

Anticipating the sources
of health and safety risk
in construction
Know the worth of risk.



Anticipating the sources of health and safety risk is paramount in construction and has been subject to increasing focus over the past 5 to 10 years. Safety performance has plateaued as the impacts of health and safety interventions are not what they should be. Deloitte has identified the following causal factors in the plateau in safety performance:

- Business objectives tend to limit the ability for safety performance improvement as they inherently focus on a numeric value (e.g. LTIFR), rather than measuring areas that impact front line safety behaviour. The focus on a numeric value is a comfort issue – we know numbers. As a result, Boards and Executive demand lower performance numbers without fully understanding why. The problem is – does a lower numeric indicator equal a safe workplace?
- Pre-construction activities do not adequately focus on health and safety requirements. Organisations are placing too much emphasis on measuring site-based controls during the construction phase, rather than up front risk analysis and design in pre-construction works
- Traditional safety performance indicators used in construction have reached their expiry date. The vast majority of indicators focus on site performance and control-based processes, and fail to address decisions or events occurring upstream of site and in the pre-construction phases of the project lifecycle. Without addressing these sources of risk, traditional indicators offer little information to decision makers who aim to anticipate and prevent incidents.

Deloitte seeks to challenge current thinking around the measurement of safety performance in construction. We suggest that a new approach is needed, one based on predictive analysis and uncharted indicators of safety risk in the pre-construction phases of the project lifecycle. More action is needed in the following areas:

- Building clear leadership and accountability for safety performance
- Leveraging the power of data
- Predicting and preventing incidents through targeted interventions
- Providing insights that can be shared from project to project to improve pre-construction health and safety related activities
- Measuring the Return on Investment on safety.

A new approach to performance measurement is needed – one based on predictive analysis and uncharted sources of risk in the pre-construction phases of the project lifecycle

Introduction

Safety performance has plateaued as the impacts of health and safety interventions are not what they should be

Safety has always been a vital issue during construction related activities. Globally, there has been increased pressure for construction projects to operate safely and move towards 'zero harm' using programmes such as behaviour-based safety to produce significant improvements. Yet it seems that improvements have plateaued as construction continues to be one of the industries experiencing the highest number of serious injuries¹.

With billions spent on construction projects in Australia in 2012/13 – mostly in the mining and resources sector – it's not a surprise that the health and safety of workers has become a primary consideration in project delivery. However, varying standards, poor monitoring and resource constraints have resulted in inconsistent practices being applied to measuring health and safety impact or success. The inconsistency has resulted in poor, lagging metrics being used to monitor health and safety performance with limited focus on forward-looking, risk based metrics and a myopic view on safety performance.

For an organisation to determine whether it is achieving its objectives – whether those objectives are performance or compliance related – metrics need to measure impact and inform decisions for affecting change and developing intervention strategies to prevent harm. Our experience also tells us that safety performance measures need to measure risk² – otherwise we are not managing the effects of uncertainty on the workforce. There is much to gain from a shift from performance monitoring to proactive intervention through predictive analysis.

Herein lies the problem, how do you know what you don't know?

It may not be a surprise, but what you don't know can hurt you. The trouble is... you don't know what you don't know



¹ Key Work Health and Safety Statistics, Australia. Safe Work Australia. 2013.

² Risk is defined by AS/NZS 31000:2009 as the effect of uncertainty on objectives. Objectives can have different aspects (e.g. financial, Health and Safety), and can apply at different levels of an organisation (e.g. strategic, operational and tactical)

Current state of play

Whilst there has been a marked improvement in safety performance in the construction industry in the past 10 years, fatalities remain unacceptably high and the incidence rate of serious workers' compensation claims remains higher in the construction industry compared to other industries³. Coupled with increasing community expectations to ensure that workers 'go home safe' at the end of each and every shift – something needs to be done to decrease the level of incidents.

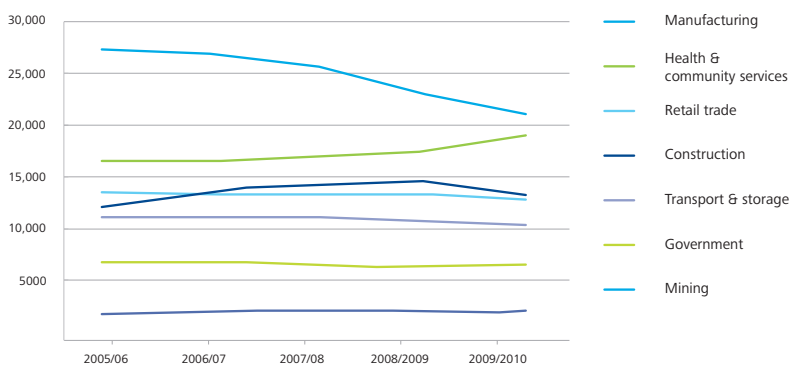
The lack of sufficient understanding of the underlying root cause of safety incidents, together with a lack of balanced indicators designed to predict and pre-empt incidents, limits sustainable improvement in construction safety compared to other high risk industries. Safe Work Australia's Notifiable Fatalities Monthly Report⁵ reports that there has been 19 construction related fatalities in the 11 month period to November 2013. The 19 fatalities represent 10% of the total 194 work place fatalities in Australia since the beginning of the 2013 calendar year and is very high compared to other industries.

