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Leading OHS at Metropolitan Fire Brigade: David Savio, director of health, safety and wellbeing at Melbourne's Metropolitan Fire Brigade (MFB), talks about experience in OHS and shares his insights into the future of the profession

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Undertaking the journey from lag to lead safety indicators

There is still a traditional reliance on lag indicators such as LTIFR and TRIFR rates in many businesses, however, this is shifting as more forward-thinking companies adopt leading safety indicators, writes Craig Donaldson.

Craig Donaldson, editor, OHS Professional

We recently ran an article in the OHS Professional eNews, based on Citi’s Safety Spotlight: ASX100 Companies & More: Injury & Fatalities Data FY05 to FY17 (where available) Presented & Interpreted report. This article detailed the safety performance of Australia’s top listed companies, based on reportable safety statistics (normally in the form of LTIFR and TRIFR rates).

This article generated a more-than-usual amount of feedback, with some readers lamenting a reliance on lag indicators and encouraging a shift towards more positive, lead safety indicators. SIA CEO Dave Clarke also picked up on this and penned an article in response to member feedback (www.linkedin.com/pulse/its-past-time-we-started-measuring-health-safety-new-ways-clarke). In the article (which has 85 likes and 20 comments to-date) it is observed that there is a lack of high quality national benchmarking which genuinely reveals the state of OHS in companies.

The SIA’s own published position is that “business and government would greatly benefit from improved data sources to measure health and safety performance” and “the SIA advocates for the establishment of a national health and safety benchmarking system which can be used for regular reporting to Federal and State governments.”

In light of this, OHS Professional will be exploring the application of lead indicators in safety and how this can best be effected in this and upcoming issues. The cover story for this edition, for example (beginning page 16), explores how the Sydney Motorway Corporation’s WestConnex project – currently the largest road infrastructure in Australia – uses lead indicators to drive impressive safety outcomes. The project is estimated to cost in the order of $18 billion, and at about one-third complete it has clocked up more than 22 million hours worked already. Sydney Motorway Corporation constantly monitors and reports on safety lead and lag indicators, and to indicate the success of its approach, its LTIFR is below 1.0 (against an industry benchmark LTIFR of 10.9). If your company has a good story to tell about the adaption and application of lead safety indicators please let me know.

Along the lines of improving OHS standards, the news report (page 8-9) explores what ISO 45001 means for Australian OHS professionals. With the recent publishing of this standard there has been a number of different positions taken by business and other groups on the potential impact the standard might have. Our news report includes insights from Roland Tan, (FSIA, CHOHSP, and the SIA’s representative in the SF-001 committee within Standards Australia) as well as Jon Temby (member of the SIA College of Fellows and an executive and chair of the College of Fellows Standards Committee) who provide a more informed and balanced perspective on the standard with advice on what OHS professionals should do.

Also in this edition, we look back on the 1984 Union Carbide disaster in Bhopal, India, which is perhaps the world’s starkest lesson in how occupational health issues can transform into an enduring public health catastrophe. In the 72 hours following this disaster, between 8000 and 10,000 men, women and children perished, many in the most atrocious ways, and today officially recognised victims now total almost 600,000. In this article (starting page 26), The Bhopal Medical Appeal’s Tim Edwards and Colin Toogood explore how this catastrophe came to pass, and detail myriad avoidable failures in safety systems as well as risky cost-cutting initiatives in which equity seems to have trumped safety, and how they contributed to a horrific outcome.

Clarification: In the last issue (March 2018) of OHS Professional we ran a feature titled ‘Why safe work method statements have lost their way’. This feature said Safe Work Australia did not release the research report titled The Efficacy of Safe Work Method Statements and WHS Management Plans in Construction. Safe Work Australia did not release the research report but funded it.

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Lifting the bar ... again and again

The standard of OHS has been lifted continuously over the years, but it’s not enough, and the OHS profession can contribute to the next wave of reductions in fatality/injury statistics through becoming better at what we do, writes Dave Clarke

“... again and again

The key word in “continuous improvement” is “continuous”. No matter where you sit in time, or the processes you are involved in or where in any organisational cycle you may be, the underlying premise is that both the business and the environment around it are in a constant state of change, and so you are on a continuous, ever-changing journey of improvement. The outcome is in some ways a destination never reached, and it’s the journey that counts. That’s an idea that makes sense to me. Here are some examples of the development of the health and safety profession:

The work of the Australian OHS Education Accreditation Board

Now accrediting nearly all of Australia’s OHS higher education courses, the key benefit of the program is in its focus on continuous improvement. With common principles and source materials, over time each course has the opportunity to identify areas for growth and change and get to work on those.

The Australian OHS Body of Knowledge

One of the key source documents in the ongoing improvement process for higher education courses is the OHS Body of Knowledge. The BoK is a living document, in a constant state of change as existing chapters are edited and updated and new chapters are created, drawing on new knowledge as we learn from research and evaluation. Just some examples of the areas drawing a stronger focus include: psychological health and other health-related subjects, leadership, influence, and the psychology of working with people. As the BoK changes over time, those changes are folded into higher education courses.

Professional development

The profession has long been without some of the basics to drive good quality professional development, but this has now changed. With the new OHS professional Global Capability Framework we have a clear framework for describing the knowledge and skill requirements for health and safety people at deferent levels, and we’re now at work endorsing training which fits the bill.

Australian standards

Discussed in this edition, the new work on ISO 45001 – probably the most important international business standard when it comes to health and safety – has resulted from years of work by committees around the world, and our profession has been a part of that. Australian standards currently have serious problems around their excessive cost to Australian business, caused by a distribution monopoly currently held by SAI Global (no relation to the SIA!), and the Commonwealth must work with Standards Australia to resolve that issue. Standards are a critical element in the journey of continuous improvement for Australian business, especially when it comes to health and safety, and should be available open-source and free of charge to the business community.

Certification

Certification is also a contributor to the continuous improvement of the profession, and also its status within the company. It will take time, but as the new national program grows, employers will be increasingly confident that they’re getting people capable of working well at the level they are certified. Certified Practitioners and Professionals participate in annual programs of continuous improvement through CPD planning. It’s great to see the recent increasing number of advertisements valuing certified people, and this will continue to grow over time.

It’s notable that the profession is past the cycle of accelerated growth in numbers of health and safety people throughout the 1990’s and early 2000’s.”

Dave Clarke, CEO of the Safety Institute of Australia

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Six ‘megatrends’ to reshape workplace health and safety
New technologies and ways of working will introduce new challenges for work health and safety and workers’ compensation, but also have the potential to make work safer and reduce workplace injury over the next 20 years, according to a study from CSIRO’s Data61 in partnership with Safe Work Australia. The Workplace Safety Futures report explores how six megatrends underpinned by advances in digital technologies and shifting employment patterns may affect WHS and workers’ compensation in Australia in years to come. The megatrends range from advancing automation and the gig economy to rising screen time and an ageing workforce. Joanna Horton, Research Analyst at CSIRO’s Data61 and co-author of the report, said the Australian workplace has undergone significant structural and demographic changes along with digital technologies such as automation, artificial intelligence and augmented reality entering the workforce in greater numbers.

Safe Work Australia laments young worker fatality rate
The death of 14 young people in work-related incidents is too many, according to Safe Work Australia CEO, Michelle Baxter, who recently urged leaders to educate young workers about workplace health and safety. “14 young workers were killed in work-related incidents in 2016, which is 14 workers too many,” said Baxter. “Young workers have an increased risk of workplace injury due to lack of experience, maturity and awareness of WHS responsibilities, so we must focus on building safe and healthy workplaces for this vulnerable group. “I can’t overstate the important role of employers, employees and business leaders in educating young workers about their WHS rights and responsibilities, providing the right tools and in ensuring they feel empowered to speak up about safety and health.” Safe Work Australia recently launched a young worker web page which provides access to resources and toolkits to help both young workers and their employers create safe and healthy workplaces.

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Construction workers urged to avoid musculoskeletal injuries
Builders and contractors were recently urged by WorkSafe Victoria to do more to prevent musculoskeletal injuries, the most common type of injury to construction workers. WorkSafe inspectors will be visiting construction sites in coming weeks to ensure sites are managing the hazards and risks associated with musculoskeletal disorders, which are typically soft tissue injuries such as sprains, strains or injuries from overuse. Musculoskeletal disorders are most commonly caused by manual handling such as lifting heavy or awkward loads, or slips and trips while moving around a work site. In the past five years, WorkSafe has accepted more than 6200 injury claims made by construction workers for musculoskeletal disorders, while some 60 per cent of those workers needed more than four weeks off work. The impact of musculoskeletal disorders can be devastating, said WorkSafe Victoria construction program manager, Dermot Moody. “A soft tissue injury to a back, shoulder or wrist can be long term, debilitating and often career-ending,” he said.

