ISSUES IN THE MEASUREMENT AND REPORTING OF WORK HEALTH AND SAFETY PERFORMANCE: A REVIEW

November 2013

This report was co-funded by Safe Work Australia, Safety Institute of Australia and CPA Australia.

Authors:

Dr Sharron O'Neill
International Governance and Performance (IGAP) Research Centre
Macquarie University

Professor Nonna Martinov-Bennie
International Governance and Performance (IGAP) Research Centre
Macquarie University

Ms Angela Cheung
International Governance and Performance (IGAP) Research Centre
Macquarie University

Ms Karen Wolfe
NSW Branch President
Safety Institute of Australia

Disclaimer

The information provided in this document can only assist you in the most general way. This document does not replace any statutory requirements under any relevant state and territory legislation. Safe Work Australia is not liable for any loss resulting from any action taken or reliance made by you on the information or material contained on this document. Before relying on the material, users should carefully make their own assessment as to its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. The views in this report should not be taken to represent the views of Safe Work Australia unless otherwise expressly stated.

Macquarie Lighthouse Press
Macquarie University NSW 2109

ISBN 978-1-74361-308-5 [PDF]
ISBN 978-1-74361-309-2 [DOCX]

Foreword

Safe Work Australia is working closely with the International Governance and Performance (IGAP) Research Centre at Macquarie University, to standardise and improve work health and safety reporting by businesses and organisations. This work is being co-funded by the Safety Institute of Australia and CPA Australia.

Currently there is a lack of standardised and accepted indicators to measure the work health and safety performance of organisations and businesses at the organisational level. Work health and safety information can and is being reported on a voluntary basis, however reporting is often selective and inconsistent. This hinders comparisons of work health and safety performance and due diligence reporting over time and across organisations.

This paper is one of a series of research papers that will inform a broader three staged policy development project taking place over the next three years. The aim of the project is to develop a standardised set of indicators businesses can use in annual reports as well as guidelines for the development of lead and lag indicators relevant to the size and nature of the business.

Stage one involves developing a draft set of external and internal indicators to improve organisational level work health and safety reporting, and to help Officers meet their due diligence obligations under the model Work Health and Safety Act.

Stage two involves testing of the work health and safety indicators and guidelines. Testing will be carried out using a mixed method approach involving case studies, interviews and surveys in selected businesses across Australia. A pilot test will be conducted, and an assessment of the outcomes undertaken.

Stage three will involve a review of the research outcomes, which will be used to develop policy options for the consistent use of standardised work health and safety indicators and guidelines.

Safe Work Australia

November 2013

Contents

1. Executive Summary

Current advances in the theory and practice of work health and safety are underpinned by an increasingly comprehensive technical body of knowledge.[1] The continued improvement in work health and safety has seen significant reductions over time in work-related injury and illness frequency, both in Australia and around the world. Concurrently however, the advent of globalisation and ongoing changes in technology, management techniques, work structures and work processes are continually presenting new work health and safety hazards, risks and challenges for employers and regulators alike.[2]

Effective strategies for identifying and eliminating (or controlling) work health and safety hazards and risk are therefore critical. Research demonstrates a robust inverse relationship between an organisation's work-related injury and illness prevention efforts and the subsequent frequency and severity of damage to people at work. Relevant, reliable and valid work health and safety performance data is critical to informing the strategic and operational decisions that drive the effective management of work health and safety[3]. This paper examines various issues relating to the measurement and reporting of that work health and safety performance data.

Historically, frequency measures of injury outcome have been at the centre of work health and safety performance evaluation. In particular, lost time injury (LTI) rates have, over time, become the cornerstone of mainstream injury reporting and the benchmark against which organisational, industry and national comparisons are made. Although LTI rates are being applied to inform an ever-growing range of work health and safety problems and decisions, they have a number of important limitations. Primarily, LTIs correlate poorly with both the human and financial consequences of work related injury and illness (WRII) (i.e. damage) meaning they do not provide a valid or reliable measure of performance for the purposes of evaluating either the consequences of work health and safety failure or the success of work health and safety controls and initiatives.

In recent decades, the increased reliance on LTI measures in work health and safety performance management and reporting has reportedly left stakeholders increasingly dissatisfied.[4] Furthermore, growing anecdotal claims of individuals seeking to manage the measure, rather than to manage performance, have pointed to practices of deliberate manipulation and under-reporting of LTI data. Yet the search for more meaningful alternatives to LTI remains contested. Among the most promising is a severity framework that classifies injuries based on impact on worker life, rather than on organisational productivity. This approach aligns more closely with models adopted by governments rather than those traditionally used by industry and provides superior insight into the magnitude of damage that results from work health and safety failure.

Ultimately, injury measures inform about specific incidents of work health and safety system failure, however they cannot provide a valid measure of work health and safety system integrity. Consequently, additional positive (leading) performance indicators (PPIs) have been strongly advocated since the mid-1990s, as tools to better inform decisions regarding work health and safety risk and the effectiveness of hazard control initiatives. Despite industry demand and the availability of guidance for developing PPIs, progress has been slow and questions have been raised about the extent to which existing PPIs are fit for purpose. Collaborative endeavours that combine the specialised technical expertise of work health and safety professionals and measurement expertise of accounting professionals (at organisational, industry and national levels) may result in promising developments in the innovation of PPIs.

[1] For example, HaSPA, 2012 (*Australia*); Safety, Health and Environmental Body of Knowledge, 2011 (*USA*).
[2] Watson et.al., 2003; Frederick and Lessen, 2000.
[3] For example, Chhokar, 1987; Ginter, 1979; Chelius, 1991; Borys, 2000; Reason, 1993.
[4] Stricoff, 2000, p36; Hopkins, 1994, 2000, 2005.

2. Work health and safety in Australia

'Safety' is defined as freedom from the risk of injury and 'health' as freedom from the risk of illness.[5] A safe and healthy workplace is therefore one in which those hazards that pose a potential risk to the health and safety of workers (and others in the workplace[6]) are eliminated or controlled effectively. Australian businesses have achieved considerable success in improving work health and safety over recent decades. However, ongoing rates of **work-related injury and illness (WRII)** provide evidence as to the ongoing challenge that **work health and safety** poses for Australian workers, business and the broader economy. The failure to control occupational hazards contributes to over half a million WRII each year, including more than 125 000 serious (sic) injury cases.[7] These cases not only inflict varying levels of pain and suffering on workers but also impose a significant financial burden on workers, businesses and external stakeholders.[8] Costs of WRII include: lost wages; medical treatment; compensation for pain and suffering; legal fees; fines and penalties; lost productivity; poor morale; and expenditures associated with retraining, recruitment and the hazard mitigation to prevent recurrence.

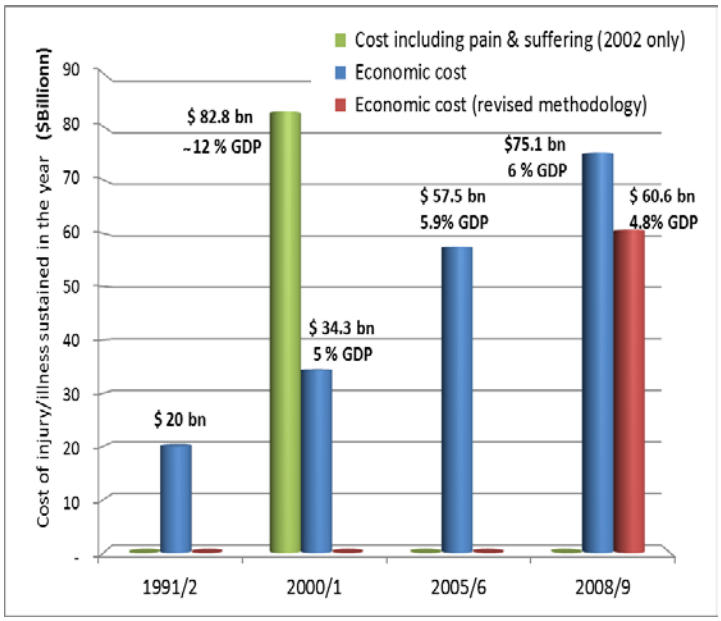

Figure 1 Economic cost of work-related injury & illness in Australia

At around 5% of GDP, the cost of WRII to the Australian economy is significant and rising. Figure 1 summarises findings of studies into the estimated economic costs of WRII incurred in the 1991/2, 2000/1, 2005/6 and 2008/9 financial years.[9] The estimated cost of pain, suffering and early death (included in the 2000/1 data only) was reported to '*conservatively add a further $48.5 billion to the [$34.3Bn] total cost*'.[10]

Only 14-15% of serious injuries tend to involve fatality or permanent disability, yet these routinely account for over 90% of economic cost (i.e. 2009: $54.8 of $60.6bn).

The human, social, financial and economic consequences of WRII underscore the importance of ensuring work health and safety in Australian workplaces. This requires measurement systems capable of informing about work health and safety issues (e.g. information about WRII outcomes and work health and safety risk) in order to enable the evaluation and continuous improvement of effective work health and safety policy, regulation and practice.

[5] Oxford Dictionary.
[6] For example, customers, suppliers, and bystanders may be present in a workplace.
[7] Serious injury in this context refers to cases involving one week or more absence from work: Safe Work Australia, 2012.
[8] ASCC, 2009; NOHSC, 2004; Safe Work Australia, 2012b.
[9] *Ibid*. Note the red bar (2008/9) reflects a corrected methodology around the analysis of permament disability and the blue (2008/9) bar therefore is provided only to facilitate a reliable comparison between 200/1, 2005/6 and 2008/9 data.
[10] NOHSC, 2004.

3. Measuring work-related injury & illness (WRII)

The measurement and analysis of WRII is a challenging task because injuries and illnesses are not homogenous outcomes. Instead, they are driven by a diverse range of causes and contributing factors and can differ significantly in their physical, mental, social and economic consequences.[11] Consequently, a single measure of WRII occurrences is far too aggregated to inform the various decisions that policymakers, boards, managers, employees and other stakeholders seek to make.

The dissection of WRII outcomes into meaningful and decision-relevant subsets, categories or classifications is a subjective exercise.[12] The same data may need to be classified in different ways (e.g. according to frequency, severity, bodily location or agency) so as to provide useful information for different end-users. Further, the boundaries between different categories are often difficult to define, thus leaving classifications contested and poorly understood. This is partly attributable to choices about boundaries being framed by the available knowledge and experience at the time. Categories must therefore be reviewed and reassessed as knowledge advances.

Accordingly, there is no single, scientifically 'correct' classification system or approach for the organisation of WRII into meaningful categories capable of informing strategy, programs or other issues of interest. Instead, as with all information gathering exercises, particular classification and measurement choices must be tailored to ensure each of the resulting measures provides high quality data that is 'fit for purpose'. The over-riding requirement is that measures are:[13]

- *Valid*: actually measure what they purport (claim) to measure
- *Relevant*: meet their intended purpose (i.e. are useful for informing decision(s), noting that different information may be relevant to different users and decisions), and
- *Reliable:* are complete, free from omission, bias and error.

Anecdotal evidence points to a lack of reliability and comparability in WRII reporting and invalid conclusions drawn from inappropriate selection of WRII data. In turn, this suggests a poor level of understanding of both the history of WRII measurement and the principles that underpin current measurement practices.[14] Issues arising from the safety triangle may contribute to this confusion.

3.1 The legacy of the safety triangle

Much of the thinking that underpins contemporary WRII performance evaluation is heavily influenced by Heinrich's safety triangle. Herbert W. Heinrich (1886–1962) was an American insurance assessor and industrial safety pioneer and author of '*Industrial Accident Prevention: A Scientific Approach'*(1931). Heinrich observed from an examination of insurance incident reports that, for every accident that causes a major injury, there are 29 accidents that cause minor injuries and 300 accidents that cause no injuries. The 1:29:300 ratio became known as Heinrich's Law.