The graph shows the number of serious claims by industry between 2005 and 2011. The construction industry is the third highest contributor to the total number of serious claims and has a relatively stable volume of claims each year. The consistent volume appears to indicate that intervention strategies and performance monitoring practices are not effectively **improving** safety in the construction industry.

Business objectives are not driving the appropriate change in culture that is needed to reduce incidents

Few things influence organisational strategy, business outcomes and the mental health and wellbeing of the workforce quite as profoundly as safety. Traditional health and safety organisational objectives, such as targeting a 20% reduction in Lost Time Injuries (LTI) in a calendar year, promotes a myopic view of what is important to the business and ultimately focuses attention on the wrong objective. It may seem counter intuitive asking an organisation to not only focus its business objectives on reducing its LTIs, however, it is increasingly common that such business objectives have unintended consequences.

Number of serious claim by industry - 2005 to 2011



Source: Compendium of workers' compensation statistics Australia 2010/11. Safe Work Australia, dated March 2013.

Of the significant amount of research into models of incident causation and safety program effectiveness, no single model has provided a sufficient understanding of the underlying causes of construction incidents to help prevent the same kinds of incidents reoccurring⁴. Because of this lack of understanding organisations have tended to 'throw' resources at the problem to have health and safety professionals on the ground in an attempt to protect staff. A dangerous culture of 'leave it to the safety person' has emerged, meaning that management and workers are not taking active responsibility for safety.

³ State of Play: The Australian Construction Industry in 2008' Australian Constructors Association and Australian Industry Group ((25.3 claims per 1,000 employees in 2005-06), compared to the aggregate for all industries (15.6 claims))

⁴ Brown, I. D. (1995). "Accident reporting and analysis." In Wilson, J. R., and Corlett, E. N. (1995). Evaluation of Human Work. Taylor & Francis, London, England

⁵ Notifiable Fatalities Monthly Report. Safe Work Australia. November 2013

For example, let's consider an organisation's Executive mandate that in 2014, the organisation must achieve a 20% reduction in Lost Time Injury Frequency Rate (LTIFR). While the organisation may use balanced initiatives and informed means to achieve its targets, this mandate is likely to result in other outcomes, such as:

1. The organisation achieves the target and celebrates success with incentive payments, which at first, may sound positive. However the actual result is a shift to a culture of underreporting and a desire to hide from bad news
2. The organisation does not achieve the 20% target, and workers perceive that management was not truly committed to achieving its objectives – that is, the objective of 'zero harm' or 'keeping me safe and free from harm' is viewed with cynicism and disbelief.

But why are organisations focusing on a numeric indicator? The introduction of the 'Bird' safety triangle many years ago has shaped the current reporting culture. In haste to comply with the safety triangle, many organisations have forced safety indicators upon the business to report incidents and/or observations on a regular basis, which has over-emphasised the 'coffee cup problem'.

Safety reports are now being issued with incidents like 'coffee with no lid' and 'water on the kitchen floor', which pads out the lower section of the pyramid. Such low-level reports are never going to provide insight for high-risk safety incidents and potential fatalities, but are 'necessary' to maintain the shape of the triangle. Large equipment users, as an example, fill the middle of the triangle; with lower back strain and near misses with equipment being legitimate incidents that need reporting and thorough incident analysis. Operations with high-risk tactical activities focus on the top of the triangle, only reporting those incidents they are forced to, with little contribution to the rest of the triangle.

The 'coffee cup problem' means that safety reporting is now inundated with low value, high volume reports that dilute the value of safety reporting. So building organisational objectives focused on reducing LTIFR by 20% may not have the desired effect on performance as the focus will ultimately centre on low-value actions.