Safety warning about armed holdup procedures in workplaces
WorkSafe WA recently issued a reminder to workplaces to ensure they have procedures in place to deal with armed holdups and aggressive behaviour following a number of armed holdups over recent months. There were particular concerns for workers in retail premises, said WorkSafe WA director Sally North. “Retail premises that have extended opening hours are most frequently targeted,” North said. “These include service stations, chemists, bottle shops and takeaway food outlets. The targeted premises tend to be small, high-volume businesses in isolated locations with poor external lighting that may be staffed by lone workers. The potential is always there for workers to be injured – especially if weapons are involved – and offenders may be very unpredictable if affected by alcohol or drugs. Employers should ensure they are complying with WA’s workplace safety and health laws by having the appropriate procedures in place for dealing with violence and aggression in their workplaces.”

Motorbikes and quad bikes dominate farm injury hospitalisations
Almost 22,000 people were hospitalised in the period from 2010–11 to 2014–15 as a result of an injury which occurred on a farm, according to a recent research report. Injuries involving motorcycles and quad bikes on farms accounted for 21 per cent of hospitalisations for people aged 15 and over. The Australian Institute of Health and Welfare Hospitalised farm injury, Australia 2010–11 to 2014–15 report found there were 3894 motorcycle-related hospitalisations and 1144 quad bike-related hospitalisations over the period from 2010–11 to 2014–15. Males accounted for over 90 per cent of hospitalisations involving motorcycles and 80 per cent of hospitalisations involving quad bikes. Around four-fifths of injuries involving motorcycles were sustained by the rider, while for quad bikes, almost 90 per cent of injuries were sustained by the driver. Other common mechanisms of injury leading to hospitalisation in people aged 15 and over involved horses (52 per cent), contact with other animals and plants (15 per cent), contact with machinery (13 per cent) and fall-related injury (10 per cent).
What does ISO 45001 mean for Australian OHS professionals?

The International Standard ISO 45001:2018, Occupational health and safety management systems – Requirements with guidance for use, was recently published by the International Organization for Standardization. OHS Professional speaks with two experts about what it means for OHS professionals in Australia.

What does the introduction of ISO 45001 mean for the Australian OHS profession?

It will mean easier, faster and reduced costs to implement for those organisations who have already successfully implemented ISO management system standards (MSS), for example, ISO 9001:2015 and ISO 14001:2015, according to Roland Tan, FSIA, ChOHSP, the SIA’s representative in the SF-001 committee within Standards Australia.

“It also facilitates the implementation of an integrated management system (quality, environmental, business continuity and other MSS) where the Annex SL directive applies. This directive is a high-level structure established by the ISO where identical core text and common terms and definitions are required of MSS published by the ISO,” explained Tan, who is also an assessor for the SIA’s certification program.

“It also provides an opportunity to benchmark with global best practice in managing OHS risks and initiate opportunities to improve OHS performance.”

Jon Temby, member of the SIA College of Fellows, and executive and chair of the COF Standards Committee, also believes the new ISO 45001 standard will provide a greater opportunity to benchmark Australian OHS against performance in other countries which have also adopted the standard. “This was not reliably achieved under OHSAS 18001 or AS 4801, despite their similarities,” he said.

Benchmarking will assist continuous improvement as well as better enabling OHS professionals to immediately contribute in different jurisdictions, and Temby also noted that integrated management system compliance will be simpler and more efficient due to the common approach and terminology found in the related standards of ISO 9001 and ISO 14001.

Is the ISO 45001 standard an improvement of AS/NZS 4801?

Tan said ISO 45001 is an improvement over AS/NZS 4801 for the following reasons:

- The AS/NZS 4801 standard has not been reviewed and updated since 2001 when it was first published.
- The AS/NZS 4801 standard is not an international but an Australian–New Zealand OHS management system standard.
- ISO 45001 has introduced additional terms and definitions to facilitate understanding and implementation (e.g. risk and OHS risk and OHS opportunity, top management, objective, effectiveness, process, monitor, incident, corrective action) of an OHS management system.
- The leadership and worker participation clause requirement in ISO 45001 is central to the planning, support and operation, performance evaluation and improvement phases of the OHS management system; the clause requirement describes OHS leadership characteristics that need to be demonstrated.
- ISO 45001 has introduced a new requirement in understanding the organisation and its context, which requires an understanding of the needs and expectations of workers and other interested parties.
- In addition, ISO 45001 has also enhanced similar requirements to AS/NZS 4801 (for example, consultation and participation of workers, planning actions to address risks and opportunities, hazard identification, management of change, emergency preparedness and response).

What are the key outstanding issues that need to be addressed with the standard?

“The SIA does not believe there is any outstanding issues that must be addressed with the standard,” said Tan. “The standard, as is with other ISO series of management system standards, is not prescriptive to cater to specific jurisdictions and industry sectors; management system standards as a whole are not meant to be prescriptive.”

Organisations intending to benefit from the standard should ensure good understanding of the requirements of the standard, in reference to their business context, interested parties and the organisation’s challenges and expectations, before implementing the standard.

“The Safety Institute of Australia [SIA] has and continues to actively participate in and contribute to the development of the standard. The SIA had researched and identified key issues of the standard and had also surveyed members’ views on key issues. The SIA had recommended to the SF-001 committee within Standards Australia, improvements to the standard. Four of those SIA recommendations have now been reflected in the international standard,” he explained.

Over 20 other guidelines to supplement the standard have also been submitted to the SF-001 committee post-release of the standard – to facilitate understanding and implementation of the requirements of the standard. Examples of these guidelines include the clarification and examples of hazards, non-OHS risks, competence, legal and other requirements, emergency preparedness and response, monitoring and measurement (calibration), said Tan.

Temby noted that there have been some discussions among other interested parties in relation to their interpretation of the standard for the Australian business context. “Given that there may be an annex of interpretive information developed for the Australian context, we do not believe that there are any significant issues that might hinder implementation at this stage,” he said.
“As with all standards, and in particular, ISO standards, it is expected that well-informed OHS professionals will have no difficulty in interpreting the standard both in the Australian context and for the specific business. The SIA’s contributions to the standard are significant and included member feedback. A number of SIA-sourced points have now been included in ISO 45001 and numerous points for inclusion in the annex have been made. Our special thanks go to the SIA representative on the committee, Mr Roland Tan.”

What are the implications for OHS functions and leaders?

Although the ISO 45001:2018 standard has similar requirements with AS 4801, Tan said some concepts (for example, process-based approach, plan-do-check-act or PDCA cycle to achieve continual improvements, leadership focus, understanding of the context and interested parties and their needs and expectations) and terms (for example, workplace, interested parties, corrective actions) may need to be unlearned, relearned or reinforced.

For those organisations who have successfully implemented MSSs such as ISO 9001:2015 and ISO 14001:2015 (which adhere to ISO’s Annex SL), they should have less difficulty in implementing the ISO 45001:2018 standard, as their core text and terms are the same.

Temby said that as long as OHS functions and leaders carefully review the standard to clarify the similarities and understand the differences, they will be in a good position to influence management decision making in the context of ISO 45001 and its potential for efficient integration with ISO 9001 and ISO 14001. “If an IMS approach has already been implemented, the changes should not be difficult to implement,” he said.

What advice would you offer OHS functions and leaders as a result?

It is important to carefully read and understand the new standard, according to Temby. “Consult with appropriate management and operational personnel when conducting a gap analysis against current OHS/WHS practice, foreseeable business needs and priorities and ISO 45001 criteria,” he said.

“Ensure excellent communications with all stakeholders to identify and generate ownership of the actions required and implement them in the context of business needs and ISO 45001 expectations.”

Tan also recommended a number of specific steps:

- Get a copy of the ISO 45001:2018 standard and conduct a gap analysis against your existing MSS.
- Rectify the gaps (for example, develop or update processes and/or procedures, which could include risk registers, legislative and other registers, position descriptions, leadership, training, worker participation, managing changes, etc).
- Consult and communicate with interested parties (internally and externally); provide training to all interested parties affected by any changes in process and procedures.
- Conduct an audit to determine the level of compliance to the ISO 45001:2018 standard.
- Initiate corrective actions to rectify the audit findings and continue monitoring, reviewing and improving the MSS at regular intervals.
Leading OHS at Metropolitan Fire Brigade

David Savio, director of health, safety and wellbeing at Melbourne’s Metropolitan Fire Brigade (MFB), speaks with OHS Professional about his personal and professional experience in OHS and shares his insights into the future of the profession

How did you become an OHS professional?

As a 19 year old I was lucky enough to spend seven years working on various offshore pipeline projects. This gave me the opportunity to work throughout Asia, UK and Australia.