Figure 2: Heinrich's triangle

Recognising the ratio observed by Heinrich was based on assumptions of a similar type of incident and person, Frank E. Bird (1921-2007), also in the insurance industry, conducted a study to test whether Heinrich's ratio held true across a diverse

[11] Hopkins, 2005; McDonald, 1994.
[12] O'Neill, Deegan and McDonald, 2012; McDonald, 2001, 2006.
[13] Cooper and Emory, 1995; Creswell, 1994; PSASB, 1990. Note, additional characteristics for performance reporting (i.e. materiality, comparability, understandability, timeliness and cost/benefit) are addressed inSection 5.
[14] For examples, Brown and Butcher 2005; O'Neill 2010; O'Neill, Flanagan and Clarke 2013; Safe Work Australia 2012.

group of industries and individuals. Bird's 1969 study is said to have examined 1,753,498 incident reports from 297 firms in 21 industrial groups, covering 1,7500,000 employees across 3 billion working hours. Bird concluded that (i) for every major injury there were 9.8 minor injuries and (ii) that the ratio of lost time injuries to medical treatment injuries was 1:15. Bird's findings led him to propose an alternate safety triangle which has since been subject to various representations and adaptations.[15] Figure 4 depicts a Safety Triangle (or Accident Pyramid) commonly attributed to F. Bird.

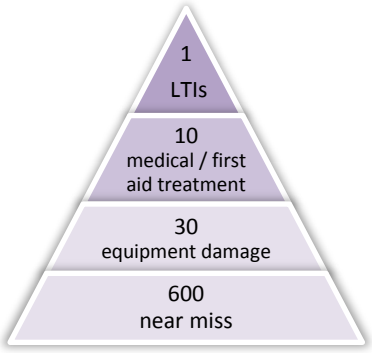

Figure 3: Bird's triangle

The frequency models developed by Heinrich (1930) and Bird (1969) offer two important propositions:

1. There is an inverse relationship between the frequency of occurrence[16] and the severity of WRII outcomes, and
2. The magnitude of this inverse relationship, i.e. the ratio between occurrences of various types of injury, although similar, is inconsistent and ultimately appears to depend on the organisational context (e.g. industry or firm factors).

Despite the two insights afforded by the safety triangle, its application to *contemporary* safety problems has been subject to considerable criticism.[17] Progress over time in both the safety and medical sciences means few will expect the identified ratio's to hold true today. However three important issues persist well into the 21st century. These relate to: the ambiguity surrounding Heinrich's (1931) 'major' and 'minor' and Bird's (1969) 'serious' injury categories; a seemingly unquestioned acceptance by industry of Bird's WRII categories as the appropriate measures of WRII occurrence to inform work health and safety decisions; and a perceived value in directing managerial attention and resources to high frequency but low consequence WRIIs and near misses. Each issue has important implications for practice and is worthy of further scrutiny.

3.1.1 Subjective and value laden terminology

The use of subjective terminology is mainstream in contemporary safety practice. What distinguishes a 'major injury' from a 'minor injury' may differ markedly from the perception of one person to another and what one person perceives as 'serious' another may not. This is clearly illustrated in WRII reporting where evidence shows that organisations reporting on 'serious injury' may be referring to WRIIs that either: require one or more days lost time; require more than five days lost time; or result in at least some form of partial permanent disability.

Rather than adopt subjective terminology, which is inherently emotive and value laden[18], a lexicon of descriptors must be developed that is rooted in objective language, based on fact and logic, which can be readily and consistently interpreted by users. Value laden terminology not only affects the ability of different users to interpret WRII data, but may also affect the way individuals respond to it (i.e. using cognitive functions of thinking/logic, rather than feeling/valuing).[19]

3.1.2 LTI and the aggregation of WRII

Arguably a second by-product of the safety triangle has been the widespread adoption of its broad classifications of fatality, major injury (or LTI), minor injury (medical and first aid treatment) and near-miss (or near-hit) as accepted categories for the evaluation of WRII. These terms are now so

[15] Furter 2011and http://crsp-safety101.blogspot.com.au/2012/07/the-safety-triangle-explained.html
[16] Frequency rates are used rather than incidence rates as incidence can be easily manipulated through employment policy.
[17] Some criticism of the research premises and methodology has also been evident. See for example: Manuele 2002.
[18] McDonald 2006.
[19] Gilovich, Griffin and Kahneman 2002; Jung 1971; McDonald 2012.

entrenched in practice that safety scholars cite lost time injury and recordable[20] injury data, in particular, as the 'cornerstone' of organisational health and safety reporting.[21]

However, use of these categories is problematic because a diverse range of WRII outcomes are aggregated within the LTI category. As illustrated in Figures 4, 5 and 8, this dilutes the usefulness of LTI data because LTIs can differ significantly in both occurrence and severity. Figure 4 presents a summary of the 323 500 compensated LTIs recorded in Australia for the 2008/9 financial year.[22] Arranged by severity, this data confirms the traditional safety pyramid principle of an inverse relationship between WRII frequency and severity.

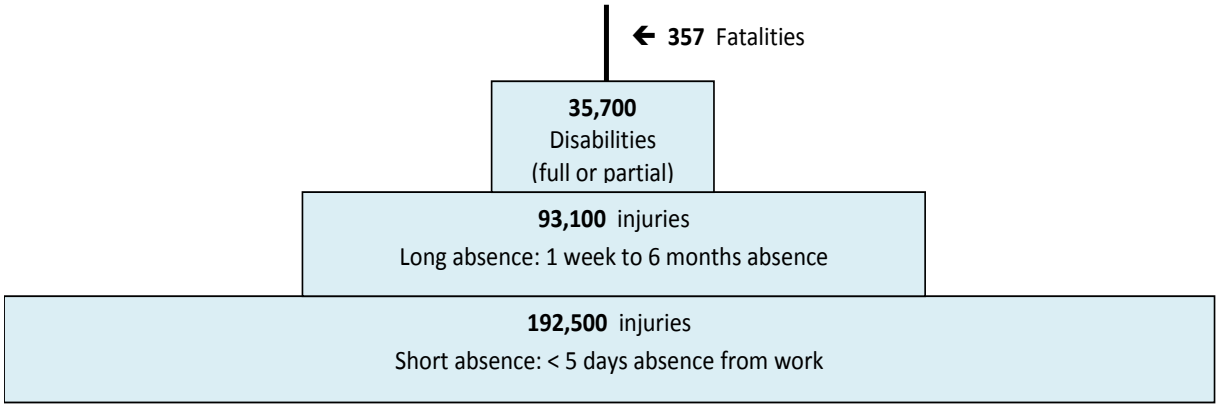

Figure 4: Compensated lost time injury frequency, by category

In contrast, Figure 5 summarises the total weeks lost (absence from employment) as a result of those 323 500 WRIIs. Once again organised by severity, the analysis reveals that the consequences of work-related, non-fatal disability, for both for workers and employers, far exceeds the consequences of all short absences and long absences combined. This is mirrored in the financial cost with the average employer costs per disability ($16 970) being almost 27 times that of an injury resulting in a short absence ($630).[23] Yet traditional LTI data does not provide valid or reliable insight into the occurrence of, or changes in, work-related non-fatal disability.

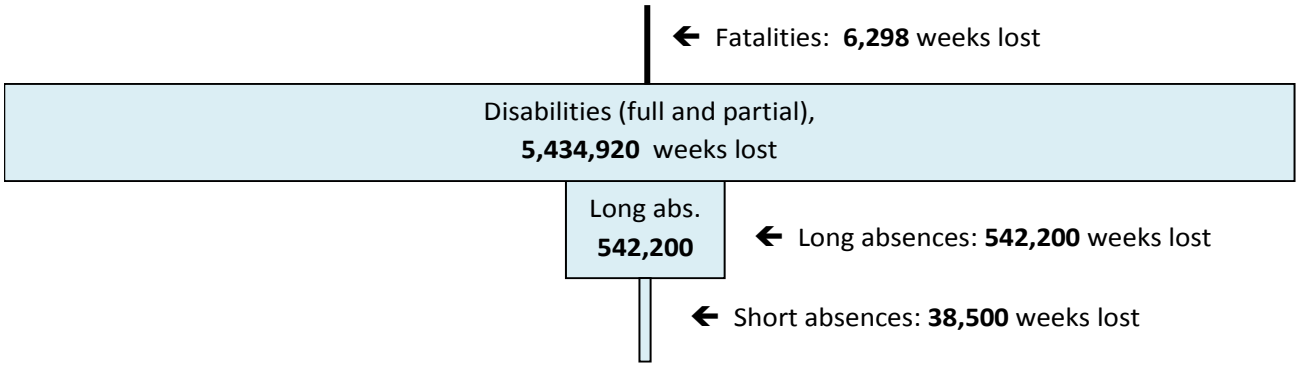

Figure 5: Total compensated lost time (in weeks), by category

This suggests WRII analyses that are guided by the traditional safety triangle are likely to reflect those WRII outcomes that are highly correlated with LTI *occurrences* (e.g. number of workers' compensation claims or cost of claims excess payments). However, such data is unlikely to provide a valid indicator for either the severity or cost of those work health and safety failures that result in lost time.

[20] Recordable injuries are essentially the combination of lost time plus medical treatment injuries.
[21] Blewett 1994; Bottomley 2000.
[22] This is the latest year for which this level of compensation data is publicly available (see Safe Work Australia 2012).
[23] Furthermore, the average economic cost of a totally disabling injury was $3,037,070 versus $2,700 for a short absence.

In turn, this highlights a danger of focusing on highly aggregated LTI or recordable injury rates when monitoring WRII performance. As the number of low consequence injuries tends to far exceed the number of high consequence injuries,[24] changes in fatal and permanently disabling outcomes are relatively insignificant components of LTI and are therefore rendered statistically invisible. This phenomenon has been illustrated empirically in an analysis of state-based workers' compensation data for the 10-year period 1992–2001. Analysis of approximately 408 500 workplace injuries revealed a downward (improving) trend in total LTI rates despite a rising incidence of permanently disabling injuries. Contrasting traditional fatality and LTIFR rates against trends in permanent (fatal and non-fatal) and temporary impairment, the study's key findings are summarised in Figure 6.[25]

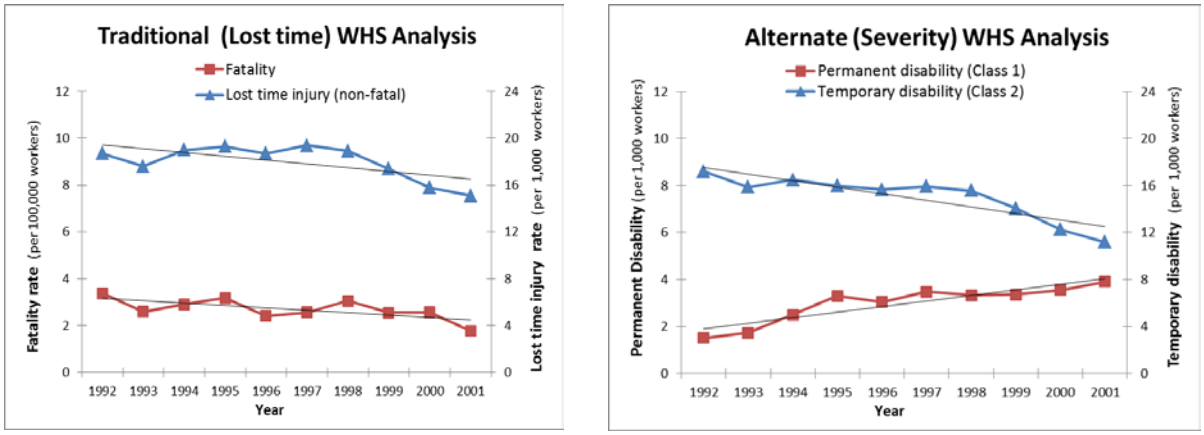

Figure 6: Comparing lost time versus severity trends in a set of WRII data

3.1.3 Assumed drivers of high consequence injury

An erroneous generalisation that appears to be attributed to the safety triangle is that near miss and minor incidents (necessarily) share the same essential factors as high consequence incidents such as fatalities. This view perhaps also stems from observations that many injuries share similar essential and contributing factors. The following quotation is indicative of this view:

> The 1-10-30-600 relationships in [Bird's] ratio indicate clearly how foolish it is to direct our major effort only at the relatively few events resulting in serious or disabling injury when there are so many significant opportunities that provide a much larger basis for more effective control of total accident losses…
>
> The study found that for every single fatality there are at least 300,000 at-risk behaviors, defined as activities that are not consistent with safety programs, training and components on machinery… With effective machine safeguarding and training, at-risk behaviors and near misses can be diminished. This also reduces the chance of the fatality occurring, since there is a lower frequency of at-risk behaviors.[26]

However, the problem is that many at risk behaviours have no causal relationship to fatal and other high-consequence outcomes. Correspondingly, analyses of near-misses and low consequence WRII events will not necessarily identify those hazards and factors that contribute to high consequence WRII. This was demonstrated in the early 1980s in a study of 1 037 mining incidents.[27] In total, 1 037 recordable injuries accounted for 9 919 days lost, although two cases accounted for 9 000 of the total 9 919 lost days. The research concluded had these two cases been removed from the analysis, the remaining incident reports would not have been of assistance in detecting the potential for fatality or

[24] Discussion of McDonald's (1985) temporary versus permanent impairment classifications is provided on page 14.
[25] McDonald 1985; 2001; O'Neill, Deegan and McDonald 2012.
[26] http://crsp-safety101.blogspot.com.au/2012/07/the-safety-triangle-explained.html
[27] McDonald, 2006.

permanent damage. Instead, the analysis would have redirected attention to the drivers of high frequency but low consequence injuries.[28]

3.2 Validity of WRII data

The validity of a performance measure is related to its ability to measure what is purported to be measured. The assessment of validity considers a number of viewpoints as indicated in Table 1.