Coffee Cup Problem

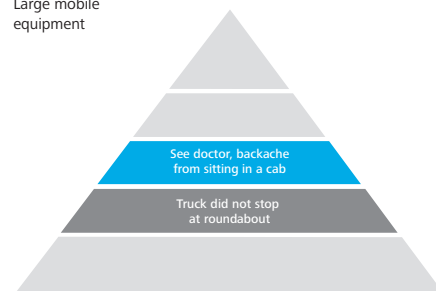
The safety triangle



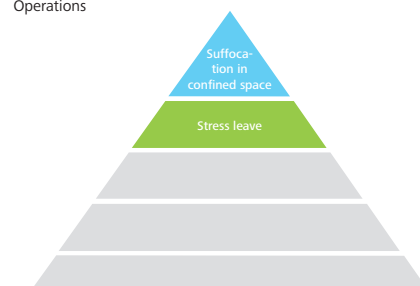
Corporate



Large mobile equipment



Operations

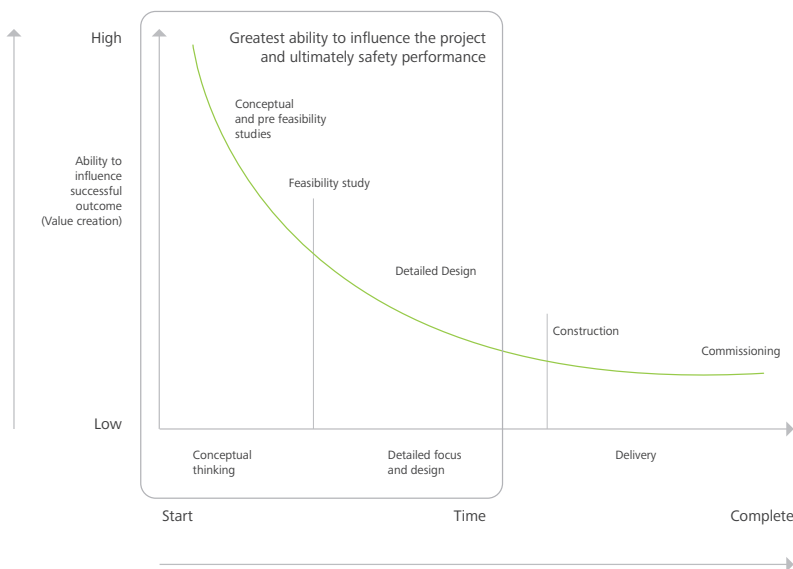


If you're not measuring risk at pre-construction, you're not effectively managing risk during construction

If an organisation's approach to health and safety is reactive in nature, it is likely that the organisation has not sufficiently defined its processes to gain useful insight into the safety risks within its operations. Research indicates that up to 94% of critical safety incidents at construction sites can be attributed to 'originating influences' such as design, procurement or project planning prior to the construction phase or upstream from site⁶. However, when it comes to safety performance monitoring in the construction industry, organisations remain fixated on measuring the application, failure or absence of site-based controls during the construction phase.

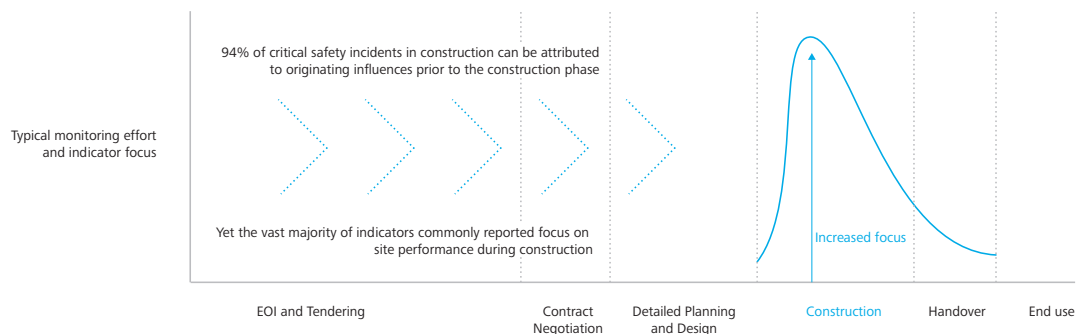
Most good projects are developed through a stage-gated process with defined objectives, deliverables and reviews. The early study stages of a project represent a progressive increase in confidence in the technical, economic and sustainable development parameters used to decide whether the project is viable. The greatest opportunity to influence the final value/outcome of a project occurs during the early stages. The early study stages permit many options and decisions to be considered and challenged. The options and decisions are then systematically eliminated to provide the optimised solution to be taken forward into feasibility for detailed and accurate definition. When the project nears commissioning there is limited potential for further value to be added. The diagram below highlights this diminishing value:

The common misconception is that completing a Hazard Identification (HAZID) workshop during pre-construction demonstrates a 'commitment' to safety. But why aren't the outcomes of these workshops tracked and monitored for completion? Why aren't senior managers and organisational leaders' involvement in meaningful safety design discussions tracked? The usual answer is that the focus shifts away from safe design to on-site physical hazards and high-risk tasks once construction commences. The diagram on the next page represents the project lifecycle overlaid with the perceived level of current focus on health and safety indicators.