I started my undergraduate degree in sports science while working offshore. After completing my studies I commenced my corporate career working in the areas of disability and occupational rehabilitation, where I helped people with personal and/or work-related injuries/illnesses gain new employment. My passion to work in this field was inspired by my personal experience living with parents with mental illness (schizophrenia) and personality disorder (narcissistic psychopath).

I have always had the passion to make a difference, particularly to improve the health and wellbeing experience and outcomes for people close to me, and within my community.

Over the past 10 years I have worked in a range of senior leadership roles, which has led me to my current role where I am the director of health, safety and wellbeing at Metropolitan Fire Brigade (MFB).

I have also completed studies in health and safety (postgraduate), and Masters in Business Administration (Executive) to further complement my leadership roles and enhance my knowledge and skills.

What makes a good health and safety professional?

Someone who can:

• Engage: lead, influence, inspire, partner and build positive relationships
• Empower: get the best out of people through coaching and mentoring
• Deliver: have a positive, meaningful and tangible impact on people and business.

What factors are important to be effective in your role?

Ultimately, everyone is responsible for health and safety. I believe in empowering and enabling others so that they can deliver on their potential. I see my role as building relationships and capabilities in partnership with people so that they are empowered to lead health, safety and wellbeing.

As workplaces are within a social context, being able to effectively understand and connect with people is absolutely critical in being able to bring out the best in individuals, workplaces and the community.

How have you made a contribution to the prevention of workplace injuries and ill health?

I would regard coaching under 10 and under 12 girls’ soccer among my more significant contributions to health within my community. There is nothing more satisfying than contributing to the empowerment of young women in society.

In a business context I have designed community-based programs (for refugees) contributing to a 254 per cent increase in revenue and a 118 per cent increase in cash flow.

In the realm of health and safety:

• 50 per cent reduction in claims cost
• $9 million reduction in premiums
• 120 per cent improvement in reporting culture
• 134 per cent improvement in corrective actions (hierarchy).

I am privileged to head up a talented team of professionals at MFB, where we continue to implement a range of programs which are designed to deliver the best health experience and best health outcomes for our people. Working in partnership with world-class firefighters to help them serve and protect the community is a real privilege.

What have been the most important learning lessons for you in your career?

My favourite word is learnability. I believe in striving to become a better person today than I was the day before, by continuing to learn and grow personally and professionally.

I think that in order to stay relevant, health and safety professionals need to continue to evolve and adapt. This requires an ability to be comfortable embracing risk, change and uncertainty.

What frustrates you the most in health and safety?

There are three things that frustrate me the most here:

• spending too much time trying to fix the past and less time forward looking (playing in the space of innovation and disruption)
• complacency, ignorance, arrogance and apathy

David Savio, director of health, safety and wellbeing at Metropolitan Fire Brigade, says OHS professionals will have a greater focus on biopsychosocial factors in strategic planning
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• also, there is nothing more frustrating than working with people who have a lack of curiosity, insight and empathy for others.

How do you see OHS evolving over the coming five years?

I see the profession shifting in focus more towards health and wellbeing (i.e. health promotion) more so than traditional safety aspects (i.e. hazard and risk management). I think that health and safety professionals will have to embrace complexity more than ever before. I also see health and safety professionals having a greater focus on incorporating biopsychosocial factors in their strategic planning.

What developments would you most like to see in the OHS profession?

A greater focus on understanding the relationships (applied) between biology, psychology and sociology. I never get tired of learning more about the relationship between neuroscience and health, safety and wellbeing in an individual, workplace and community/social context.

For example, our strategic planning for health, safety and wellbeing at MFB has incorporated the following elements:

• education, learnability and personal growth
• sports science and exercise physiology
• nutritional awareness
• sleep improvement.

How have you approached learning in your career?

Most of what I have learnt has been an accumulation of experiences from a personal and professional perspective. I draw most of my learning through mistakes that I have made (of which I have made many). These experiences have been instrumental in helping me build the technical, strategic skills as well as the social and emotional awareness that I rely upon in my role as a health and safety professional.

What approach have you taken to structure and assist your learning?

I embrace life experiences as an opportunity to learn. I have been privileged to have grown up in an environment filled with adversity and complexity – one parent diagnosed with schizophrenia and the other a narcissistic psychopath. I continue to care for one of my parents to this day, which continues to allow me to navigate adversity through problem solving, and learning to calmly navigate complexity by honing skills such as resiliency, agility and adaptability.

I also utilise formal (education institution) and informal (self-learning) mechanisms.

What advice would you give other safety professionals in pursuing development?

• Be authentic
• Build positive and productive relationships
• Know your values and stay true to those values
• Be curious
• Take risks and continue to learn
• Learn to embrace and feel comfortable working with change, disruption, innovation, complexity and ambiguity.

Are you certified? If so, why and what is your experience of the process?

Yes. I really value the experience and knowledge that I have acquired to allow me to meet the standard of certification. My professional experiences outside of traditional health and safety roles such as working in construction (offshore gas pipeline) and also in social welfare has really enabled me to differentiate myself from some of my other colleagues within the profession, and has probably also allowed me the opportunity to have a rather social wellbeing approach to health and safety.

Are you a mentor/mentee with SIA? If so, how has it assisted your career, or have you assisted the mentee’s career?

I am a mentor and have also been a mentee. I continue to learn and grow from both experiences. Over the years I have been privileged to have worked with a range of mentors. These people have been a strong influence in helping me shape my values personally and professionally.

I also coach women’s soccer, which has enabled me to better understand the value of empowering young women to deliver on their potential.

If you would like to be featured as a health and safety person for future editions please email communications@sia.org.au

“Health and safety professionals will have to embrace complexity more than ever before”
Beyond OHS law compliance: how to become a safety leader

With a significant number of changes in safety laws and regulations in recent years, companies vary widely in their approach to compliance. OHS Professional speaks with Clyde & Co partner Alena Titterton about what companies can do to take a more proactive approach to compliance.

Are companies more proactive or reactive in safety law compliance?

It’s difficult to generalise. In my experience there is a varied level of compliance across Australian organisations’ approach. We have fantastic companies that are very proactive in their approach, but we also have organisations that are largely reactive.

I have been heartened by organisations that have a largely reactive or calculative approach (to take the Hudson Safety Cultures paradigm), reaching out and asking, how can we get from where we are to a more proactive approach? When I think about the common theme of why those organisations have done that, it has always been their top leadership driving that conversation. It always takes leaders who want to get runs on the board because they knew there is a more systemic issue to deal with at a cultural level than any one area of non-compliance.

In the last few years we have seen a slip backwards in levels of compliance on some of the safety basics. This has particularly been the case with respect to managing the risks associated with working at height and plant safety. It’s critical that we have laws that are appropriately enforced.

There is also a significant degree of confusion with respect to what is required for the horizontal consultation obligation: the duty to consult, co-operate and co-ordinate where there are overlapping safety duties with others. I recently polled an audience and found over 75 per cent of attendees’ organisations were not engaging with that particular obligation. As we know, areas of overlap cause significant risk when not appropriately managed, so that is an area of concern that requires redress.

Where are the common challenges in taking a proactive approach?

People and organisations which have a desire to be proactive and see compliance as a minimum standard as part of that, will always make efforts to achieve compliance. They are typically organisations with leaders at all levels of the organisation who understand that safety is intrinsically linked to success from the operational perspective.

Those that don’t show safety leadership typically have a short-term view of the world. Their approach is informed by asking: what can I get away with today and what is the chance of getting caught? That permeates the approach through their organisation. And that usually comes down to a lack of leadership and will, and a lack of ability from advisers to positively influence the attitude and direction of such leaders.

How can organisations take a holistic “spirit of the law” approach to safety compliance?

We should not begin with the law as the starting proposition. Organisations need to start by asking themselves: what do our people need to keep them safe and healthy? What do we need to do to make sure we’re not going to adversely impact anyone’s health and safety in the course of our operations? And that requires an organisation and its leaders to be focused on actually understanding the nature of the operations and the hazards and risks in the work, and then working collaboratively with its people around the solutions to eliminate or otherwise manage those risks.

If we did a better job of the fundamentals of hazard and risk management in health and safety (as it applies to an organisation’s specific operations), we would come closer to legal compliance. Because ultimately, effective practical risk management is what the law is aiming for organisations to achieve.

But that has to be done with workers, not to workers. There is no point creating
safety management systems that look perfectly legally compliant on paper if they are not implemented in practice. Workers need to feel ownership over their systems of work in order for them to be implemented. We need to be better at bridging the gap between work as imagined (on paper in the safety system) and work as done (by workers in the field).