Approach	Description	Assessment procedure
4. Content validity	The extent to which a measure appears to measure the characteristic it is supposed to measure	Assessment of the appropriateness of a measure for the task at hand
5. Criterion validity	The extent to which a measure is correlated with some other predictor or criterion (external measure)	Examination of the relationship between the measure and criterion
6. Construct validity	The extent to which a measure behaves in a theoretically sound manner	Investigation of the relationships between the measure concerned and measures of other concepts or characteristics within a theoretical framework

Table 1: Validity assessment approaches

(Source: adapted from Diamantopoulos and Schlegelmilch (2000))

Considerations of validity are critical to WRII measurement, as injuries and illnesses have a diverse range of attributes and outcomes. Efforts to classify and aggregate information about WRIIs must therefore ensure the resulting performance measures and indicators[29] measure what they purport to measure. Unless valid interpretations of WRII data are made by users, the subsequent decisions based upon that data are likely to be flawed.

Of the various performance data employed across the business, Government and not-for profit sectors, it is increasingly clear that the use of LTI rates is particularly problematic and deserves special attention. The current focus on LTI data has been a response to the institutional shift in practice from inherently technical to more systematic approaches to managing work health and safety and the subsequent need for performance indicators to inform continuous improvement efforts.[30] Of the many available measures, research indicates LTI and LTI frequency rates (LTIFRs) have been most widely adopted by industry as key performance indicators (KPIs) to guide work health and safety strategy and communicate performance in corporate reports to managers, boards and external stakeholders.

The appeal of LTI data to managers is understandable given **LTIFR is essentially an organisational productivity indicator**. It reflects the number of incidents or events that resulted in lost productivity (workdays) due to work health and safety system failure. An LTI is defined in the Australian Standard on Workplace Injury Recording (AS1885) as follows,

> *Lost-time injuries/diseases*—those occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more.[31]

However, since LTI and LTIFR data are likely to include injuries that vary substantially in severity, measures of lost workdays (LWD) and lost workday frequency rates (LWFR) arguably provide more valid indicators of lost productivity than LTIs. This is because lost *workdays* target the actual number of productive days lost rather than simply counting the number of WRIIs that resulted in an absence.

[28] The subject allocated 6,000 days for a fatality and 3,000 days for a permanent disability as per the American Standard.
[29] Note, a performance measure will measure X to understand X. An indicator measures X to understand Y.
[30] Borys, Else and Leggett 2009; Glendon 2009; Hale and Hovden 1998.
[31] AS 1885.1-1990, Workplace Injury and Disease Recording Standard, Worksafe Australia, p.6.

Further, as discussed in Section 3.1, LTI measures do not provide valid and reliable measures of injury severity because they include a disproportionately large number of low-consequence WRII and exclude certain types of legitimate WRII. The validity and relevance of WRII measures are therefore important considerations in light of anecdotal evidence claiming Australian organisations increasingly rely on LTI data to inform an ever-broadening range of organisational work health and safety decisions.[32]

3.2.1 LTI(FR) is not a measure of injury

LTI measures do not capture all WRII outcomes, but rather only a subset of WRII. LTI data will exclude any injuries that do not impair an individual's ability to perform their normal duties for a full shift. These may include, for example low consequence WRIIs such as injuries that require relatively superficial medical treatment. Importantly, the essential requirement for one full shift absence from work means LTIs may also exclude some costly cases of permanent damage or long term impairment such as hearing loss, damage to ligaments and some musculoskeletal disorders. This contradicts models, such as Bird's safety triangle, which imply that LTI measures capture an organisation's most 'serious', or damaging, WRII outcomes by default. Unless LTIs are the only injuries sustained by individuals in an organisation, LTI data does not and cannot provide a valid measure of 'injury'.

Moreover, a poor correlation has been demonstrated time and again between the frequency of aggregated injury outcomes and their physical and financial consequences (see section 3.1). Therefore LTI and LTIFR data are not valid measures of the consequences (extent of damage) arising from injury either. Together this demonstrates that LTI data is not a valid measure of injury as:

i) LTI data fails to measure injury *frequency* (LTI/LTIFR only measures a *subset* of injury), and
ii) LTI data fails to measure injury *consequence* (LTI/LTIFR *correlate poorly* with damage/costs).

Monitoring injury outcomes by focusing on LTIFR essentially limits attention to high frequency but low consequence WRII outcomes and causes decision-makers to overlook the occurrence and impact of low frequency but high consequence WRII outcomes.[33]

3.2.2 LTI(FR) is not a measure of safety

Although LTI outcomes are often reported by industry as 'safety measures', injury measures do not measure *safety*. Safety is defined as 'freedom from the ***risk*** of injury'.[34] Injury rates do not measure that risk, nor do they objectively evaluate risk drivers (latent conditions or hazards) or the effectiveness of controls over those hazards.[35] LTIs can confirm, in hindsight, that a risk had been present at the time of an injury; however the absence of injury does not confirm the absence of uncontrolled risk. This is illustrated time and again by cases in which work health and safety disasters were preceded by impressive injury free periods.[36] Accordingly, LTIs do not and cannot provide a valid measure of safety.

3.3 Relevance of WRII data

The concept of relevance focuses on the alignment between performance measures (or performance indicators) and the required work health and safety decisions. For example, incident analyses seek to identify patterns or trends in injury outcomes through examining attributes such as the occurrence, frequency (occurrence per hours worked), incidence (occurrence per employee), mechanism, agency, affected bodily location and nature of the WRII (see section 3.3.1). This process seeks to increase the visibility of contributing factors in order to inform future control initiatives and monitor the effectiveness of past work health and safety interventions.

[32] For example Collins 2013
[33] Hopkins 1994, 2005; McDonald 1994.
[34] Oxford Dictionary 2004.
[35] Hopkins 2005; Reason 1997; Janicak 2010.
[36] Hopkins 2000, 2005.

3.3.1 Classifying qualitative attributes of WRII

Classifying the mechanism and agency of WRII

Classifying WRIIs according to their attributes aims to provide important insight into the causes and contributing factors for work health and safety failure. Although classifications are (again) subjective, some guidance for Australian organisations is provided by the Australian Standard on Workplace Injury and Disease Recording (AS1885.1). For example, AS1885 advocates the following categories for analysing the circumstances surrounding WRII:

MECHANISM OF INJURY/DISEASE
01 Falls from a height
02 Falls on the same level (including trips and slips)
03 Hitting objects with a part of the body
04 Exposure to mechanical vibration
05 Being hit by moving objects
06 Exposure to sharp, sudden sound
07 Long term exposure to sounds
08 Exposure to variations in pressure (other than sound)
09 Repetitive movement with low muscle loading
10 Other muscular stress
11 Contact with electricity
12 Contact or exposure to heat and cold
13 Exposure to radiation
14 Single contact with chemical or substance (excludes insect / spider bites and stings)
15 Long term contact with chemical or substance
16 Other contact with chemical or substance (includes insect / spider bites and stings)
17 Contact with, or exposure to, biological factors
18 Exposure to mental stress factors
19 Slide or cave-in
20 Vehicle accident
98 Other and multiple mechanisms of injury
99 Unspecified mechanisms of injury

Table 2: Guidance on WHII classification by mechanism (Source: AS1885.1)

BREAKDOWN AGENCY/AND AGENCY OF INJURY/DISEASE	
01 Machinery and fixed plant	11 Outdoor environment
02 Mobile plant	12 Indoor environment
03 Road transport	13 Underground environment
04 Other transport	14 Live animals
05 Powered equipment, tools and appliances	15 Non-living animals
06 Non-powered hand tools	16 Human agencies
07 Non-powered equipment	17 Biological agencies
08 Chemicals	18 Non-physical agencies
09 Non-metallic substances	98 Other agencies
10 Other materials, substances or objects	99 Unspecified agencies

Table 3: Guidance on WHII classification by agency (Source: AS1885.1)

Classifying the subject (bodily location and nature) of WRII

The Australian Standard on Workplace Injury and Disease Recording (AS1885.1) also advocates the following categories for investigating incidents and monitoring trends in the Body Location and Nature of WRII (see tables 4 and 5). Further insight may be gained from tabulating pairs of factors or attributes as shown in Appendix 1.

BODILY LOCATION OF INJURY/DISEASE

01 Eye
02 Ear
03 Face
04 Head (other than eye, ear and face)
05 Neck
06 Back
07 Trunk (other than back and excluding internal organs)
08 Shoulders and arms
09 Hands and fingers
10 Hips and legs
11 Feet and toes
12 Internal organs (located in the trunk)
98 Multiple locations (more than one of the above)
99 General and unspecified locations

Table 4: Guidance on WHII classification by bodily location (Source: AS1885.1)

NATURE OF INJURY

01 Fractures (excluding of vertebral column)
02 Fracture of vertebral column*
03 Dislocations
04 Sprains and strains of joints and adjacent muscles*
05 Intracranial injury, including concussion
06 Internal injury of chest, abdomen and pelvis
07 Traumatic amputation, including loss of eyeball
08 Open wound not involving traumatic amputation
09 Superficial injury
10 Contusion with intact skin surface and crushing injury*
11 Foreign body on external eye, in ear or nose or respiratory, digestive or reproductive systems*
12 Burns
13 Injuries to nerves and spinal cord
14 Poisoning and toxic effects of substances
15 Effects of weather, exposure, air pressure and other external causes*
16 Multiple injuries (only to be used where no principal injury can be identified)
17 Damage to artificial aids
19 Other and unspecified injuries

** (various inclusions and exclusions omitted)*

NATURE OF DISEASE

21 Deafness
22 Eye disorders (non-traumatic)
28 Other diseases of the nervous system and sense organs
31 Disorders of muscle, tendons and other soft tissues (includes synovitis, tenosynovitis, bursitis)
38 Other diseases of the musculoskeletal system and connective tissue
41 Dermatitis and other eczema
48 Other diseases of the skin and subcutaneous tissue
51 Hernia
58 Other diseases of the digestive system
61 Infectious and parasitic diseases
71 Diseases of the respiratory system (including asthma, legionnaires disease, asbestosis, pneumoconiosis)
81 Disease of the circulatory system (including heart disease, hypertension, hypotension, varicose veins)
91 Cancers and other neoplasms
95 Mental disorders
98 Other diseases

Table 5: Guidance on WHII classification by nature (Source: AS1885.1)

3.3.2 Classifying WRII severity

Classification of the severity of WRIIs is performed for the purpose of understanding the extent of damage (human, organisational and financial) that arises as a consequence of a failure. As illustrated in section 3.1, traditional organisational analyses of WRII severity tend to follow the classifications identified in Bird's triangle (see Figures 3 and 7) and therefore focus on highly aggregated measures such as 'all injury', 'recordable injury'[37] and 'lost time injury'.