⁶ Research Report 156 'Causal factors in construction accidents' Health and safety Executive, UK, 2003

Construction lifecycle phases and typical monitoring effort



Indicators that measure the failure rate or absence of established site controls, known as 'lag' indicators (such as LTIFR), focus on past failures rather than future opportunities to anticipate and pre-empt system failures or human error. Even so called 'lead' indicators (such as the close-out rate of corrective actions) are based on established systematic processes and do not necessarily address upstream sources of risk. Such indicators promote the wrong behaviours, rather than assist management and Executive to be proactive.

Performance reports that focus on these typical lead and lag indicators cannot provide meaningful insights to predict incidents that can be easily shared from project to project. Such performance reports are largely uninformative for decision makers. This is not to say that such indicators do not have a place in monitoring the application of systematic processes. However, if you are not actively identifying and measuring risk, you cannot respond, control, monitor or escalate. In short, you cannot effectively manage your exposure to harm and an actual risk event.

Performance monitoring in the industry has not kept pace with changing risk profiles, legal obligations or current knowledge and understanding of project lifecycle risk. Indicators need to be designed to identify risk at its source and flag it to decision makers before it is too late. For instance, if you are not monitoring the effectiveness of your design controls prior to and during construction and handover, how can you manage your risk on the ground?

Traditional safety performance indicators used in construction have reached their expiry date

Part of the problem is that as humans, we like to measure what we know, namely our actions and the outcomes of our activities. We are not comfortable measuring what we inherently do not understand (uncertainty). Deloitte's research into the types of performance measures that organisations are reporting across industries makes the following observations:

- There is still an over-reliance on lag indicators, compared to lead indicators
- Organisations have not matured to the extent where positive performance indicators have been developed and implemented
- Where organisations have said that they have developed positive performance indicators, often these are lag indicators spun in a positive manner.

Positive performance indicators should have the following characteristics:

1. Provide an indication as to how well safety is implemented by management and workers
2. Measure the process of safety, instead of purely focusing on outcomes
3. Incorporate the three elements of 'control' – being people, process and systems. Without addressing any one of these elements, you may think you are controlling risk, but there are large opportunities for risks to crystallise.

The below table provides an example of the types of metrics, both lead and lag, currently measured by various industries:

| Industry # of staff | Construction 5,000 staff | Energy 18,000 staff | Manufacturing 4,000 staff | Resources 30,000 staff |
|------------------------|--|---|--|--|
| Lead indicators | Number of new starters provided with induction | Percentage of total workforce represented on health and safety committees | Number of OHS representatives by total workers employed | Number of Health and Safety committee members attended per meeting |
| | Time taken to close out actions arising from workplace incidents | | | Number of disaster risk assessment performed at sites per month |
| | Executive Committee member attendance at Health and Safety Committee | | | Number of emergency drills conducted |
| | Number of audits performed | | | Percentage of successful drug and alcohol test scores |
| Lag indicators | Number of fatalities | Number of fatalities | Number of near misses | All injury frequency rate |
| | LTIFR on a base of 1 million man hours | Total number of incidents | LTIFR on a base of 1 million man hours | Number of fatalities |
| | | LTIFR on a base of 1 million man hours | Medical Treatment Frequency Rate (MTFR) on a base of 1 million man hours | Number of near misses |
| | | Dollar value spent on fines | Medical treatment injuries resulting in restricted work duties | LTIFR on a base of 200,000 man hours |
| | | Total number of non-monetary sanctions for non-compliance | | Injuries resulting in the use of first aid |
| | | | | Health and Safety fines and prosecutions |

The table shows the emphasis on ‘what has happened?’ rather than ‘what’s going to happen and how can we manage it?’. Whilst it may appear that there are ‘Lead’ indicators in place. These really are lag indicators with a positive spin.

We have observed organisations blame their focus on the past on the data that they collect. Until recent years, organisations have not typically had the means to effectively assess and measure the source of risk beyond typical safety performance reports. But this situation is changing – and can now be pushed further to move the focus away from the past toward the future.

What are the drivers for change?

