awareness in the moment often results from our automatic responses to such factors as rushing, fatigue or frustration.

Second-generation safety ignores the large role played by simple inattention in personal safety incidents.

Road incident statistics or our driving experiences can form a useful framework for comparison. Some incidents are caused by people intentionally driving while intoxicated, which is a deliberate choice. However, we can find many examples in the literature claiming that more than 90 per cent of road incidents are the result of driver error. The National Motor Vehicle Crash Causation Survey in the US assigned driver error to 94% of over four million crashes investigated between 2005 and 2007.³ I would propose that most incidents on the road involve people who see themselves as safe drivers, but at a critical moment simply made a mistake they never intended to make.

A better understanding of how the brain works

Many popular explanations for unsafe behaviour are founded on social science. What people believe from among these explanations depend largely on what they have been exposed to. After all, what we find familiar we tend to believe to be true.

This belief that safety can be vastly improved by making it a conscious priority unfortunately works against how our brain functions. It is not possible to embed safety into our conscious decision-making processes all of the time.

As mentioned above, neuroscientists estimate that some 95 per cent of our actions are subconscious, taking place at the back of our minds^{4,5}. We do a lot of things in the same way every day, without giving them much conscious thought, because we have done them before, many times.

Improving our conscious decision-making processes certainly helps, but it is just about impossible to shift this mode of thinking from comprising five per cent of brain activity to being dominant.

The remainder of this book will examine the extent to which the subconscious, the sum of our automatic responses to situations and habits, propels our actions, especially when we come into contact with a hazard. To understand the importance of the subconscious, we first must understand how the brain functions.

Summary of Section I

Individuals are injured by coming into contact with hazards during movement because something unexpected happens.

Incidents only happen in the moment, so this is the best time to focus on preventing them.

First-generation safety focuses on hazards. It's based on risk management and consultation, which are the cornerstone of Safety Management Systems. Its aim is to provide clarity so workers know what is and is not allowed. The resulting view of safety is black-and-white: workers are safe if compliant, unsafe if not compliant.

Second-generation safety deals with conscious decision-making that can affect safety. It's based on the premise that safety is a deliberate choice and uses safety leadership and safety observations to help workers make safe conscious decisions. Its aim is to foster a community of enablers that promote the importance of safety so that people can remain keenly aware of staying safe. It expands the black-and-white view of safety from compliance to deliberate choices.

Although first- and second-generation safety have helped improve safety considerably over the past 30 years, there are still many injuries and safety incidents that are stubbornly resistant to these two approaches.