**What steps can OHS professionals take in the process?**

There is a real habit of OHS professionals in incident investigation, when worker non-conformance with a safety procedure is found, to automatically say “worker failed to comply with x procedure” and then recommend a corresponding corrective action to “re-train” or “re-brief” said workers. It’s a lazy way of looking at the issue. We need to ask better questions. Why did the worker not follow the procedure? Is it a good procedure? Is there a way of making the way the work is performed in reality safe, rather than dragging workers kicking and screaming to the procedure that bears no relationship to the reality of how work is performed?

My advice for OHS professionals is twofold. First, spend more time facilitating than doing. Engage workers and supervisors in the field working to create safe systems in practice and mentor them, making sure the approach you help them arrive at meets the legal requirements. Second, spend more time investing in improving your influencing skills, particularly in how to communicate with your organisation’s leaders. Spend time learning the language of the organisation more broadly. I see real issues because of many OHS professionals’ inability to effectively communicate with business leaders. You need to marry the safety objectives with the business objectives in communications with operational and senior leadership for the safety message to get any cut through.

Alena Titterton is a partner in the regulation and investigation practice specialising in health, safety and security at Clyde & Co, and recently spoke on safety law compliance at the NSW Regional Safety Conference & Expo in Newcastle.

“**There is also a significant degree of confusion with respect to what is required for the horizontal consultation obligation**"
Taking the safety pulse of South Australia

Australia’s OHS regulators play a fundamental role in improving health and safety outcomes. OHS Professional speaks with executive director of SafeWork SA Martyn Campbell about the evolving role of the regulator, priorities in compliance and enforcement, and the hallmarks of organisations with good OHS.

What are the priority areas/industries for SafeWork SA over the coming 12 months?

I have recently taken up the role of executive director of SafeWork SA, having spent the last eight years in the construction and mining industries in Australia, Papua New Guinea and Indonesia. My priority is to rebuild organisational capability and capacity whilst bringing a practical application to the Australian Work Health and Safety Strategy 2012-2022 and the seven national priority industries.

These priority industries are agriculture; road transport; manufacturing; construction; food services; public administration; and safety, healthcare and assistance. They are reflective of the industries where we see injuries occurring.

In addition, we work on six national priority work-related conditions: musculoskeletal disorders; mental health conditions; cancers (including skin cancer and asbestos-related cancers); occupational lung disorders; contact dermatitis; and noise-induced hearing loss.

To contextualise these priorities for all South Australians, SafeWork SA has developed industry action plans which seek to deliver practical solutions to support the industries to continue to improve work health and safety outcomes. The plans provide data around the types, causes, location and costs associated with injuries and what we are committed to doing to contribute to the reduction of injuries across South Australia. So far we have developed plans for the agriculture, construction and hospitality industries, with others to follow.

How is the role of SafeWork SA as a regulator evolving with regards to its work with both government and employer organisations?

In order to increase engagement with workers and employers, SafeWork SA has separated its regulator and educator functions. The educator arm of our business has an advisory team aimed at working at an individual business level as well as across industry sectors. WHS advisers can visit businesses direct to offer free practical and pragmatic advice that helps businesses not just understand their legal obligations but also support them to put in place effective systems to manage their health and safety risks. The role of the advisers is to build the capability of duty holders, enabling them to integrate health and safety into their own businesses.

Our industry advisers work collaboratively with industry associations, unions and government to drive positive outcomes that benefit across a wider audience. Our industry action plans are developed in consultation with these key stakeholders, taking into consideration both injury data, emerging trends and where the industry identifies certain needs. None of our advisers have inspection powers, so all stakeholders can feel comfortable asking for help to better understand and meet their work health and safety needs. We have seen a steady increase in demand and appetite for this service at a business and industry level, and as community and business confidence grows, I expect to see this part of our business grow exponentially.

The regulator arm consists of inspectors, whose role and training is focused on enforcement and ensuring compliance. We have just completed a mobility enhancement project to make our inspectors more mobile and agile to better respond to workplace accidents, incidents and complaints. Additionally, we have partnered with Charles Sturt University to deliver investigation training aligned with university-level qualifications. We’ve also realigned our investigation team with the recruitment of 12 new investigation positions and a team focusing on quality and excellence. This training is an ongoing commitment to ensuring investigative, compliance and training excellence and timely outcomes.

How do you see this evolving over the coming three to five years?

The changing nature of work and a move away from more traditional work relationships, including more flexible workplaces, working from home, and internet of things means that all regulators will need to be more agile and identify modern approaches to ensuring health and safety obligations are met.

I think we will always need some form of compliance and investigative capability, but it would be great to see more voluntary compliance and a greater focus on education rather than prosecution.

What are the red flags you watch for in organisations, which are likely to indicate poor OHS?

In the short time I’ve been at the helm I have seen safety risk management at the forefront of prosecutions and compliance work. The lack of any risk identification, or poor
risk assessment and application of controls seem to be a key in the recent prosecutions. Also important are basic fundamentals such as consultation with workers and health and safety representatives. I would encourage every employer to take time to thoroughly identify the risks associated with the work and apply the hierarchy of controls. Then document it!

Conversely, what are the common indicators of good OHS within organisations?

When the senior leadership thoroughly understand the risks at an operational level and can demonstrate their care for their workers, you know there is a mature and inclusive safety system. Visible safety leadership and application of psychology-based thinking has an enormous effect on morale, safety and productivity. So leaders who are regularly out in the field talking with their workers are a solid example of best safety practice.

What advice would you offer OHS leaders to improve health and safety outcomes?

Get out of the office and into the field. Understand the operational safety risks and how they are controlled. What looks good on paper isn’t always the most appropriate operational solution. Talk to your staff about what makes them safe, how you can implement good practice so they go home safe at the end of their day. Empower all workers, from the highest levels of management to the most junior workers, to drive the safety culture, and consult, consult, consult!

“It would be great to see more voluntary compliance and a greater focus on education rather than prosecution”
Sydney Motorway
Taking the lead on safety indicators
Sydney Motorway Corporation
WestConnex is a 33-kilometre, predominantly underground motorway scheme currently under construction in Sydney. WestConnex is a joint project of the New South Wales and Australian governments and is the most significant investment in road infrastructure in Australia at present, with a projected cost of more than $18 billion.

Roads and Maritime Services has commissioned Sydney Motorway Corporation to finance, deliver and operate WestConnex, which involves the widening and extension of the M4 East, duplicating the New M5 and connecting the two motorways to provide an underground link that will create a free-flowing western bypass of Sydney’s CBD.

The project is about one-third complete, with more than 22 million hours of work clocked up already. With roadheaders working 24/7, cranes in the sky and hundreds of pieces of plant above and below the ground, the project has become a major driver of economic growth in NSW. Currently, there is a 3900-strong workforce helping to deliver these projects, including 1000 who make the journey underground every day, with two-thirds of the project being built underground.

**Monitoring and measuring safety**

“The safety of our workers, the community and road users is our number one priority during design, construction and operation,” says Ken Reynolds, project director for the New M5 and a leadership team member of Sydney Motorway Corporation.

“Sydney Motorway Corporation constantly monitors and reports on safety lead and lag indicators and is committed to continual improvement in systems and further developing, embedding and refining its safety culture program [behavioural markers] approach. We're working collaboratively with our contractors to improve workplace health and safety performance and response initiatives. We've also implemented a range of leading indicators, which are currently used across our projects to measure performance and identify risk.”
Sydney Motorway Corporation lead indicators include:

- Reporting of high-potential incidents
- Reporting of all near-miss incidents
- Monthly workplace inspections by contractor
- Monthly reporting of worker inductions
- Monthly WHS audits
- Drug and alcohol testing and non-negative results
- Reporting of current risk assessment and control plans
- Number of WHS surveillance inspections conducted by the client
- Number of senior management inspections conducted by the client.

“Using lead indicators ensures we continually look at our safety systems and processes across the business. Gathering information in this way also enables us to identify where to look so we can address potential issues before they escalate,” says Reynolds.

**Key strategies and initiatives**

Three key strategies are used by Sydney Motorway Corporation. First is its culture initiative, where Sydney Motorway Corporation has commenced an initiative to further develop its safety culture within the corporation itself, and how it works with its main contractors. Each subsidiary of Sydney Motorway Corporation has a management team acting on behalf of each asset trustee, and this team interacts with the major contractors associated with each project.

Sydney Motorway Corporation engaged The Keil Centre (a consulting firm which specialises in human factors in health and safety) to develop a framework for the organisation. “We didn't want to reinvent the wheel, but wanted to develop something that most of our contractors are familiar with,” says Reynolds. “We didn't see this as us doing our own thing, because we've got to have a culture that goes from Sydney Motorway and into the contractors and down through their subcontractors. At any point in time we have to have the same approach to safety.”

This framework, “being safe”, includes the behaviours that define what is critical to a robust safety culture across different groups: senior managers as well as everyone and anyone that is likely to visit the site. Everyone from the executive level down has to confront safety risks and set high safety standards, according to Reynolds, who adds that communicating openly and involving the workforce are also fundamental elements of the framework.