#1 Increasing policy and regulation in work health and safety

Harmonisation and reforms to health and safety legislation requires organisations to consider sources of safety risk beyond the traditional notions of workplace safety. New laws are increasing the upstream obligations of designers, engineers and suppliers, whilst expanding duties of Officers⁷ and their due diligence requirements.

Due diligence, as defined by the Work Health and Safety Act 2011, consists of six components:

Work Health and Safety Act 2011 due diligence requirements

| | |
|--|---|
| Knowledge of WHS matters | ✓ |
| Understanding of the nature of the operations of the business and the associated hazards and risks | ✓ |
| Resources and processes | ✓ |
| Information regarding incidents, hazards and risks and responding in a timely way | ✓ |
| Legal compliance | ✓ |
| Verify the provision and use of the resources and processes | ✓ |

Source: M.Tooma, *Due Diligence: Duty of Officers*. 2012

To support Officers in meeting their due diligence requirements, they should be provided with accurate but relevant information to make informed decisions. As these changes expand the liability of construction organisations, as well as that of clients, business partners and service providers, there needs to be clearer focus on what is measured and how intervention strategies are designed to impact organisational performance.

Also, new requirements to consult with other duty holders force organisations to address these interfaces as a source of risk and to address extended liability where it has not existed before. For example, organisation X as a 'principal contractor' may be required by the 'owner' to provide periodic reports – but how often are principal contractors involved in the reporting of its sub-contractors?

#2 Personal liability of Directors – what do they need to know?

Perhaps the most critical change (as a consequence of changing legislative landscape) affecting organisations is the introduction of personal liability for Officers and directors. In addition to criminal culpability (penalties including fines and imprisonment), Officers now have positive duties to exercise 'due diligence' to ensure that the organisation complies with its duties and obligations. Expanded duties and personal liabilities provide the imperative for decision makers to demand access to better information for managing risks to health and safety associated with their operations.

Non-Executive Directors are also faced with a complex challenge. They are technically liable under the legislation, but are only involved in the organisation for limited periods of time, relying heavily on information provided by the business – further emphasising the question: 'how do you know what you don't know?'

⁷ Officer of a corporation means (as defined by Part 1.2, Division 1 Section 9 of the Corporations Act 2001):

(a) a director or secretary of the corporation; or

(b) a person:

(i) who makes, or participates in making, decisions that affect the whole, or a substantial part, of the business of the corporation; or

(ii) who has the capacity to affect significantly the corporation's financial standing; or

(iii) in accordance with whose instructions or wishes the directors of the corporation are accustomed to act (excluding advice given by the person in the proper performance of functions attaching to the person's professional capacity or their business relationship with the directors or the corporation); or

(c) a receiver, or receiver and manager, of the property of the corporation; or

(d) an administrator of the corporation; or

(e) an administrator of a deed of company arrangement executed by the corporation; or

(f) a liquidator of the corporation; or

(g) a trustee or other person administering a compromise or arrangement made between the corporation and someone else.

#3 Acute people challenges in the industry compound operational safety risks

Expanding operational risk profiles are compounded by acute people challenges such as an ageing workforce, the skills shortage and an absence of effective resource planning in the industry.

The growing demand for workers means wages and turnover costs will rise as workers are enticed to switch to higher paying roles. For example, growing demand issues are highly relevant and applicable for construction work in the telecommunications industry because of the upscale in construction related activities. Our recent work with a major player in the industry has highlighted the significant demand for resources, especially for multi-disciplined workers, such as riggers and telecommunication technical specialists (known in the industry as 'triggers').

The net effect on safety is that experienced and safe workers are harder to recruit and retain, while promotions or transfers of internal staff to meet demand create significant training gaps that must be filled. Without a strong and clear human resourcing strategy, construction organisations could be exposed to greater safety risks.

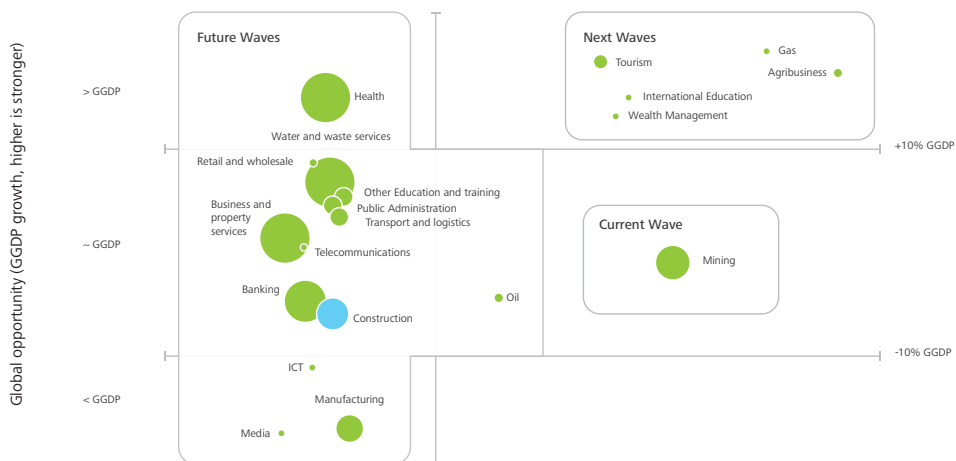
#4 Economic conditions continue to drive diversification and acquisitions, leading to new or amplified operational risks