[37] Recordable injuries essentially aggregate medical treatment and lost time injuries. See OSHA 1996.

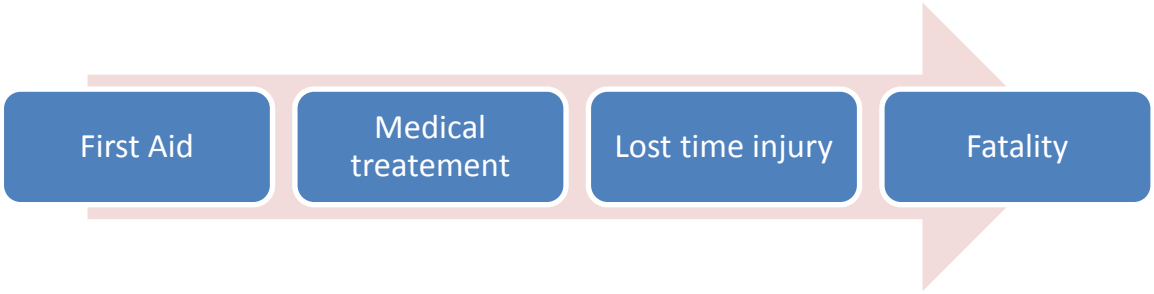

Figure 7: A traditional approach to classifying WRII severity

By aggregating within the LTI category both i) low frequency, high consequence WRIIs (such as disability and long-term temporary impairment); and ii) high frequency, low consequence WRIIs (see Figure 8), this approach has a number of important limitations. First, LTI rates focus attention on the frequency of occurrence rather than the consequences and draws attention to

high volume incidents rather than those resulting in the greatest damage.

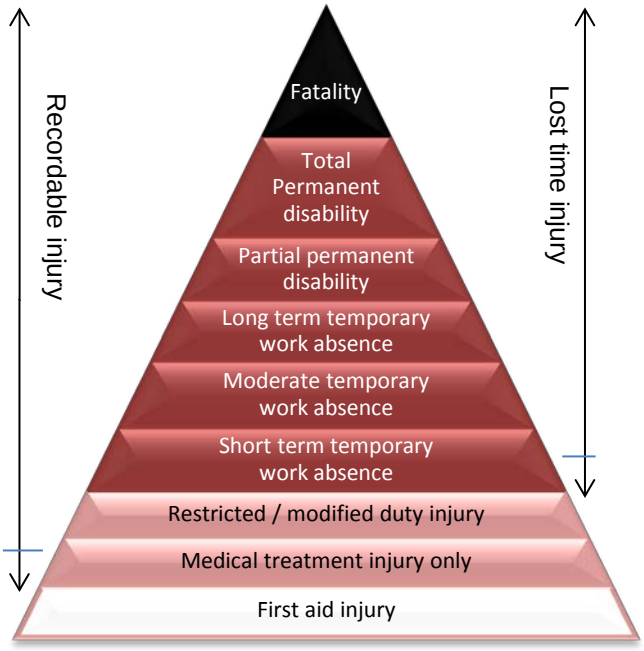

Figure 8: Traditional classifications of WRII outcomes

Second, LTIs fail to recognise as impairments those WRIIs that result in long-term or permanent damage but no lost work time (such as work-related hearing loss). By treating these as medical treatments, the significance of their consequences can be grossly understated.

Figure 8 illustrates the general relationship between injury severity and frequency experienced by most organisations. Injuries requiring medical treatment, modified duties or short periods of work absence occur more frequently than those resulting in moderate to long absences or partial disability, whilst incidents resulting in total permanent disability or fatality are rare. However, it can also be seen that LTI and recordable injury measures are unlikely to provide relevant information as to the occurrence, frequency or incidence of long absences and disabling incidents that permanently alter a person's life.[38]

This is particularly problematic in hazardous industries. As Hopkins (2000) observes,

> LTI data are thus, at best, a measure of how well a company is managing minor hazards; they tell us nothing about how well major hazards are being managed. Moreover, firms normally attend to what is being measured, at the expense of what is not. Thus a focus on LTIs can lead companies to become complacent about their management of major hazards... concentrating on high frequency/low severity problems [X] managed to halve its LTI frequency rate in the four years preceding the explosion [from 153 injuries / million hours to 71]. By this criterion [X] was safer than many other [operations]. But as a consequence of focusing on relatively minor matters, the need for vigilance in relation to catastrophic events was overlooked. Clearly the LTI rate is the wrong measure of safety in any industry which faces major hazards.[39]

[38] For example, McDonald 1985; NOHSC 2004; Safe Work Australia 2012a, 2012b.
[39] Hopkins 2000, pp70-71.

Reconceptualising WRII severity

An alternative approach to classifying WRII by severity provides far greater validity and reliability in the measurement of both financial and human WRII costs. In turn, this improves the information available to inform organisational work health and safety strategy. Severity classifications focus on the consequences of WRII from the perspective of the injured person, rather than the employer organisation.[40] Impairment therefore reflects time until a full recovery is achieved, and whether a full recovery is achieved, rather than simply time taken to return to work.

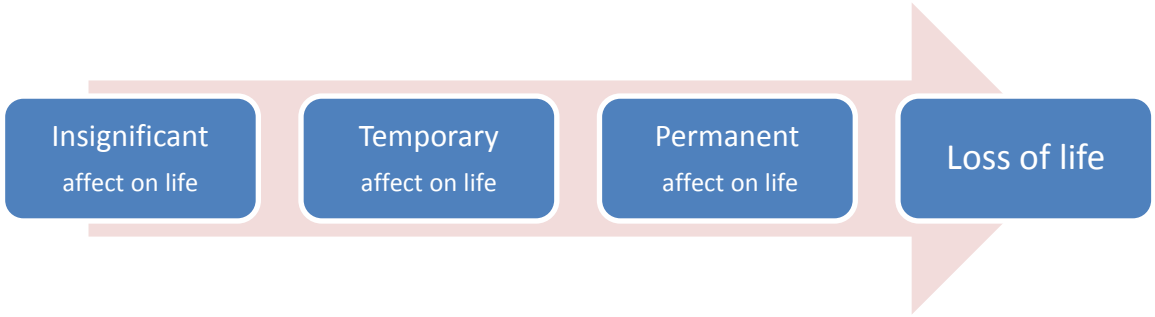

Figure 9: Examples of severity approaches to classifying WRII subsets

Depicted in an inverted safety pyramid (see Figure 10), the contemporary Class 1, 2 and 3[41] severity categories address limitations outlined in the previous section by recognising outcomes associated with injuries that do not result in lost time. Severity categories thereby draw attention to high-consequence (Class 1) rather than low-consequence (Class 2 and Class 3) WRIIs. This does not mean Class 1 WRII are the sole focus of analysis but rather that efforts to prevent temporary impairment are not at the expense of those to prevent life altering damage.

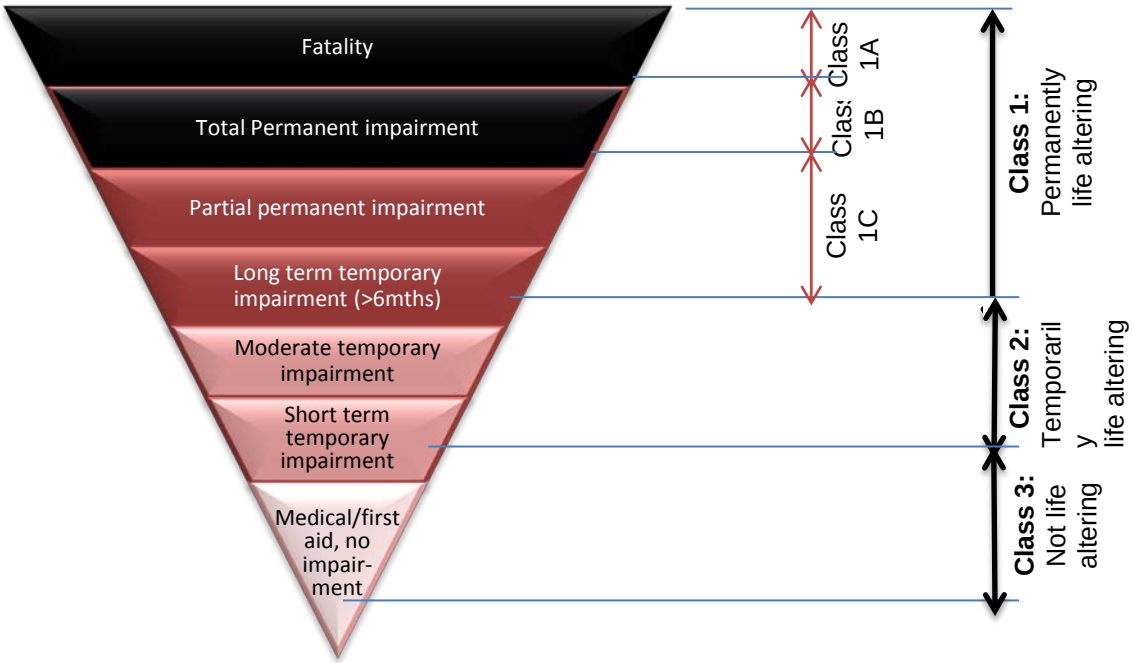

Figure 10: Severity-based classifications of WRII outcomes

3.4 Reliability of WRII data

For WRII measures to be reliable they must be free from error and bias. Prior research has identified significant variation in the way WRII outcomes are labelled, calculated and reported in different organisations. This stems from the absence of universally accepted classification system and clear

[40] McDonald 1985, 2005, 2012.
[41] Ibid

and consistent definitions for measuring injury occurrences. LTI rates provide a particular case in point. Evidence suggests that within some firms, LTI data only captures injuries while in others they capture both injury and illness outcomes, calling the resulting measures *Lost Time Injuries*, *Lost Time Incidents* or *Lost time Cases*. Furthermore, considerable flexibility appears to exist with respect to the way LTI data is calculated. LTIs may or may not include: work-related fatalities, work-related illnesses, restricted duty cases, injuries where lost time occurs days or weeks after the incident, and injuries resulting in uncompensated lost time.[42] Furthermore, organisations have been shown to use different approaches to: recording fatality and disability; reporting (or not) on contractor injuries; and presenting LTIFR data (e.g. as a rate per million hours or per 200 000 hours). Understanding how an organisation has actually defined and measured these and other WRII measures is therefore critical for using or benchmarking WRII data. Other reliability concerns are also important.

3.4.1 Issues of sample size

Traditional analysis of work health and safety within organisations has tended to rely heavily on injury data. However the sample sizes at an organisational level are typically so small that changes in injury rates on a monthly, or even annual, basis are likely to be statistically insignificant. In such circumstances, the use of injury rates to evaluate line managers' is described as "ludicrous".[43] The use of appropriately validated activity measures, as opposed to incident rates, is advocated as a more valid measure of manager and supervisor performance.[44]

3.4.2 Issues of under-reporting of injury

Analyses of WRII typically employ workers' compensation data, although it is widely acknowledged that compensation data fails to capture all WRII.[45] The Australian Bureau of Statistics Work-related Injuries Survey (ABS 2010) concluded that while 640 700 people experienced a WRII in the 2009/10 year (approximately 38.2 injuries per million hours or 2 464 per weekday), only 35.9% received workers' compensation. A further 24.7% received some financial assistance from their employer, private insurance or government (such as Medicare or Centrelink) and 39.4% received no assistance at all.[46] Safe Work Australia acknowledges these limitations in maintaining the (Australian) National Data Set for Compensation-based Statistics and supplements workers' compensation data with other information sources such as coroners' information for injury fatalities and survey data for injuries.

Further examination reveals some uncompensated injuries are the result of conscious choices by individuals not to lodge a claim (e.g. for minor injuries), while others relate to cases typically excluded from compensation systems; such as journey (commuting) claims, various long latency occupational diseases and WRIIs sustained by self-employed workers, members of the defence forces and some police forces. Safe Work Australia uses denominator data calculated by the ABS to mirror, as far as possible, employees covered by workers' compensation schemes and then compares industries and trends over time using incidence and frequency rates rather than claim numbers. Nevertheless, a comparison of the 2005 ABS survey with compensated claims of the same period[47] showed that even when the datasets are scoped to include injuries with similar periods of time lost (one working week or more for the compensation data and five or more days for the ABS survey) the compensation incidence rate for male employees was 80% of the ABS survey rate. For female employees the compensated claims rate was only 60% of the ABS survey rate. Compensation data thus does not provide a valid and reliable measure of total WRIIs.