There are positive and negative behaviours that are a part of this framework for each group, and these have been developed and are now being rolled out in communications and engagement workshops. “I don't like to use the word training, because it's more about engagement and development,” says Reynolds.

Another important initiative can be found at the senior leadership level, which needs to demonstrate and monitor the commitment to

“Using lead indicators ensures we continually look at our safety systems and processes across the business”

Ken Reynolds, project director for the New M5 and a leadership team member of Sydney Motorway Corporation, believes the construction industry still has a way to go in adopting lead indicators.
providing the systems and resources to realise safety performance. “We look for active personal involvement of the senior executives and senior management. We have KPIs, for example, where they’re expected to regularly go to site and they report on any safety issues they see [among many other points],” says Reynolds.

To develop the framework The Keil Centre ran a series of workshops around the business, and these were rolled out across each of the project teams. They also met with the heads of each of the major contractors and asked questions about how their people perceive Sydney Motorway Corporation’s safety, why it was important, and what they would like to see to assist them in safety. This helped Keil with assessing pre-existing positive and negative behaviours.

“It’s important to bring our contractors on the journey and take ownership. Once they felt they were a part of this process, they automatically bought in,” says Reynolds, who adds that even though each contractor has their own culture, continuity and alignment in safety was important in the engagement process.

Leadership and monitoring of safety at Sydney Motorway Corporation level are also critical. “Senior leadership lead, demonstrate and monitor commitment to providing the systems and resources to achieve a high level of safety performance,” says Reynolds. “The active personal involvement of senior management provides the impetus and support for safety that is clearly understood at all levels of the project. Regular surveillance, analysis and review of lead indicators by the client or contractor is also important – they assess compliance with the contractor’s risk controls for high-risk construction work activities such as working in and around mobile plant, working at heights, with live services, mobile cranes and lifting operations, electrical work and in live traffic.”

Improving contractor engagement

“The New M5 project, for example, is a $4 billion project, and we spend millions of dollars a day. Decisions are made pretty fast because things happen really fast. I wanted a team that actually understood a contractor, so most of my construction team have worked for tier one contractors. My safety lead has worked for a tier one contractor. I also employed a tier one contractor superintendent and a lead foreman in my team. It is this foreman and superintendent who are onsite somewhere every day, because they have the knowledge and the expertise to go walk on the site and immediately say, ‘That doesn’t look right’. That’s good practice,” he says.

“We don’t just work in silos, so we assess compliance with the contractor’s risk controls for the high-risk construction work,” says Reynolds. “We have developed a collaborative relationship with our contractor management teams and openly discuss WHS performance and response initiatives at the supervisor level and at regular team meetings. These discussions include the findings identified in our surveillance inspections, audits and our representatives as well as the contractor’s incident reports and alerts. We continue to drive to close the gap between work as planned and work as done, through better operational discipline.”

Reynolds provides an example of another
contractor who has a CER program, or a “cold eye review” program. This is a process which involves a site taskforce comprising management, safety personnel and engineering/design personnel. This taskforce goes from site to site looking at high-risk construction activities and the application of safety essentials, and it’s also an opportunity for each site to learn how other sites are doing it.

“These are pretty successful in transferring the positive and the negative learning and knowledge. They also get involved in the MATES in Construction program – the suicide prevention program.”

Regular monthly meetings are held with contractors on both the M4 East and New M5 projects, as well as the SafeWork NSW infrastructure group. “They have representatives who meet monthly and share information, discuss trends in the industry, and get updates from SafeWork NSW. They like that. It’s an opportunity for them to engage on a more positive note and transfer learning, rather than just when they’ve got an issue onsite which inspectors need to be sent to. This leads to better collaboration and a stronger working relationship, because it’s in a positive setting, even though issues will come out,” he says.

**Employing safety indicators**

WestConnex has a dashboard featuring a wide range of lead and lag indicators. These statistics include lag indicators, whole-of-life stats, rolling 12-month stats and diagrams which detail “damaging energies” such as mobile plant incidents, people being hit by falling objects, body stressing and the like.

Sydney Motorway Corporation also uses lag indicators. Reynolds explains that the Lost Time Injury Frequency Rate (LTIFR) is below 1.0 and the Total Recordable Injury Frequency Rate (TRIFR) and Medically Treated Injury Frequency Rate (MTIFR) are also below target. This compares against an industry benchmark LTIFR of 10.9 (for the 2015-2016 period, according to Safe Work Australia data for the heavy and civil engineering construction sub-industry, which includes road and bridge construction and other heavy and civil engineering construction). Furthermore, as part of Sydney Motorway Corporation’s fitness for work program, it has carried out 106,000 drug and alcohol tests, with non-negative results representing less than 1 per cent.

The benefits of the lead or positive indicators are five-fold:

- “We know from the near-miss incidents reported and investigated, including high-potential incidents, what high-risk controls failed to determine what needs to be addressed,” says Reynolds.
- The number of workplace inspections conducted each month provides insight into the presence of leaders, who are engaging and checking workplace controls are used as planned.
- The number of system and critical safety risk audits conducted each month confirms that the project WHS plan and system is being checked regularly and whether the “above-the-line” engineering controls for high-risk construction work are in place and effective.
- The number of WHS surveillance inspections conducted by Sydney Motorway Corporation gives the workplace another set of eyes and demonstrates and engages safety culture values and practices.
- Confirmation of risk assessment and control plan reviews undertaken each month provides confidence that current risks have been reviewed.
Major OHS risks

Reynolds is responsible for the safety, environment, sustainability, operations and maintenance and the centralised technical integration teams across all WestConnex projects. There are a number of significant OHS risks faced in the construction of these projects, and Reynolds explains that the major ones are tied to critical high-risk construction activities. These include working at height, near traffic, with services, in and around mobile plant, with cranes and lifting and temporary works as well as public risks associated with heavy vehicles and chain of responsibility.
“We use the lead indicators to provide an insight into how safety is managed on site,” says Reynolds, “as these are good indicators of a site’s safety performance, showing its level of operational discipline, reporting maturity and capacity to learn. The high potentials and the near-misses are probably the better lead indicators in that if you spend the time to look at them, they can provide insights into where issues might be developing and where you might have to do something proactive before they turn into real injuries or real incidents.

“That’s where we stop things before they occur. But you need to put the effort in to analyse the trends and analyse what’s in front of you, whether it’s plant-to-plant or plant-to-person, or it’s one site over another site. There’s a lot of analysis you’ve got to do, so you have to delve into a number of avenues of investigation to arrive at a conclusion. You can then put the effort into education so you can turn the numbers into something more positive.”

The journey to lead indicators

Ken Reynolds, project director for the New M5, has worked for a range of tier one contractors and clients his whole career, and believes the construction industry has “taken a while” to move away from lag indicators to focus more on lead indicators. “Essentially, lag is just talking about what went wrong, whereas lead can give you insights into things before they happen. Therefore, you have a much better chance of pre-empting issues, to make sure you don’t have incidents,” says Reynolds.

“That’s fundamentally why I believe in lead versus lag as being the predominant focus of indicator. The whole industry’s on that journey. I don’t think the industry’s at that point where they recognise lead is better than lag. A major challenge for me is taking the lead to move people towards focusing on smart, useful, informative lead indicators, which is a journey we are on.”

Benefits of using positive indicators

Lead indicators are called positive indicators in Sydney Motorway Corporation, as they are more appropriate to curbing issues and injuries. “You’ve got a better chance at this rather than just looking at the history, because that doesn’t give you the insight into why things happen or necessarily where things happen,” says Reynolds.

“The use of the positive indicators tells stakeholders that we’re checking the implementation of the system at a range of levels continually, rather than just reporting on what went wrong.”

These positive indicators help give better information about:
• Patterns of hazards and implementation of risk controls, including what is not working well

OHS Professional will run a series of features on lead indicators in upcoming issues of the magazine.
Melbourne Water is a statutory authority wholly owned by the Victorian Government and controls much of the water system in Melbourne including reservoirs, and sewerage and drainage systems that service the city. Last year, Melbourne Water won the WorkSafe Victoria Award for best solution to a specific workplace health and safety issue for successfully trialling and adopting virtual reality (VR) in design, which has enhanced its ability to identify design defects and OHS risks when planning capital projects.

Having a diverse set of skills is one of the keys to the success of the safety group within Melbourne Water, according to the organisation’s safety manager, technology and innovation, Scott McMillan. “We realise that collaboration with field-based staff is a lot more constructive if we can have a practical conversation supported by trade or engineering experience, which leads to practical solutions for our colleagues. This, however, can only be successful with support from our professional OHS staff, who can make sure we meet all of our statutory requirements,” he explains. “We genuinely want to work with the business to deliver positive change, and we see this as the only way to achieve true collaboration.”