Despite their overall resilience in the aftermath of the global financial crisis, traditional construction markets in Australia are still constrained. We have seen little to no growth over the past five years in residential, commercial and industrial construction markets, yet significant growth in infrastructure construction, primarily due to significant investment in mining, energy and resources, together with fiscal stimulus on institutional buildings. Deloitte's third edition in the Building the Lucky Country series, titled, Positioning for Prosperity highlights that the construction 'wave' of growth is below GDP growth, which comes with its challenges.

We also see the bigger players increasingly diversifying their portfolios through bids and acquisitions to benefit from the contrasting growth seen in infrastructure, energy and resources, such as the Leighton Contractors Pty Ltd acquisition of Henry Walker Eltin (HWE) Mining and the Lend Lease Group acquisition of engineering and construction firm, Valemus Australia.

Such conditions result in new and amplified operational risks, on top of the exposures faced during transitional integration of acquired entities due to loss of staff and process.

Australia's current, next and future waves of growth, 2013-33



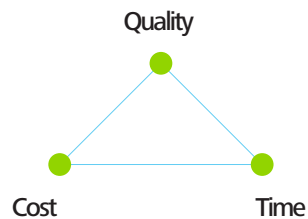
Australian advantage (Right is stronger)

Source: Deloitte Access Economics

#5 Efficient project delivery versus health and safety – we have to do more with less

Typically, an organisation's goal is to maximise shareholder value. Therefore, all activities undertaken and performed by the organisation should enforce and support the organisational goal, by delivering the strategy. In the construction/project world, there are competing challenges between delivering organisational goals, delivering projects efficiently and effectively, as well as maintaining the project management philosophy and approach to achieve sustainable outcomes. The problem is – and this is in no means a new concept – we have to do more with less.

Projects operate on the time, cost and quality paradigm. All three need to be in balance – but current market conditions mean projects have to deliver more with less. Delivering with less may not necessarily involve less money (although it usually is!) but you may have to deliver to the required standard in less time. There may even be an argument that the level of expected quality could be lower?



Given the competing interest in ensuring delivery in a resource constrained environment, health and safety systems are more likely to be circumvented or only delivered superficially in an attempt to demonstrate commitment. This is problematic for a high risk industry, like construction.

#6 Advances in technology

Advances in technology and access to technology are proving to be interesting drivers for change in safety management. Greater access enables management and workers to connect more efficiently and effectively than ever before. Some examples of technological advances that are driving change in the safety space are:

- Smartphone applications for risk assessments, incident response, logging of hazards and providing forms of training and advice
- Location based hazard information, which provides greater information to enable decision making 'at the coal face'
- Deeper ability to use data and predictive analysis to provide real time identification to location aware mobile devices, including wearable technology
- Driverless vehicles, which has already been seen on mine sites and predictive hazard identification capabilities that will be built as standard fit-outs into vehicles such as video, GPS and driver health management.

The list of technological advances is almost limitless, and when combined, enable a greater level of and quicker decision making. If used successfully, promotes a safer work environment.



How do we make a step change in safety performance?

In order to anticipate risk, decision makers need to recognise and better understand the originating influences or 'early indicators' of safety risk. Organisations need to understand exactly what can go wrong during the various stages of the project lifecycle that ultimately leads to poor safety performance. Of equal importance is an understanding of 'what must go right' and how effective targeted programs are for reducing safety risk.

In an attempt to focus activity on driving change, we have identified five actions that an organisation could take to mature its approach to health and safety performance and answer the question – how do you know what you don't know?



Potential action 1: Build clear leadership and accountability for safety performance

Site-based controls for safety tend to be well established due to a direct proximity to the materiality of risk (where the impacts of the risk are felt through incidents). Subsequently, resource allocation, risk management and performance monitoring activities tend to be focused on tactical risks during the construction phase of a project. Conversely, the absence of well-established mechanisms to identify and control project risk prior to the construction phase has led to a skew in the selection of performance indicators towards site team performance.