The ABS (2010) study also observed that approximately 141 000 injured workers received financial assistance from their employer of which 92 000 received regular sick leave rather than workers'

[42] These include injuries for which workers' compensation claims have been rejected or not lodged.
[43] Petersen 1996, p15.
[44] Kahneman, Slovic and Tverskey 1982; Petersen 1989, 1996.
[45] ABS 2001, 2010; Drexel 1992; Herr 1998; NOHSC 2004.
[46] Reasons for failure to lodge workers' compensation claims include: injury being perceived as minor (50%); unaware or ineligible for compensation (20%); and concerns such as negative impact on current and future employment.
[47] Safe Work Australia. Comparison of compensation data with all incurred work-related injuries. 2009

compensation. Presumably these 'sick days' were not recorded as lost time. Notably almost 31% of absences compensated through ordinary sick leave related to injuries requiring five or more days absence from work. These findings potentially provide empirical evidence to support anecdotal claims that individuals manipulate injury performance measures by under-reporting LTIs. In doing so, the ABS data reinforces the poor validity and reliability of LTI and workers' compensation data (at a jurisdictional level at least) as reliable proxies for serious WRII.

3.4.3 Issues in under-reporting of occupational illness

Despite the conceptual similarity between work-related injuries and illnesses, data reliability and completeness are particular challenges when measuring and reporting on occupational illness and disease. Three issues are particularly problematic.

- **Long latency period:** many occupational illnesses have a long latency period meaning a significant time lag may occur between the hazardous exposure and the detection of illness. Mesothelioma presents a useful example of this problem.
- **Tenuous link between illness and work:** it is difficult to determine whether some illnesses are occupational diseases due to the tenuous link between the contributing factor(s) and work, or the presence of multiple contributing factors. For example, a case currently receiving media attention in Australia concerns legislation passed by the Commonwealth in 2011 following an identified link between firefighters' exposure to chemicals when battling fires and higher rates of certain types of cancer. For those facing one of 12 types of cancer, the Bill removed the onus on those firefighter's under the Commonwealth jurisdiction to prove these cancers were caused by work. Not all Australian States have followed this lead.[48]
- **Unwillingness to identify:** some individuals are reluctant to come forward with work-related illnesses. The stigma surrounding work-related mental ill-health, such as job stress and work-related depression, means many individuals are unwilling to report and consequently WRII data underestimates the incidence of such cases.[49] For example, ABS research conducted in 2010 revealed over 70% of workers who reported experiencing work-related mental stress did not apply for workers' compensation.
- **Inadequate detection regime:** few organisations focus a similar level of attention on the identification and prevention of work-related disease as they do work-related injury. This may be due to lack of awareness or to the three issues outlined above.

3.5 Beyond injury measures

Although there are significant limitations in applying measures such as LTI and LTIFR to contemporary work health and safety issues, WRII measures are not entirely useless. Appropriate WRII measures are essential to understand the damage (to people, organisations and the economy) that results from work health and safety failures. As discussed above, some approaches to measuring WRII (such as Class 1, 2 and 3 outcomes) are more valid and relevant in this regard than other measures (e.g. LTI data). Nevertheless, although WRII measures provide crucial information for a range of work health and safety decisions, they are not sufficient for many other work health and safety decisions, such determining as the effectiveness of work health and safety risk management. This has motivated efforts to develop and validate alternate (positive) measures of work health and safety inputs and activities.

[48] Willingham 2013.
[49] For example, LaMontagne, Sanderson and Cocker 2010; LaMontagne 2010; 2012; Safe Work Australia 2013a, 2013b.

4. Developing positive indicators of work health and safety

4.1 What are positive (leading) performance indicators?

Positive performance indicators (PPIs), also referred to as 'leading indicators', aim to detect and provide advance warning of latent safety hazards. This allows organisations to implement proactive actions designed to prevent future safety incidents. Their value lies in the avoidance of safety failures and the associated injuries, illnesses and direct and indirect failure costs. Direct costs may include medical costs, legal costs, compensation, insurance premiums, worker absenteeism, disruptions to production processes and damaged equipment. Indirect costs may include damage to reputation, loss of human capital and adverse consequences for worker morale and industrial relations.

The term **positive**, rather than **leading**, performance indicator is deliberately used in this report to emphasise the relative nature of the term 'leading'. Depending on the referent point, a PPI may be either a leading or a lagging indicator. This is illustrated by the 'training effectiveness' measure in Figure 11. For example, the number of staff trained and competent in a critical work health and safety skill is a both the outcome of the training process, and at the same time, a potential factor driving injury prevention.

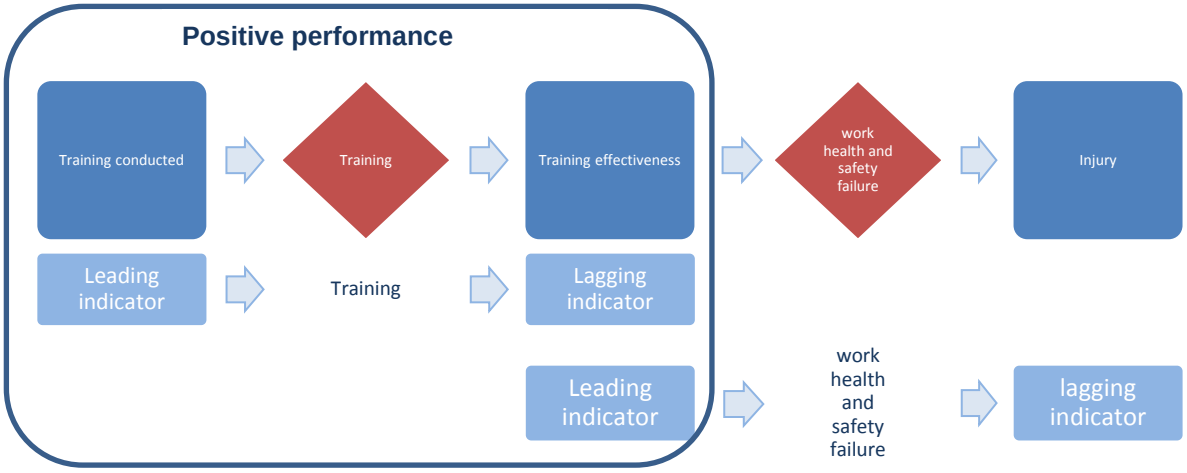

Figure 11: Leading and lagging indicators

PPIs provide important data for informing work health and safety performance improvement, monitoring the effectiveness of work health and safety system inputs and processes and highlighting where prioritised efforts or increased resources are likely to add future value. PPIs can be used at organisational and/or business unit levels.[50]

4.2 How are positive performance indicators (PPIs) developed?

Fundamentally, the process of developing PPIs involves assessing the organisation (at all levels) for critical areas of safety risk and identifying issues for improvement. More specific work health goals and action items are then established to address the identified issues. PPIs can then be identified or developed, tested and subsequently implemented. PPIs must be monitored and reviewed regularly to ensure they remain appropriate to the organisation as it evolves.[51]

[50] *Ibid*.
[51] *Ibid*.

An organisation develops PPIs according to its particular safety issues and their drivers, in the context of broader organisational dynamics (i.e. culture and systems). PPI results are therefore not usually comparable across organisations, as they are tailored to an organisation's particular needs and characteristics. In turn, this means they cannot be standardised and are typically not suited to benchmarking across organisations.[52]

4.3 Characteristics of high quality PPIs

Like all sound measures PPIs must always be valid, relevant and reliable. High quality PPIs should also demonstrate the following essential qualities:

- clearly defined and understood
- measurable accurately, objectively, timely, consistently and reliably
- relevant and adapted to the organisation
- informs and enables action by the organisation
- aligned with organisation's internal systems
- accepted by managers and workers, and
- cost efficient.[53]

Key issues PPIs may address include: commitment and policy, planning, implementation of work health and safety initiatives, measurement and evaluation of resources and processes, review, and continuous improvement.[54] Alternatively, they may seek to ensure management and workers have the relevant information, tools and authority to act; to evaluate the extent to which safety culture that is aligned with performance; and to monitor the safety system.[55] Examples of PPIs include the number of safety audit non-conformances, the percentage of risks eliminated (rather than controlled) and the proportion of staff trained in a particular skill.

4.4 Issues in developing PPIs

Three interrelated factors can complicate the development of PPIs:

- organisations are dynamic
- there is an imprecise link between PPIs and injury performance, and
- implementation issues may arise (typically relating to, for example, information gathering and reporting needs, practicalities, development and monitoring costs).

4.4.1 Organisational dynamism

Organisations are dynamic and composed of various interacting systems and components. Safety can be affected by any one or combination of direct and indirect factors, which transcend across different organisational layers, units and/or systems.[56] These can range from broader management culture to direct work processes.

Further, PPIs must also be relevant to the specific risks, improvements and work health and safety strategy of the organisation.[57] Misjudgement at any stage in the process of identification can lead to a focus on inappropriate PPIs. Hence, the task of developing and implementing PPIs can be

[52] ICMM, 2012; Step Change in Safety, undated. As organisations progress through different levels of maturity, commonality between PPIs of organisations should diminish further (discussed below).
[53] Comcare, 2004; ICMM, 2012.
[54] Australian Government, 2005.
[55] IWH, 2011.
[56] ICMM, 2012.
[57] *Ibid*.

challenging. For example, a PPI may be chosen that does not address the required safety improvement, or may be redundant as it is already covered by another PPI.[58]

It is important to ensure PPIs correspond to the organisation's level of maturity. An organisation's work health and safety maturity is argued to progress along five stages (although not always in a strictly linear fashion):

i) ***Pathological***: organisation cares little about work health and safety beyond being caught in breach of the law
ii) ***Reactive***: organisation responds to accidents by making improvements
iii) ***Calculative***: organisation is focused on ensuring management systems are effective
iv) ***Proactive***: work health and safety leadership and values drive continuous improvement, and
v) ***Generative***: continuous learning and improvement is ingrained throughout the organisation.[59]

PPIs will change in accordance with the organisation's evolving maturity so it is important to review them regularly to ensure they remain aligned with an organisation's maturity level, safety issues and broader organisational dynamics, goals and strategy.[60]

4.4.2 Imprecise links to outcomes

PPIs must be related to work health and safety goals and have a "reliable and valid" causal relationship with performance in terms of (lagging) work health and safety outcomes.[61] However, the relationship between PPIs and outcomes can be tenuous due to time lags and to causation being indirect or contingent.[62] This may render the value proposition of PPIs difficult to prove and the selection of PPIs more complex and political. To overcome this somewhat, it is advised that organisations map various causal routes and consider factors both remote and close to the work health and safety outcome.[63] It is also recommended that a combination of leading and lagging indicators be used to provide a more complete assessment an organisation's work health and safety performance.[64]

4.4.3 Implementation issues

Integration

PPIs should be implemented using a structured, systematic approach.[65] The PPIs must fit within the overarching work health and safety framework, which must correspondingly be accommodative to PPIs. These must also be integrated with other organisational systems, including human resources, production, finance, technological and risk management. These systems are interrelated and dynamic, which can render the task of integration challenging.