**Major OHS risks**

Many Melbourne Water staff travel across the greater Melbourne region regularly, and driving is one of the biggest risks to staff, McMillan explains. “Tackling an issue that is very personal to people is tricky, and we have realised that a lot of approaches work on the stick rather than the carrot to improve driving behaviours.”

As a significant consumer of electricity, this is another significant safety risk for Melbourne Water, and “we are constantly monitoring the risks that this poses for our staff and contractors,” says McMillan. “Any complex hazard that can’t be seen instantly increases its profile to us, and we are always working to improve on our electrical safety systems.”

Melbourne Water also has three major hazard facilities, which are all licensed due to the large quantities of chlorine stored onsite to disinfect both water and waste water. “We are acutely aware of the challenges of safely managing dangerous chemicals in ageing infrastructure, and always looking to whether or not there are other solutions out there to reduce our risk to both employees and public – for example, replacing liquid chlorine with sodium hypochlorite,” says McMillan.

**Behind safety strategy**

Melbourne Water’s strategy is based on the pillars of “safe people and culture, safe assets, and safe systems,” McMillan explains. “Our team is structured around these principles with the underlying drive that Melbourne Water is committed to achieving a generative safety culture. The drive for generative safety culture guides our actions. This drives outcomes that not only see safety benefits but cultural benefits. Our focus on VR and changes to our permitting system are examples of this.

“This approach is designed to simplify our systems to allow the business and every individual to effectively manage the most serious risks, wherever possible moving up the hierarchy of controls. We have also introduced a more customer-focused approach to be a more solutions-focused resource for the business to draw on.”

**The business case for VR in design**

Melbourne Water has an extensive capital works program, and at the functional design stage Melbourne Water conducts a HAZOP (Hazard and Operability Study) and safety in design assessment with early drawings involving designers, constructors, project managers, the operators and maintainers. Despite this, McMillan says very late in the construction process, hazards were still being identified during a hazard identification process on completion, which made it more difficult and often more expensive to fix these issues.

“The challenge of being able to imagine and contextualise a two-dimensional drawing into something on which meaningful feedback could be provided was a challenge, and as a consequence the teams were missing opportunities for improvement,” he says. “In addition, our operators and maintainers were sometimes unsure of the process and how to provide feedback in these design meetings. Some of those missed items went on to become contributing factors in events that led to cause injuries and significant operational incidents.
All involved felt there must be a better way to conduct our HAZID assessments and collect early and impactful feedback.

**Key elements of the VR initiative**

In the process, a relatively standard 3D CAD model is converted into a VR-ready file format and run on a gaming laptop. “We set up the system to give all relevant parties the opportunity to get familiar with both the VR experience, and then the plant that they’re assessing,” says McMillan. “The reason that this has been so successful is due to the fact that the process wasn’t seen as a novelty, it was embedded into our corporate procedure that ensures all future complex projects need to incorporate a VR design.

An outcome that wasn’t expected was the engagement of operation and maintenance staff in the HAZOP process, which increased immensely, McMillan recalls, “not merely because of the immersive nature of the virtual reality experience, but because of the commitment the organisation had made in investing additional resources to ensure they could effectively contribute to the hazard identification process.

“A design review meeting and HAZOP at functional design would normally see one operator and one maintainer contribute their ideas over a period of several hours. Virtual reality let all staff walk through the plant and provide granular feedback in 15 minutes. It also gave our staff a chance to familiarise themselves with the plant before construction had begun.”

**Business benefits**

McMillan estimates that of the additional 20 hazards that were identified in the VR session of one design, all had the potential to cause injuries or additional labour costs. “Melbourne Water is working towards achieving a generative safety culture; the only way to succeed is to try new ideas. Some ideas may fail and we accept that as a learning opportunity, but it allows us to think a little bit differently which has given us some fantastic successes,” he says.

**Melbourne Water: an overview**

The water supply system operated and managed by Melbourne Water comprises:

- catchments covering more than 140,000 hectares
- 10 major storage reservoirs with a capacity of 1,810,500 megalitres
- 64 service reservoirs that provide short-term storage
- about 1300 kilometres of distribution mains and aqueducts
- 18 water pumping stations, used to pump water from low-lying areas to higher areas
- five water filtration plants
- 49 water treatment (disinfection) plants.
Harsh lessons in OHS history: the Union Carbide disaster

The 1984 Union Carbide disaster in Bhopal, India, is perhaps the world’s starkest lesson in how occupational health issues can transform into an enduring public health catastrophe, write Tim Edwards and Colin Toogood

“I know that I am not doing the right thing,” the engineer confessed. “However, this is the practice and my superiors are fully aware of what I am doing.” A pause.

“Therefore, I am not doing anything wrong.” His final words betray desperation. “God is with me.”

The 40-page report by the Union Carbide pesticides factory’s in-house safety team involved dozens of interviews. It emphasised glaring safety issues in standard operations, facilities and procedures right across the plant’s most hazardous production units. Due to particular deficiencies, the report warned, “There may be cases involving runaway reaction”. In such a scenario, “There is no procedure available for handling a vapour cloud release”. Managers stung by the strongly worded report asked the authors to “soften and dilute” their observations.

Less than three months later, a runaway reaction duly vaporised 28 tonnes of deadly methyl isocyanate (MIC), a highly “reactive, toxic, volatile and flammable” chemical and an acute “oral and contact poison” that was bulk-stored onsite in tanks the size of locomotives.

Avoidable failures were legion. Unreliable or disabled instruments contributed to workers only spotting the rapid increase of heat and pressure when the reaction was already out of control. Six safety systems meant to safeguard the use of MIC were either out of commission or not up to the job of neutralising the escaping vapours. No warning sounded as the gases blasted through the chief safety device at some 200 times the pressure it had been designed to handle.

A father’s raw grief on the morning of 3 December 1984, after pleas for doctors to “save my son” came too late at Hamidia hospital, Bhopal. Photo Credit: Kamlesh Jamini (Jamini Photo Studio Bhopal)

The gleaming tower and pipework of Union Carbide’s MIC unit in Bhopal, shortly before it began manufacturing the deadly chemical in 1980. The white tower in the foreground is the “vent gas scrubber”, the unit’s chief safety device which proved to be entirely unfit to meet the heat, pressure and quantity of gases that blasted through it on the night of 2 December 1984. Photo Credit: Kamlesh Jamini (Jamini Photo Studio Bhopal)

A vast poison cloud formed above the plant’s tangle of pipework. Caught by a cold northerly breeze, it drifted down and rolled towards Bhopal’s central train station, swiftly and silently blanketing 16 square miles of the sleeping city. By the time locals awoke to the danger, the gas was already upon them, dense, burning, suffocating.

What followed is commonly known as the worst industrial catastrophe in history. The figures defy ordinary comprehension: best estimates say that within the first 72 hours, between 8000 and 10,000 men, women and children perished, many in the most atrocious ways. Over the first weeks, 160,000 were admitted to local hospitals, but this was
only the beginning. Officially recognised victims of Union Carbide’s disaster in Bhopal now total almost 600,000, whereas unofficial estimates place the death toll today at 25,000, or possibly more.

**Disaster by design**

Union Carbide used MIC as an intermediate in the manufacture of carbamate pesticides like Sevin, which in the late 1960s found a growing market in “Green Revolution” India. By 1972, US engineers began designing major “high technology” units for manufacture in Bhopal, based upon Carbide’s only other existing facility in Institute, West Virginia. Signed technology transfer agreements, “the best manufacturing information presently available from or to Union Carbide” was promised Union Carbide India Ltd (UCIL), a local subsidiary incorporated by the American parent in 1934.

Carbide nevertheless deviated from these agreements within three weeks. “Unproven technology” was designated for the MIC–Sevin process in an effort to cut 25 per cent from the cost of the US$28 million investment. The reason? Under the terms of India’s new Foreign Equity Regulation Act (FERA), overseas investments were subject to strict controls. Larger investment in Bhopal threatened to dilute Carbide’s majority shareholding in UCIL. A loss of majority equity would lead to a loss of management control, and hence a loss of royalties, technical and service fees.

Early ambitions for Bhopal were soon tempered by other economic realities. Described as “an oversized plant for an undersized market”, the company considered abandoning the project altogether, even before the build-stage was complete. But the plant was critical to Carbide’s plan to gain special exemption from FERA and in this way hold onto a majority of UCIL. The project therefore continued, but planned investments were again slashed. This time, construction materials were among the compromises: in one instance, local carbon steel parts replaced “expensive American-standard” steel.