The current approach to performance monitoring means accountability mechanisms are disproportionately applied to project delivery teams and that safety decisions made by leaders are not effectively measured. The increasing pre-occupation with site team performance is compounded by an out-dated and persistent attitude where safety is perceived to be the 'site's domain'. This is in direct conflict with sentiments of site teams, who often feel they inherit the poor decisions that impact adversely on safety made by those in pre-construction phases. As a result, strategies and efforts to increase leadership and accountability may be undermined, leaving leaders ultimately accountable yet uninformed about what they need to do.

ACTIONS TO CHANGE – what can we do?

To overcome this barrier, an organisation needs to set the tone from the top and encourage active responsibility amongst front line workers. Further, a re-balancing of scorecards and focus is required to hold up-stream designers and decision makers accountable for the safety outcomes and safety impacts that their designs and decisions have on sites during construction.

There is a profound difference between accountability and responsibility. Accountability refers to persons (typically senior members of an organisation) ultimately answerable for areas of the business and its performance. Whereas, responsibility refers to persons (typically staff 'at the coal face' of the operations) actively engaged in delivering an outcome. Separating accountability and responsibility will foster the right culture as well as targeting the first driver for change.



Potential action 2: Leveraging the power of data

Have you ever wondered why you collect the data that you do? Do you know there is other data that your business is collecting which may provide insight into safety? What does the data actually help you achieve? We spend so much time collecting and analysing subsets of data for a specific defined purpose, but do we think laterally about what the data says about us? Mostly, the answer Deloitte receives from our clients is 'no'.

Increasing focus on Board level risk reporting in the industry over the last 12 months is breaking down historical aversions to the collection and analysis of non-functional risk data for risk management purposes, such as tendering and estimating information. Organisations need to focus on measuring the sources of construction risk through innovative data mining and predictive analysis to amplify, demystify and anticipate the sources of risk arising:

- From the activities of organisational decision makers such as functional leads, general managers, bid leads, project planners and estimators, procurers, designers and human resource planners that impact on project safety performance
- At the interfaces with business partners, suppliers and service providers.

An indicator can be used to motivate managers and employees to design and implement important activities and must be used to monitor and evaluate those activities in case there is a need for revision to achieve organisational strategies. The most important aspect of choosing an indicator to measure safety performance is that it must directly reflect the extent to which a desired or expected outcome has been achieved. Indicators must be robust, reliable and most importantly accurate.

Historically, safety practitioners have often chosen ineffective, inadequate, and invalid performance measures. Some of these more traditional, and less exact, forms of safety performance measures include the number of lost workdays, the number of injuries, and financial losses. To avoid the shortcomings of these overly simplistic measures, safety metrics must be based on sound business practices and statistical procedures, and should be used to implement a process of measuring safety programs. A typical barrier to using right metrics has been IT systems not being linked with each other, or difficulties analysing large volumes of data. These excuses are no longer valid.

ACTIONS TO CHANGE – what can we do?

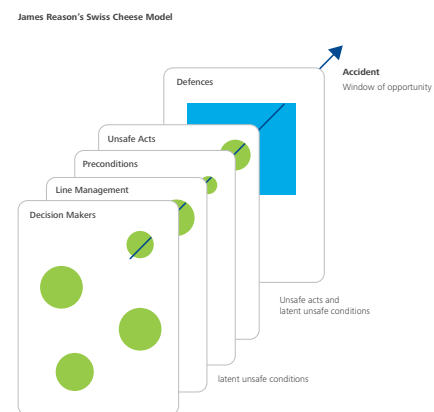
With an increasing uptake of data solutions for common business processes (including performance reviews, project management and finance), the ability to draw on data to discover meaningful correlations between business indicators is significantly expanding. The collection of broader business data enables effective meaningful correlation between safety data, behaviours and business process information to create a new suite of measures. These measures can target behavioural change as the understanding of key drivers and business requirements become increasingly understood.

The ability to design and accurately measure safety indicators depends heavily upon the process that is followed to quantify that performance. The quantification of performance should follow a methodical approach of; problem/indicator definition, standardisation of language and units of measure, source and validate the necessary data streams, develop the method of measurement, form an accurate view of the current baseline, agree definition and baseline with the business, measure and track performance over time, continually improve and refine.



Potential action 3: Predict and prevent incidents through targeted interventions

Incidents ultimately occur because of a series of failures in processes, systems and decisions. James Reason’s ‘Swiss Cheese’ model of incident causation encompasses this position and provides a visualization of the lines of defence used to combat risk. The ‘Swiss Cheese’ model is well established in the construction industry and is often referred to in risk management methodologies in order to determine the most effective combination of controls.