Organisational culture and dynamics

Organisational culture and dynamics influence the choice and effective implementation of PPIs. For example, a pathological work health and safety culture is likely to mean information from workers is not readily vailable. However, it would also mean that managerial culture should be an area of focus for PPIs.[66] Further, ineffective implementation can divert attention away from actual safety towards

[58] Step Change in Safety, undated.
[59] Hudson 1999, 2001, 2003, 2007.
[60] Step Change in Safety, undated.
[61] ICMM, 2012, p13.
[62] Janicak, 2003.
[63] ICMM, 2012.
[64] *Ibid*.
[65] *ICMM, 2012*.
[66] Step Change in Safety, undated.

the PPIs themselves.[67] A multidisciplinary, 'bottom-up' approach is recommended to ensure appropriate PPIs are chosen, valued and that there is ownership and responsibility of the PPI.[68]

Information

Practical considerations include how to collect, interpret and report PPI information and the frequency required.[69] Information gained from PPIs must ultimately inform and enable action by the organisation and be mindful that information requirements may vary across different users.[70] Further, qualitative and subjective measures may lend themselves to uncertainty in interpretation. Different weights may also be assigned to PPIs in accordance with relative importance, which requires consideration of how PPIs are combined and the effect of different inputs.[71] Other challenges include metrics that are: unable to detect small but significant changes; excessive or ill-defined, and that ensure the entire process is cost efficient.[72]

4.5 Existing guidance

Appendix 2 lists sources of further information that may provide assistance to organisations in identifying and developing potentially useful performance indicators.

[67] *Ibid*.
[68] ICMM, 2012.
[69] Australian Government, 2005.
[70] ICMM, 2012.
[71] Step Change in Safety, undated.
[72] ICMM, 2012.

5. Reporting on work health and safety

Validity, relevance and reliability are essential to developing sound work health and safety performance measures (as discussed in section 2). Also important are additional qualitative characteristics relating to reporting of work health and safety measures. These include measures being:

i) ***Material***: reported information should be sufficiently relevant and important such that that errors or omissions are likely to influence the decisions of intended users
ii) ***Comparable:*** information must be presented in a clear and consistent way so performance is comparable both over time and, where possible, across different organisations, and
iii) ***Understandable***: information must be capable of being understood by the intended user(s) of the report.

Internal work health and safety reports may be prepared for boards, senior managers, supervisors and employees. However, organisations may also report work health and safety information to external stakeholders. Again, reported information will differ according to the needs of the intended report user(s) and, in the case of voluntary reporting, according to the information the organisation chooses to publish.

5.1 Mandatory work health and safety reporting

Employers are required by law to report certain safety incidents to the relevant regulatory authority as and when they arise. These are referred to as "notifiable incidents" under the *Work Health Safety Act (2011)* as enacted in all federal, state and territory jurisdictions - except Victoria and Western Australia, which have similar state law provisions. Reportable (or notifiable) incidents in the various jurisdictions are summarised in Appendix 3. Regulators do not make this information publicly available although may release highly summarised jurisdictional statistics from time to time.

However, public accountability for the effectiveness of work health and safety systems is important because WRIIs have a disproportionate impact on external stakeholders. In addition to the physical, emotional and social consequences experienced by injured workers, their families and community networks, injured workers also bear a substantial proportion of the economic costs of an organisation's failure to ensure work health and safety[73]. Figure 12 illustrates the distribution of the economic cost of Australian WRII across key stakeholder groups of employer, injured worker and society; the latter comprising largely of costs imposed on other business (through the cross-subsidising nature of workers' compensation systems) and on taxpayers (through public health and social security systems).

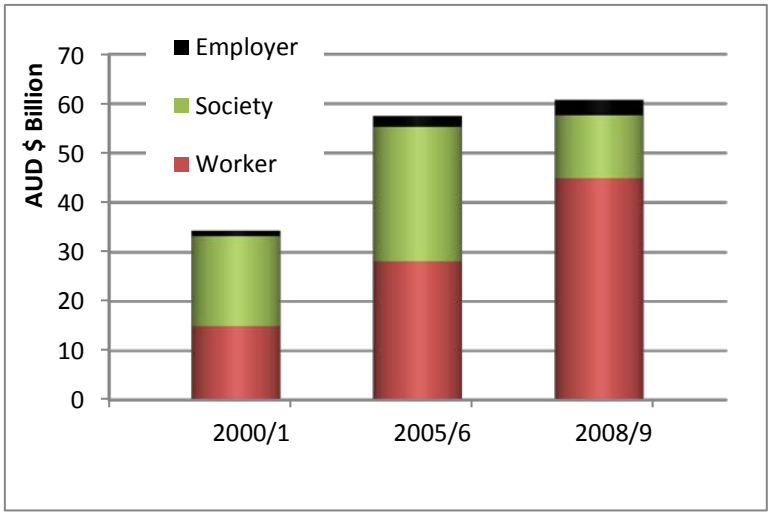

Figure 12: Economic cost of injury and illness in Australia
(Sources: Safe Work Australia, 2012b; National Occupational Health & Safety Commission, 2004; Australian Safety & Compensation Council, 2005)

Prior research and work health and safety legislation both reinforce management's ability to influence work health and safety outcomes. This suggests organisations should be accountable to stakeholders for the effectiveness of managerial decisions that impact work health and safety effectiveness.

Furthermore, analysis of workers' compensation data (see Figure 13) reveals a relationship between the severity of injury and the economic burden imposed on external stakeholders. This finding is

[73] McDonald, 2006; Safe Work Australia 2008; 2012.

consistent with the organisational impact presented in section 3.1.2 above and suggests that reporting information about the severity of WRII outcomes is likely to be of great interest to external stakeholders such as investors, employees, competitors, industry and employer organisations, trade unions and policy-makers.

At present, however, there are limited requirements for the routine mandatory disclosure of work health and safety performance information to stakeholders. These are summarised below.

5.1.1 Health and safety legislation

The WHS Act contains provisions for courts to impose publicity orders relating to individual offences, however only work health and safety legislation enacted in the Commonwealth jurisdiction[74] places a mandatory obligation on organisations to ensure specific work health and safety information is included in each Annual Report. Even so, this legislation applies only to Annual Reports provided by Commonwealth Authorities and Entities, and not to other organisations such as private businesses operating within the jurisdiction.

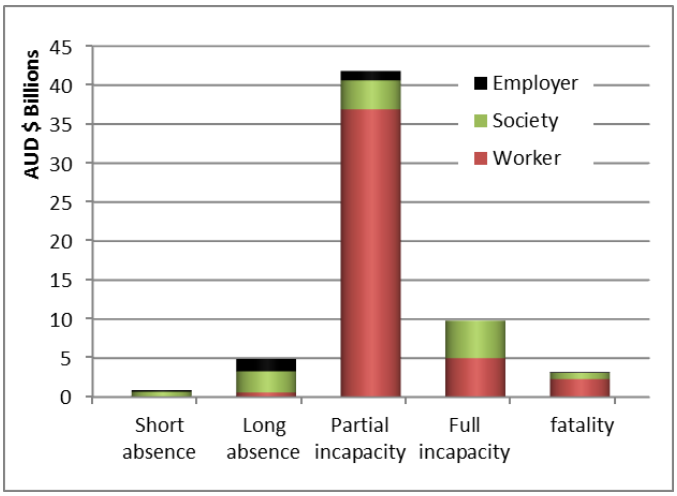

Figure 13: Economic burden of work health and safety failure, by severity
(Source: Safe Work Australia, 2012b)

5.1.2 Other State-based legislation

In some jurisdictions, mandatory requirements for reporting on work health and safety by State departments and public bodies are found in State government directives. For example, the Victorian Government's *Financial Reporting Direction FRD22B - Standard Disclosures in the Report of Operations*, issued by the Department of Treasury and Finance, states:

> "General information must include a statement on occupational health and safety matters, including appropriate performance indicators and how they affect outputs" (p1), and
>
> "An entity's statement on occupational health and safety matters should identify the performance indicators adopted to monitor such matters, and outline the entity's performance against those indicators" (p2).

Again however, these work health and safety reporting requirements do not extend to private sector entities.

5.1.3 Corporations law

In certain circumstances, the disclosure of work health and safety information in Annual Reports may be required under the provisions of the *Corporations Act 2001*. Sections 299-300 of the Corporations Act require that where issues (including work health and safety) present a **significant change** in the operations, results or state of affairs of an entity; they must be disclosed in the Directors' Report section of the Annual Report. Also, where the firm's expenses, liabilities or contingent liabilities are **deemed material**, Accounting Standards dictate they must be disclosed in financial statements or associated notes.

However, these requirements are unlikely to mandate the routine disclosure of work health and safety performance information given the subjectivity inherent in 'significant', the non-routine criteria of a 'change' to operations, and the tendency for 'materiality' to be interpreted only in the narrow context of an entity's financial expenses, liabilities or contingent liabilities relative to its financial position and performance[75]. Most reporting entities will therefore face no mandatory work health and safety disclosure obligations.

[74] Work Health and Safety Act 2011 (Cth), see Schedule 2, Part 4.
[75] Hecimovic and O'Neill, 2012.

5.2 Voluntary work health and safety reporting

In the absence of mandatory requirements for external reporting on work health and safety, community expectations for organisations to account publicly for their social impact are driving many firms to voluntarily report on issues such as work health and safety.[76] These disclosures are provided in, for example, corporate annual reports, stand-alone sustainability reports (also referred to as CSR, triple bottom line, or stakeholder reports), and in media such as organisational websites, corporate newsletters and other advertising.[77]

Research has, however, been critical of the quality of voluntary work health and safety disclosures.[78] In particular, studies of the work health and safety data provided in Annual and Sustainability Reports suggest a tendency for it to:

- Be self-laudatory, focusing selectively on positive results and 'good-news' stories
- Not identify the key work health and safety hazards and risks relevant to the organisation and its workers
- Not discuss the nature and effectiveness of work health and safety risk control strategies and processes
- Not address occupational health exposure and disease, instead focusing only on injury
- Concentrate on highly summarised injury measures, such as LTIFR and TRIFR, which are too aggregated to provide useful information on high consequence risks and WRII, and
- Misrepresent reducing injury rates as empirical evidence of improved work health and safety (risk).

Furthermore, examination of work-related injury data reveals various WRII performance reporting tends to be incomplete, unreliable and incomparable:

- Different firms report different WRII measures, and some firms change the measures they report on from year to year, both preventing user comparisons across firms and over time
- Some firms omit WRII data from reports where results are poor (or deteriorating)
- Some firms present similar injury measures but call them different things (e.g. injury rate and incident rate), other firms use the same labels but actually measure their data differently (e.g. LTIFR calculated per 1 million hours or per 200 000 hours), and
- Very few WRII disclosures are subject to independent assurance or review.

Overall, work health and safety disclosures have tended to lack the necessary detail (e.g. glossaries and definitions), the stability and completeness needed for users to make valid interpretations.[79] As a result, voluntary work health and safety reporting is often irrelevant for stakeholder decision-making and inadequate for discharging managerial accountability for the control of work health and safety.

5.3 Existing frameworks and guidance

Appendix 4 lists sources of further information currently available to organisations when selecting work health and safety information to report to internal decision-makers and external stakeholders. However, these sources are often inconsistent, presenting competing frameworks and conflicting recommendations for measuring and reporting WRIIs. The absence to date of generally accepted, high quality guidance for work health and safety reporting contributes to the limitations of existing voluntary disclosures outlined above.

5.4 Future directions

The limitations of injury data (LTI rates in particular) have been debated for decades. The need for alternate measures of WRII and supplementary provision of positive performance measures is well

[76] Deegan and Rankin, 1997; O'Neill, 2010; Tilt, 1994.
[77] Guthrie and Parker, 1989; Gray et al, 1995; Martinov-Bennie, Frost & Soh, 2012.
[78] Brown and Butcher, 2005; O'Neill, 2010; O'Neill, Clarke and Flanagan, 2011.
[79] Brown and Butcher, 2005; O'Neill 2010; O'Neill, Clarke and Flanagan, 2010; 2011; Vuontisjarva, 2006.

documented.[80] Nevertheless, despite the availability of guidance documents, frameworks and suggestions for developing PPIs, limited progress has been achieved in crafting and empirically validating the high quality process performance measures needed to support work health and safety decision-making.

The accounting profession has disciplinary expertise in the design and management of performance measurement, reporting and control systems. Yet, evidence suggests accountants have, at least to date, tended to import existing injury measures such as LTI and LTIFR rates into balanced scorecards and other performance reports and control systems, rather than actively engage with work health and safety professionals to develop more valid, relevant and reliable measures of work health and safety performance. This review suggests significant potential exists for collaborative efforts of the work health and safety and accounting professions to develop, test and validate novel performance measures and indicators for work health and safety management control systems.