Due to its corrosiveness, carbon steel is incompatible with MIC. Stainless steel is an inherently safer choice which mitigates the rusting hazard. In an earlier “Corrosion Review”, engineers at Institute, West Virginia, reported that over 448 days of operations almost every item in the MIC unit had failed and been replaced. They insisted that if another facility was built to manufacture MIC, “materials of construction at least as good as those presently used... will be required”. For Carbide, however, equity seems to have trumped safety.

**Non-standard procedures**

Kenneth Bloch, a PHA/loss control engineer, detailed some of the major process safety failures in Bhopal in *Hydrocarbon Processing* (2012). A series of chronic MIC leaks from as early as 1982 (see sidebox) led to the introduction of alternative safety procedures. Bloch points out that “non-standard operating procedures may address one hazard while introducing others”. In Bhopal they interrupted the flow of nitrogen into system parts made from carbon steel, letting in air and thereby allowing pipes to corrode. Maintenance procedures had to be devised to flush out MIC trimer deposits.

**“By the time locals awoke to the danger, the gas was already upon them, dense, burning, suffocating”**
with water – routine water-washing is considered the likeliest source of the iron and water that were catalysing agents in the eventual disaster.

Had MIC been kept at 0°C for safe storage, as required by manuals, there may have been time to prevent catalysts causing a thermal runaway reaction. However, a number of seal failures connected to circulation pumps led to a decision to shut down the MIC refrigeration system. MIC was henceforth stored between 15°C and 40°C, thus, high temperature alarms were also disconnected. If the tank temperature soared, there would now be no warning.

Skilled operators are also key to hazard management. But in 1983 a major “operations improvement program”, driven by losses and equity priorities, saved the company a cool US$1.25 million by, among other things, making 333 workers redundant. As a result, UCIL managers made Bhopal unions sign a memorandum of agreement “eliminating such work practices which are not conducive to efficient working of the plant”. Numbers of field maintenance staff and operators in the MIC unit were halved. Operator training was slashed from six months to two weeks. Managers in Hong Kong observed that “future savings of such magnitude would not be easy”. There was little left to cut.

Disaster without end
Over time, communities usually find ways to recover from natural disasters. A technological disaster endures. Bhopal has a beginning, but no end. It is happening still, and it is happening now, even as you read these words.

MIC didn’t only attack the lungs. Crossing the pulmonary barrier, it hitched onto amino acids, was ferried through the blood, then broke down, causing damage to organs, to immune, nervous and reproductive systems, to cells and to genes. Community researchers recently confirmed worst fears. Those exposed to gas are developing cancers – chiefly of the kidneys, throat and lungs – at 10 times the rate of locals who were unexposed.

It doesn’t stop at this. Damaged children are being born in Bhopal in such numbers that there is really no foreseeable end to Carbide’s disaster.
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That “The essence of (the) proposed solution, lies in an attempt to use water supplies in the Bhopal area…”, concluding design risked the “danger of polluting subsurface evaporation ponds” but also warned that Virginia designed the three enormous “solar panels” from Union Carbide’s Technical Centre in West Virginia. That thousands of people. In 2006, a team of doctors held a camp in these areas. One said they had never seen so many cases of cerebral palsy in a single population. Residents of 42 housing colonies are among the first to be gassed.

“Less advanced environmental consciousness”

Even if the 1984 disaster had been averted, Bhopal would have suffered a chemical tragedy. During normal operations, huge quantities of toxic waste were routinely dumped in and around the site, with thousands of tonnes buried in unlined pits. Sodium chloride wastes were also pumped into huge lakes a few hundred metres north. Engineers from Union Carbide’s Technical Centre in West Virginia designed the three enormous “solar evaporation ponds” but also warned that the design risked the “danger of polluting subsurface water supplies in the Bhopal area…”, concluding that “The essence of (the) proposed solution, lies in the less advanced environmental consciousness (sic) in India.”

By 1989, Carbide began testing soil and water samples from the factory site and found every sample lethal to fish. Toxic chemicals had leached from the abandoned waste into the groundwater aquifer of nearby slums, which residents were using as their primary supply. Carbide kept the test findings to itself, issuing no warning to locals. Chemicals found in Bhopal community wells are known to damage the brain, liver and nervous system and cause cancers and birth defects. Although a full contamination survey has never been carried out, various studies reveal that toxic chemicals have spread for several miles through the underground aquifer, affecting tens of thousands of people. In 2006, a team of doctors held a camp in these areas. One said they had never seen so many cases of cerebral palsy in a single population. Residents of 42 housing colonies are now potentially exposed to contaminated water. In 1984, a number of those colonies were among the first to be gassed.

Multiple warnings before the disaster

Between 1978 and 1984 the Department of Industry Safety and Health recorded six major accidents at the plant – a figure which workers at the plant dispute as under-counted. As a direct result, one worker died and at least 47 were injured, many seriously.

In December 1981, one engineer died after a leak exposed him to liquid phosgene.

In January 1982, a ceramic pump seal shattered, releasing phosgene and hospitalising 24 workers.

In February 1982, an MIC leak injured 18. Unions lobbied visiting overseas executives about the dangerous conditions due to failing equipment.

In May 1982, parent Union Carbide conducted an “Operational Safety Survey” that noted numerous lapses in safety regulations, highlighting 10 hazards classified as “major” in the fatal MIC unit alone. The auditors also praised the factory’s “creative approach” to improving workplace safety with non-standard operating and maintenance procedures.

On 5 October 1982, hundreds of residents of adjacent slums fled their homes when a loose-fitting valve released a cloud of MIC, chloroform and hydrochloric acid, seriously injuring four workers.

Shortly after, workers’ unions led a community awareness campaign with thousands of warning posters. “Lives of thousands of workers and citizens in danger because of poisonous gas”; “Safety measures deficient”.

The incidents prompted a series of articles by a local journalist warning of a major disaster, leading to questions in the state parliament but no action. Local factory inspectors, dependent on Union Carbide’s technical know-how and reassurances, renewed the plant’s manufacturing licence 15 times.

Standing with the survivors

In 1989, India settled with Carbide out-of-court for 15 per cent of its original claims. For the deaths of thousands and the maiming of half a million more, Carbide’s punishment amounted to a 0.49 cent per share hit on pre-tax dividends for the 1989 financial year. It granted $2000 for each death, $500 to each incurably ill victim.

Today there are thousands of families all over Bhopal who are desperately ill, penniless, without social support, without effective medical treatment, without emotional or psychological closure, caught up in an endless cycle of re-victimisation.

Unable to stand by and watch innocent people suffer and die without help, ordinary people around the world have joined together to fund two award-winning clinics in Bhopal. Both were founded by survivors themselves and are the only places where 10,000 families poisoned by waterborne toxins can go for free first-class care.

The Sambhavna Trust has eased the suffering of over 32,000 people by combining conventional and Ayurvedic medicine with community health work. The Chingari Trust offers hundreds of children physiotherapy and speech therapy, skills training and basic education. There is no one else to do this work.

Tim Edwards is executive trustee and Colin Toogood is campaigns manager for British charity The Bhopal Medical Appeal. Edwards has advocated on behalf of Bhopal for twenty years, advising on the social, legal, environmental and medical complexities of Union Carbide’s disaster. For more information visit www.bhopal.org.
“Far too many business leaders don’t understand culture, let alone how to shift it”
Improving OHS through changing culture and understanding psychology

The 2018 SIA National Health and Safety Conference brings together stakeholders from across the health and safety profession to discuss challenges facing WHS professionals and practitioners as well as the latest ideas, innovation and research.
up as cultural change,” he says. “While the conversation centres around the integral nature culture has in achieving business outcomes, far too many business leaders don’t understand culture, let alone how to shift it. There are certainly some fantastic cultural leaders out there, but in my experience they’re a rarity rather than the norm.”

Hill explains that the biggest barrier to culture change is an emotional investment into the belief that it needs to change, as culture change is often seen as a KPI or business strategy rather than the foundation that allows strategy to be executed. Importantly, behaviour change is the result of when beliefs and state change, rather than the primary driver. “The challenge for business leaders is to actively demonstrate the behaviours that align to a certain belief change. If this isn’t done explicitly, the integrity of the message is already challenged,” he says.

There are a number of steps companies can take to resolve these challenges and effect genuine culture change, according to Hill. “Have more conversations about: a) what they want to become as a culture, then b) what new beliefs we need to adopt for that to happen, and then c) how we might demonstrate this new belief through our behaviours in our work,” he says.

“The last of these steps isn’t simply adopting the new behaviours you require from your people, but rather a significant shift in your behaviours. If you can’t demonstrate willingness to change as a leader, then why would your people?”

This also has a number of implications for OHS in encouraging safe behaviour and improving OHS outcomes, Hill adds. “OHS has improved markedly over the years through controls and processes, yet we know that no matter how controlled the environment can become, risks will still present themselves. So to go from a compliant OHS culture to another level requires working on the beliefs our people hold about safety,” he says. “Until we tackle this deepest driver of behaviour, we’ll be destined to create attitudes toward safety that are simply automated, unthinking process at best, and box-ticking at worst.”