Human factor analysis also considers the situational and personal inclination for unsafe acts in the lead up to an incident. Organisations often invest in safety training and behavioural programs in an attempt to address the likelihood of those final unsafe acts in order to prevent an incident occurring. However, reducing the potential for critical incidents is not simply about influencing the trajectory for that final unsafe act or decision. Rather, achieving the goal of ‘zero harm’ must be about closing the holes in every slice of cheese to truly manage the risk and prevent incidents from occurring.

ACTIONS TO CHANGE – what can we do?

Organisations need to develop intervention strategies aimed at targeting the root causes of incidents and unsafe behaviours to prevent or minimise re-occurrence. Monitoring regimes need to be updated to monitor the right things and be increasingly forward-looking.

Organisations with access to sophisticated safety analytics are better able to use the data that they collect to understand workforce behaviour, predict 'at risk' behaviours and potential 'red flags' that can be managed to prevent incidents. For example, an organisation was confident in its safety analysis, but had not identified individuals at risk of being involved in an incident, engaged Deloitte to perform an in-depth safety analytics. One result was the identification of a group of approximately 200 maintenance workers at risk of fatigue related incidents despite having undertaken fatigue training and working on a roster designed to manage fatigue issues.

One of the determining factors of the group of workers was that the individuals took high amounts of paid overtime. But why? Further analytics identified that these people had certain traits, including: single income households, the workers lived in areas with high mortgages and had a number of young children at home. The analytics profile is known as the 'nappy valley' problem – that is, workers are pre-disposed to taking overtime to achieve minimum lifestyle payments, to the detriment of fatigue issues.

The action required to address the 'nappy valley' problem was different to the typical response of more fatigue training. The typical action would never have addressed the real safety risk. Furthermore, the actual issue would never have been identified through traditional safety measures or analysis.



Potential action 4: Provide insights that can be shared from project to project to enable greater pre-construction health and safety related activities

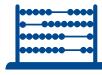
Deloitte research has also indicated that pre-construction activities need to provide greater focus on health and safety risks so as to introduce effective upfront intervention strategies that mature during construction activities.

Without access to risk-based indicators for real time risk management, decision makers have no formal mechanism for sharing lessons and insights from project to project. Using insights from more sophisticated data analytics that are both general and organisation-specific will allow:

- Meaningful benchmarking and industry trend analysis to advance overall safety performance
- Operational excellence and optimisation of safety strategy, providing competitive advantage in the market
- Workforce engagement in problem identification and problem solving to help leaders and managers tackle the 'how' and 'why'.

ACTIONS TO CHANGE – what can we do?

Structured lessons learnt programs need to be initiated in the industry to promote sharing of knowledge. This may be sharing via specific forums designed to engage organisations, or via formal communication channels within organisations to ensure that other project managers are aware of recent incidents. Deloitte believes more needs to be done to promote a culture of 'problem identification' and 'problem solving' with workers to bring to light the operational and organisational causal factors that impact on their day to day safety. These safety conversations help to build awareness and understanding across the organisation of how small changes in operational decisions can have big impacts on how we work and ultimately our safety.



Potential action 5: Measure the Return on Investment on safety

Organisations are spending more and more money on safety without seeing consistent or proportionate benefits. We demand ‘bang for buck’ from large-scale change programs and yet for years, safety has escaped the same business scrutiny of delivering measured outcomes from initiatives. Smarter indicators are needed in order to flag risks to decision makers before they materialise and an incident occurs, allowing the development of targeted interventions. On the flip side, organisations need to better understand the effectiveness of its controls and interventions in reducing risk to health and safety. The effective use of data permits the evaluation of such controls and can highlight downfalls to refine and redevelop interventions based on site specific conditions.



ACTIONS TO CHANGE – what can we do?

Organisations need to require safety functions to develop clear business cases for change and investment, with the same level of sophistication and scrutiny afforded to other operational programs.

Once the clear business case has been set, strategic indicators aimed at measuring safety performance should be developed – which are not purely focused on traditional indicators, such as LTIFR. Measuring elements of workplace culture and senior management active demonstration of commitment to safety will drive greater ROI within an organisation. Our firm belief is that with an engaged workforce, safety becomes a way of business.

How Deloitte can help

Deloitte can assist organisations implement safety programs while improving corporate performance. Our multidisciplinary team has experience in implementing safety transformation programs in some of the world's largest and most complex organisations. Together with our advanced data analytics capability, we can provide end-to-end safety solutions tailored to meet your needs.

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