6. Conclusion

Advances in work health and safety theory and practice have been underpinned by an increasingly comprehensive technical body of knowledge since the mid-20th century. This has fostered continued improvement of work health and safety outcomes, both in Australia and around the world.[81] Yet, efforts directed at identifying and continuously improving work health and safety performance evaluation have seemingly not kept pace. In particular, there is an ongoing need for relevant, reliable and empirically validated performance measures and indicators that can help understand the material consequences of WRII and more effectively inform work health and safety strategies and practices.

The traditional reliance on measures such as LTI has been heavily criticised of late. Recognising the limited value of LTI data for informing most work health and safety decisions, some scholars have called for the focus of attention to shift away from injury outcome measures to positive (or leading) work health and safety performance indicators. Yet, this overlooks the critical point that activity (input and process) and injury (outcome) measures simply provide different types of data, each relevant for informing particular *types* of decisions. Disregarding one or the other would akin to asking investors to choose between receiving a Balance Sheet and an Income Statement: both are important because they provide different perspectives on an organisation's success – one reflects position and the other reflects performance.

The findings of this report suggest three areas for change required in relation to the measurement and reporting of work health safety performance:

- A shift in the focus of managerial attention from LTI and LTIFR measures of injury to Class 1 WRII outcomes (more valid and reliable measures of damage) and TRIFR
- The identification and validation of effective PPIs to provide valid, reliable and relevant information about work health and safety inputs and processes for driving work health and safety strategy and practices, and
- Collaborative efforts to unlock the specialised technical expertise of work health safety and accounting professionals (at organisational, industry and national levels) to innovate new, effective approaches for monitoring and managing work health and safety performance.

[80] Bottomley, 2000; Work Safe Australia, 1994.
[81] For example, HaSPA, 2012 (*Australia*); Safety, Health and Environmental Body of Knowledge, 2011 (*USA*).

7. References

Australian Bureau of Statistics (ABS). (2001). *Work-Related Injuries*. Canberra.

ABS. (2010). *Work-Related Injuries, Australian 2009-10* (cat. no. 6324.0). Canberra.

Australian Safety and Compensation Council (ASCC). (2005). *Guidance on the Use of Positive Performance Indicators to Improve Workplace Health and Safety*. Canberra.

ASCC. (2009). *The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2005-06*. Canberra.

Blewett, V. (1994). *Beyond Lost Time Injuries. Positive Performance Indicators for OHS*. Worksafe Australia. Canberra: 1-6.

Borys, D., Else, D. & Leggett, S. (2009). The Fifth Age of Safety: the Adaptive Age. *Journal of Health and Safety Research and Practice*, *1*(1), 19-27.

Bottomley, B. (2000). *OHSMS Performance Measures that Add Up*. Occupational Health and Safety Management Systems Conference Proceedings, Sydney, Crown Content.

Brown, J. and Butcher, F. (2005). Reporting on Occupational Health and Safety in Annual Reports: A Look at Disclosure Practices in New Zealand. *New Zealand Journal of Employment Relations, 30*(1), 1-22.

Collie, A., Pan, Y., Britt, H. & Henderson, J. (2011). Coverage of Work-related Problems by Workers' Compensation in General Practice. *International Journal of Social Security & Workers' Compensation, 3*(1), 1-14.

Collins, R. (2013). Losing faith in lost time injuries. *Inside Safety*. Perth, Australia: Aspermont Limited.

Comcare. (2004). *Positive performance indicators: measuring safety, rehabilitation and compensation performanc*e. Canberra, Australia: Australian Government.

Cooper, D. R. & Emory, C. W. (1995). *Business Research Methods* (5 ed.). USA: Irwin.

Creswell, J. W. (1994). *Research Design: Qualitative and Quantitative Approaches*. Thousand Oakes, California: Sage.

Deegan, C. & Rankin, M. (1997). The Materiality of Environmental Information to Users of Annual Reports. *Accounting Auditing and Accountability Journal*, *10,* 562-583.

Drexel, S. R. (1992). Managing Workers' Compensation Costs at Kelly Services. *Management Accounting,74*(5), 42.

European Chemical Industry Council (CEFIC). (2011). *Guidance on process safety performance indicators*. Belgium, May. Retrieved July 5, 2013, from http://www.cefic.org/Documents/IndustrySupport/RC%20tools%20for%20SMEs/Document%20Tool%20Box/Guidance%20on%20Process%20Safety%20Performance%20Indicators.pdf.

Frederick, J. & Lessin, N. (2000). Blame the Worker: The Rise of Behavioral-Based Safety Programs. *Multinational Monitor*, *21*(11), 10-17.

Frost, G., Jones, S., Loftus, J. & van der Laan, S. (2005). A Survey of Sustainability Reporting Practices of Australian Reporting Entities. *Australian Accounting Review*, *15*(1), 89-96.

Furter, E. (2011). Bird incident pyramid: true or false? Retrieved March 6, 2011, from www.sheqAfrica.com.

Gilovich, T., Griffin, D. & Kahneman, D. (2002). *Heuristics and biases: the psychology of intuitive judgement*. Cambridge: Cambridge University Press.

Glendon, A. I. (2009). Process hazards and analogies: Response to Andrew Hopkins. *Safety Science*, *47*(4), 476-477.

Gray, R., Kouhy, R. and Lavers, S. (1995). Corporate social and environmental reporting: A review of the literature and a longitudinal study of UK disclosure. A*ccounting, Auditing and Accountability Journal*, *8*(2), 47-77.

Guthrie, J. & Parker, L. D. (1989). Corporate Social Reporting: A Rebuttal of Legitimacy Theory. *Accounting and Business Research*, *19*(76), 343-352.

Hale, A. R. & Hovden, J. (1998). Management and Culture: The Third Age of Safety. In Feyer, A. M. & Williamson, A. (eds). *Occupational Injury: Risk Prevention and Intervention*. London: Taylor and Francis.

Health and Safety Professionals Alliance (HaSPA). (2012). *The Core Body of Knowledge for Generalist OHS Professionals*. Tullamarine, VIC., Safety Institute of Australia.

Hecimovic, A. and O'Neill, S. (2011). Are Non-financial Corporate Social Material to Assurance Providers? *Centre for Social & Environmental Accounting Research* summer school. St Andrews, Scotland.

Herr, M. L. (1998). Occupational Illness: Where is the Outrage? *American Industrial Hygiene Association Journal*, *59*(2), 83-84.

Hopkins, A. (1994). The Limits of Lost Time Injury Frequency Rates. *Positive Performance Indicators for OHS: Beyond Lost Time Injuries*. Canberra: Australian Government Publishing Service, Commonwealth of Australia.

Hopkins, A. (2000). *Lessons from Longford: The Esso Gas Plant Explosion*. Sydney: CCH Australia Ltd.

Hopkins, A. (2005). *Safety Culture and Risk: The Organisational Causes of Disasters*, Sydney: CCH Australia Ltd.

International Association of Oil and Gas Producers (IAOGP). (2011). *Process Safety - Recommended practice on key performance indicators*. Report No. 456.

International Council on Mining and Metals (ICMM). (2012).*Overview of leading indicators for occupational health and safety in mining*. London: ICMM.

Institute for Work & Health (IWH). (2011). *Benchmarking organizational leading indicators for the prevention and management of injuries and illnesses*. Toronto: IWH.

Janicak, C. (2010). *Safety Metrics: Tools and Techniques for Measuring Safety Performance*. Plymouth, UK: Government Institutes.

Jung, C. G. (1971). *Psychological types*. Princeton, New Jersey: Princeton University Press.

Kahneman, D., Slovic, P. & Tversky, A. (1982). *Judgement under uncertainty: Heuristics and biases*. Cambridge: Cambridge University Press.

Manuele, F. A. (2002). *Heinrich Revisited: Truisms or Myths*. National Safety Council.

McDonald, G. L. (1985). *Defining the Objectives - Immediate and Future*. University of New South Wales Occasional Paper No. 10. Sydney.

McDonald, G. L. (1994). *Occupational Personal Damage Causation: Causes of Occupational Injury, Illness and Disease in Australia*. Report commissioned by Industry Commission, Sydney, 1985.

McDonald, G. L. (2001). Measuring Safety Performance: Measuring "A" while Hoping for "B". Minesafe Conference. Perth, WA.

McDonald, G. L. (2006). Better Words, Models and Concepts - Better Safety. The Safety Conference. Sydney.

McDonald, G. L. (2012). *Information Organisers*. Brisbane: Geoff McDonald and Associates Pty Ltd.

National Occupational Health and Safety Commission (NOHSC). (2004). *The Cost of Work-Related Injury and Illness for Australian Employers, Workers and the Community.* Canberra: Australian Government.

Nichol, K. (2012). The Safety Triangle Explained. Safety 101. Retrieved July 8, 2013, from http://crsp-safety101.blogspot.com.au/2012/07/the-safety-triangle-explained.html.

O'Neill, S. (2010). *Accounting for Lost Time: Examining Corporate Accountability to Stakeholders for Occupational Health and Safety*. School of Accounting and Law, RMIT, Melbourne, PhD Thesis.

O'Neill, S., Clarke, K. & Flanagan, J. (2011). The Risk Paradox of Work Health and Safety - Are Investors Adequately Informed? *UNPRI Dynamics of Responsible Investing Conference*. University of Sydney, Australia.

O'Neill, S., Clarke, K. & Flanagan, J. (2013). Mis-reporting of corporate social (health and safety) performance. *Macquarie University*. (Working Paper).

O'Neill, S., McDonald, G. & Deegan, C. (2012). Lost in Translation: Institutionalized Logic and the Problematization of Accounting for Injury. *RMIT Sustainability Conference*. Melbourne.

Occupational Safety and Health Administration (OSHA). (1996). *Occupational Injury and Illness Recording and Reporting Requirements - 61:4029-4067*. Retrieved August 12, 2008, from http://www.osha.gov/pls/oshaweb/.

Australian Concise Oxford Dictionary (4 ed.). Melbourne: Oxford University Press.

Petersen, D. (1989). *Techniques of safety management: A systems approach* (3 ed.). New York: Aloray Inc.

Petersen, D. (1996). *Analysing Safety System Effectiveness* (3 ed.). New York: International Thomson Publishing.

Petersen, D. (1999). Behaviour-based Safety: Build a Culture or Attack Behaviour. *Occupational Hazards* 61(1): 29-32.

Public Sector Accounting Standards Board (PSASB). (1990). *Statement of Accounting Concepts (SAC 3): Qualitative characteristics of financial information* Australia.

Reason, J. (1997). *Managing the Risks of Organizational Accidents*. London: Ashgate Publishing Ltd.

Safe Work Australia. (2009). *Work-related Injuries in Australia 2005-2006: Comparison of compensation data with all incurred work-related injuries*. Canberra. Retrieved July 3, 2013, from http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/215/ComparisonOfCompensationData_AllIncurredWorkRelatedInjuries_2009_PDF.pdf.

Safe Work Australia. (2011).*Work-related injuries in Australia: Who did and didn't receive workers' compensation in 2009-10*. Canberra.

Safe Work Australia. (2012a). *Comparative performance monitoring report: Comparison of work health and safety and workers' compensation schemes in Australia and New Zealand Safe Work Australia*, Canberra. Retrieved June 30, 2013, from http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/716/CPM_14.pdf.

Safe Work Australia. (2012b). *The cost of work-related injury and illness for Australian Employers, workers and the community: 2008-09*. Canberra.

Safe Work Australia. (2013). *Compendium of workers' compensation statistics Australia 2010-11*. Canberra.

Safe Work Australia. (2013). *The incidence of accepted workers' compensation claims for mental stress in Australia*. Canberra.

Safety, Health and Environmental Body of Knowledge. 2011. Retrieved July 5, 2013, from http://www.safetybok.org/.

Tilt, C. A. (1994). The Influence of External Pressure Groups on Corporate Social Disclosure: Some empirical evidence. *Accounting, Auditing and Accountability Journal*, *7*(4), 47.

Vuontisjarva, T. (2006). Corporate Social Reporting in the European Context and Human Resource Disclosures: An Analysis of Finnish Companies. *Journal of Business Ethics*, *69,*331-354.

Watson, I., J. Buchanan, J., Campbell, I. & Briggs, C. (2003). *Fragmented Futures: New Challenges in Working Life.* Leichhardt: The Federation Press.