Hill says it is important for OHS professionals to firstly be the embodiment of belief in safety (not just the person who follows procedures) and secondly, engage key influencers in the business to emotionally engage in the conversation around OHS. “Until this happens, you won’t shift the prevailing beliefs around safety nor the behaviours required to go beyond best practice,” he says.

**How to improve psychological safety and OHS outcomes**

Also speaking at the conference is lead biological safety adviser for the University of Queensland, Amanda Jones, who says that most organisations generally don’t understand or apply psychological safety and achieve the goal of genuinely improving OHS outcomes.

Some larger organisations which are big on innovation (like Google and Facebook) have made names for themselves, in part, from the types of workplaces they provide. “These are the types of workplaces we all wish we worked in – comfy lounges and foosball tables in the teashop, free (good) food, and vending machines, flexible work hours, and so on. These types of organisations typically spend a lot of time and resources on all things new (even though the concept of psychological safety isn’t really new). But are these workplaces actually any safer to work in? Probably,” she says.

Jones also explains that more traditional industry organisations (such as medium-sized manufacturers or service/supplier type organisations) have probably been a little slower to take up the banner of “psychological safety”, possibly due in part to understanding or applying the principles but also due to traditional safety values. “And these organisations don’t necessarily have poorer OHS outcomes, and being totally different industries, we can’t compare directly with organisations like Google. But they certainly don’t have the employee ‘job satisfaction’ ratings that Google does, and we can draw inferences from those ratings and accident and incident rate,” she says.

“We also have every type of organisation at every stage of management or OHS maturity in between, who have varying acceptance of the concepts of psychological safety, and varying degrees of application of the principles.”

There are a number of important implications in this for OHS professionals, according to Jones. “The good news is, you don’t need to do brain scans of all your workers to know what makes them tick. And you don’t have to have a PhD in neuroscience or psychology to be able to apply some basic psychological safety practices in a workplace. You do need to know your organisation, know what your safety systems are currently and know where you want them to be in the future or how you want to change your OHS outcomes. Once you know that, psychological safety practices can help you achieve that end point,” says Jones.

As with many areas of OHS, she says it can be beneficial to get a specialist in to help apply some of the principles from psychological safety systems to your organisation. However, she says there are many things OHS professionals can do themselves, and in fact they can often achieve greater change from the inside as they don’t have some of the barriers.

“Your knowledge on how well the organisation will adapt to change, you know what the culture is,” she says. “And as OHS professionals we have to be masters of change management – changing ourselves so that we can support our organisations, but also managing our organisations through change from traditional thinking to adopt new learnings or new technologies so that we can achieve the best safety outcomes possible.”

**How to improve psychological safety and OHS outcomes**

Anton Zytnik, senior OHS/WorkCover consultant with the Victorian Chamber of Commerce and Industry, says the impact
of cognitive bias on safety risks is not fully understood in many organisations – which still have a way to go in better understanding and managing cognitive bias with a view to improving OHS outcomes.

“It is still an emerging topic, particularly in safety,” he says. “Cognitive biases affect the way we make all types of professional decisions, and much of the focus has been on decision bias in areas like behavioural finance, recruitment, project management and so on.”

There are a number of issues in this for OHS professionals, according to Zytnik, who says the challenge is twofold for OHS. “Not only do we have to recognise and tactfully challenge cognitive bias in business leaders, but we also have to recognise our own biases and be prepared to consider information and opinions that may challenge some of our deeply held views,” he says.

“As OHS professionals we need to be able to think clearly and talk persuasively about risk. Unfortunately, cognitive biases distort the way we think about the probability and consequences of future events, which is why in so many businesses there is a mismatch between perceived and actual risk.”

Zytnik says it is in every OHS professional’s interest to better understand these biases in others and themselves so they can make better decisions and have safer workplaces.

There are many kinds of cognitive biases, including the “availability heuristic”, which is the tendency to rely on information that can easily be recalled when making decisions. “We have all experienced workplaces that react quickly and decisively to remedy a safety breach once there has been a serious injury, but failed to appreciate the risk one day before,” he says.

“The immediacy and vividness of an example increases risk perception, whereas the absence of an example leads to complacency. Safe workplaces understand their level of risk at all times; unsafe workplaces assume they are safe because nothing bad has happened yet.”

There are a number of steps OHS professionals can take in the process – the simplest of which is to raise awareness about cognitive bias and its implications for safety management. “Just talking openly about biases and appreciating that they may impact your decisions will have positive effects in all areas of a business, not just in safety,” says Zytnik. “Another step is to design your safety processes in a way that limits the influence of cognitive bias. For example, actor–observer bias inclines us to blame an employee’s personality for behaviour that led to an incident (“John is lazy and wasn’t paying attention”) and underestimate the importance of the situation (“The lighting was insufficient and there were trip hazards everywhere”).”

Zytnik also says that well-designed incident investigation processes and documents will oblige the investigation team to consider systemic factors, and not simply conclude that “John” needs to pay more attention next time.
Rehabilitation: work and beyond (3rd edition)

Editors: Tanya Barrett, Elana Strickland & Debra Browne
Publisher: Safety and Rehabilitation Books
RRP: $89.95

When I worked as a safety and health professional in industry, as well as putting safety in the design stage as much as possible, I also had to manage what went wrong. What went wrong could sometimes result in an employee becoming sick or injured at work, needing injury management and making a workers’ compensation claim. There was no published book that I found that provided me with information on what to do when I had to manage employees’ rehabilitation back to work.

When teaching safety and health students at Edith Cowan University, in the safety and health course we had a unit of study on rehabilitation and workers’ compensation management, but I was unable to find any relevant textbooks to be used for this unit of study. I spoke to Tanya Barrett about this problem. Tanya is very experienced at working in this area so, with other experts in return-to-work management and representatives working in the insurance industry, a book was written called Rehabilitation: work and beyond. I immediately used this book for classroom and distance education teaching.

This book is divided into six sections. The first section is called “Setting the scene”. It includes an introduction to what rehabilitation is, what needs to be completed in a workplace to support employee return-to-work programs and the findings of a research study on prevention of long-duration workers’ compensation claims. The second section includes information about employee rehabilitation from a business perspective. It provides an overview of workers’ compensation in Australia and other countries, how the organisational structure can be used to facilitate employee rehabilitation and injury management programs, case study stories about how companies improved staff productivity and reduced workers’ compensation costs, and how to do a cost–benefit analysis to show management that having a well-managed return-to-work program can increase business profitability.

The following section of the book provides information about the services and interventions required to support employee return or entry (for a redeployment program) to the workplace. It covers the role of the occupational physician in workplace rehabilitation, how to conduct a functional capacity evaluation, and the role of other members of the employee return-to-work program team. This is followed by chapters that include information on evidence-based practice in treatment and how to partner with treatment providers who include physiotherapists, psychologists and occupational therapists.

The fifth section of the book focuses on the management of return to work for employees, rehabilitation and claims management. It provides information about the role of the insurer and how to use the insurer to better manage workers’ rehabilitation and return to work. Information is provided about using people employed to work at the company (in-house rehabilitation providers), external rehabilitation providers, and when it is best to use each of these providers. Information is then provided on key strategies to use for successful rehabilitation and advanced case management strategies. Chapters in the last section of the book relate to quality management for effective workplace employee rehabilitation and include a rehabilitation checklist for practitioners, what it takes to be an effective workplace rehabilitation provider, how to evaluate the quality of service, and providers’ return-to-work management.

For me, what makes this book an effective learning resource is that it is the only book I have found that has practical experience stories from people working in the rehabilitation and workers’ compensation field, it includes checklists for practitioners to use, key interventions and advanced case management strategies. The book is easy to read and it looks at important factors that include mental as well as physical health and a cost–benefit analysis for workplace rehabilitation strategies, which is a very useful tool to use to convince management of the value of effective employee rehabilitation. I now work at Curtin University and continue to use this book as a text for our compensation and injury management unit of study. I receive very good feedback from students about how useful this textbook is, not only for their studies but also to use when working in industry. As well as being used by occupational health and safety students, occupational medical professionals and other people who are involved with managing employee return-to-work programs and workers’ compensation, this book is also a prescribed textbook for students studying occupational therapy. All profits from the sale of this book are donated to recognised research organisations for research in the areas of rehabilitation and safety.

Reviewed by Dr Janis Jansz (RN, RM, Dip. Teaching, BSc. NM., Grad. Dip. OHS, MPH, PhD), Associate Professor, Occupational Health & Safety Environmental Health, School of Public Health, Faculty of Health Science, Curtin University

More information on the content of this book is available from www.safetyandrehabilitationbooks.com
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