Willingham, R. (2013). Fire fighters front Wells. *The Age,* 17 May.

WorkCover NSW (2008). *Statistical Bulletin 2006/2007*. Sydney: Knowledge Management Branch, Workcover NSW.

Worksafe Australia. (1994). *Positive performance indicators for OHS - Beyond lost time injuries*. Canberra: Commonwealth of Australia.

Wright, H. & Barker, M. (2012). OSHA's Stance on Safety Incentive Programs. *Occupational Health and Safety*.

8. Appendices

Appendix 1: Notifiable incidents for mandatory reporting

Table 3.5(a) Workplace Injuries
K: Finance and Insurance: 2006/07

Agency	Mechanism of Injury: Manual Handling	Falls on the same level	Repetitive movement, low muscle loading	Falls from a height	Muscular stress with no objects being handled	Hitting stationary objects	Being hit by moving objects	Being trapped between stationary and moving objects	Stepping, kneeling or sitting on objects	Other	Total Claims
Furniture and fittings	12	6	4	8	6	8	3	4	2	5	58
Indoor environment	-	24	-	20	-	-	-	-	1	-	45
Office and electronic equipment	12	1	25	1	4	1	-	-	-	-	44
Fastening, packing and packaging equipment	28	-	-	-	-	-	-	-	-	2	30
Outdoor environment	-	25	-	2	1	1	-	-	-	-	29
Other materials and objects	17	-	2	-	-	1	1	-	-	1	22
Road transport	1	1	-	-	1	-	2	1	-	5	11
Other non-powered equipment	1	1	-	-	1	1	1	-	1	1	7
Human agencies	-	-	-	-	1	-	-	-	-	5	6
Other	7	6	4	2	19	-	2	-	1	27	68
Total Claims	**78**	**64**	**35**	**33**	**33**	**12**	**9**	**5**	**5**	**46**	**320**

Body Location	Nature of Injury: Sprains and strains of joints and adjacent muscles	Fractures	Contusion with intact skin surface and crushing injury excluding those with fracture	Poisoning and toxic effects of substances	Open wound not involving traumatic amputation	Other and unspecified injuries	Superficial injury	Burns	Dislocation	Multiple injuries	Other	Total Claims
Back	76	1	2	-	-	1	-	-	-	-	-	80
Multiple locations	27	2	5	4	-	-	1	1	-	1	-	41
Wrist	17	8	1	-	-	-	-	1	1	-	-	28
Ankle	16	7	1	-	-	-	-	-	-	-	-	24
Knee	18	1	3	-	-	-	-	-	1	-	-	23
Hand, fingers & thumb	9	4	3	1	4	-	-	-	-	-	-	21
Shoulder	16	-	-	-	-	-	-	-	-	-	-	16
Head	-	3	5	1	2	1	1	-	-	1	1	15
Neck	12	-	-	-	-	-	-	-	-	-	-	12
Foot & toes	5	3	-	-	1	1	-	-	1	-	-	11
Other	26	7	5	2	-	3	2	1	-	1	2	49
Total Claims	**222**	**36**	**25**	**8**	**7**	**6**	**4**	**3**	**3**	**3**	**3**	**320**

(Source: WorkCover NSW (2008) Statistical Bulletin, p122)

Appendix 2: Guidance for developing PPIs

Sources of further information		
Guidance for developing leading indicators of work health and safety		
International Council on Mining and Metals	Overview of leading indicators for occupational health and safety in mining	http://www.icmm.com/leading-indicators
Comcare	Positive performance indicators: measuring safety, rehabilitation & compensation performance	http://www.comcare.gov.au/__data/assets/pdf_file/0018/41346/Positive_performance_indicators_PUB_10_sept04_v3.pdf
Institute for Work and Health	Benchmarking organizational leading indicators for the prevention and management of injuries and illnesses: Final report	http://www.iwh.on.ca/benchmarking-organizational-leading-indicators
Australian Safety & Compensation Council	Guidance on the use of positive performance indicators to improve workplace health and safety	http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/150/GuidanceOnUseOfPPIs_2005_PDF.pdf
Step Change in Safety	Leading (safety) performance indicators: Guidance for effective use	http://www.lustedconsulting.ltd.uk/step%20change%20-%20leading%20performance%20indicators.pdf
Guidance for evaluating safety (including process safety)		
CME & WISB	Business results through health and safety	http://www.wsib.on.ca/files/Content/DownloadableFileBusiness%20Results%20Through%20Health%20&%20Safety/Biz.pdf
Institute of Directors and UK HSE	Leading health and safety at work	
UK Health & Safety Executive (HSE)	A guide to measuring health and safety performance	http://www.hse.gov.uk/opsunit/perfmeas.pdf
Oil and Gas Producers	Process safety – recommended practice on key performance indicators	http://www.ogp.org.uk/pubs/456.pdf
European Chemical Industry Council	Guidance on process safety performance indicators	http://www.cefic.org/Documents/IndustrySupport/RC%20tools%20for%20SMEs/Document%20Tool%20Box/Guidance%20on%20Process%20Safety%20Performance%20Indicators.pdf
Generic guidance on performance measurement		
UK Audit Commission	On Target: the practice of performance indicators	http://archive.audit-commission.gov.uk/auditcommission/nationalstudies/localgov/Pages/ontarget.aspx.html
UK Audit Commission	Aiming to Improve: the principles of performance measurement	http://archive.audit-commission.gov.uk/auditcommission/nationalstudies/localgov/Pages/aimingtoimprove.aspx.html

Appendix 3: Notifiable incidents for mandatory reporting

Category	WHS Act (ACT, C'wlth, NSW, NT, QLD, SA, TAS)	Victoria	WA
Death	Death of a person	Death of a person	Death of a person
Serious injury or illness	▪ immediate hospital treatment as an in-patient required ▪ immediate treatment required for: - amputation of any body part - serious head injury - serious eye injury - serious burn - separation of skin from underlying tissue (e.g. degloving or scalping) - spinal injury - loss of a bodily function - serious lacerations ▪ medical treatment with 48 hours of exposure to a substance required.	▪ immediate hospital treatment as an in-patient required ▪ immediate treatment required for: - amputation of any body part - serious head injury - serious eye injury - separation of skin from underlying tissue (e.g. degloving or scapping) - electric shock - spinal injury - loss of a bodily function - serious lacerations ▪ medical treatment with 48 hours of exposure to a substance required.	▪ fracture of the skull, spine or pelvis ▪ fracture of any bone in the arm (other than wrist or hand) or leg (other than ankle or foot) ▪ amputation of an arm, hand, finger, finger joint, leg, foot, toe, toe joint ▪ loss of sight of an eye ▪ in the opinion of a medical practitioner, is likely to prevent the employee from being able to work within 10 days from the date of injury
Dangerous incidents ('near misses')	Covers incidents in relation to a workplace that expose persons to a "serious risk" to health or safety from immediate or imminent exposure, including the following: ▪ escape, spill or leakage of a substance ▪ implosion, explosion or fire ▪ escape of gas or steam ▪ escape of a pressurised substance ▪ electric shock ▪ fall or release from height of any plant, substance or thing ▪ damage or malfunction of plant that requires authorisation to operate ▪ collapse or partial collapse of a structure ▪ collapse or failure of an excavation or supporting shoring ▪ inrush of water, mud or gas in workings, underground excavation or tunnel ▪ interruption to main ventilation system in an underground excavation or tunnel.	Incidents that expose persons in the immediate vicinity to an "immediate risk" to health or safety, including the following: ▪ escape, spill or leakage of any substance, including dangerous goods under the Dangerous Goods Act 1936 (VIC) ▪ implosion, explosion or fire ▪ fall or release from height of any plant, substance or object ▪ damage or malfunction of plant that requires a licence or registration to operate ▪ collapse or partial collapse of all or part of a building or structure ▪ collapse or failure of an excavation or supporting shoring ▪ in relation to mines: - overturning or collapse of any plant - inrush of water, mud or gas - interruption to main ventilation system.	*None*
Diseases ***(These are prescribed as 'serious illnesses' under the WHS regulations)***	▪ An infection from which work is "a significant contributing factor", including infections "reliably attributable" to work that involves providing human care or treatment, contact with human body substances or the handling animals and animal products ▪ Occupational zoonoses: Q fever, anthrax, leptospirosis, brucellosis, Hendra virus, avian influenza and psittacosis, contracted from work involving contact with animals or animal products.	*None*	▪ Infectious diseases: tuberculosis, viral hepatitis, legionnaire's disease, HIV from work involving exposure to human bodily fluids or other material that may be a source of infection ▪ Occupational zoonoses: Q fever, anthrax, leptospirosis, brucellosis, contracted from work involving contact with animals or animal products.

Category (continued)	WHS Act	Victoria	WA
Other	▪ Licensed asbestos removalists must notify the regulator at least 5 days prior to commencing the work ▪ Lead risk work, once it is identified as such, must be notified of within 7 days. This is defined as work conducted in a lead process that is likely to cause blood lead levels to exceed a threshold stipulated in the regulations ▪ Schedule 15 chemicals are present or likely to be present in a quantity that exceeds 10% of their threshold quantity.	▪ Asbestos removal work: - involving the removal of a total area of maximum 10 square metres of non-friable asbestos-containing material that is fixed or installed in a building, structure, ship or plant must be notified of at least 24 hours prior to commencing the work, or at least 5 days before commencing the work in any other asbestos-related case - a sudden, unexpected event, including non-routine equipment failures that may expose persons to airborne asbestos fibres, or failures of essential services (e.g. utilities), must be notified of within 24 hours of commencing the work ▪ Lead risk work, once it is identified to be such, must be notified of within 7 days. This is defined as work conducted in a lead process that is likely to cause blood lead levels to exceed a threshold stipulated in the regulations ▪ Schedule 9 materials are present or likely to be present in a quantity that exceeds 10% of their threshold quantity but less than their threshold quantity must be notified of within 30 days after becoming aware or reasonably ought to have become aware.	▪ Carcinogenic substances: - employers proposing to use carcinogenic substances listed in Schedule 5.5 must notify of the intended use beforehand - If a person is exposed at a workplace to a carcinogenic substance from a spill or incident, or monitoring/health surveillance results indicate excessive exposure at a workplace to a carcinogenic substance, this must be reported as soon as practicable.
Source	WHS Act, ss35-38; *Work Health and Safety Regulation 2011* (Cth), regs 394, 403, 466, 536, 699 & 752.	*Occupational Health and Safety Act 2004* (VIC), ss37-38; *Occupational Health and Safety Regulations 2007* (VIC), regs 4.3.97, 4.3.98, 4.4.19 & 5.2.27.	*Occupational Safety and Health Act1984* (WA), s23I; *Occupational Safety and Health Regulations 1996* (WA), regs 2.4, 2.5, 5.30 & 5.40.

Appendix 4: Guidance for reporting on work health and safety performance

Sources of further information		
Guidance for reporting on work health and safety		
Health & Safety Executive (UK)	A guide to measuring health and safety performance	http://www.hse.gov.uk/opsunit/perfmeas.pdf
Institution of Occupational Health and Safety (IOSH)	Reporting performance: Guidance on including health and safety performance in annual reports	http://www.iosh.co.uk/books_and_resources/guidance_and_tools.aspx#Making
Safe Work Australia	Benchmarking occupational health and safety	http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/gm1996benchmarkingohs
Safe Work Australia	Guidance on OHS reporting in annual reports	http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/151/GuidanceOnOHSReportingInAnnualReports_2004_PDF.pdf
Worksafe Victoria	Performance standards and indicators *(a guide for operators of major hazard facilities)*	http://www.worksafe.vic.gov.au/__data/assets/pdf_file/0019/12394/Performance_standards_and_indicators_FINAL.pdf
Global reporting initiative (GRI)	GRI's Sustainability Reporting Guidelines *(includes a number of work health and safety indicators).*	https://www.globalreporting.org/
Generic guidance on external reporting on corporate social responsibility		
KPMG & Group of 100	Sustainability Reporting: A Guide	http://www.group100.com.au/publications/kpmg_g100_SustainabilityRep200805.pdf
Other		
U.S. O.H.&S. administration	Employer safety incentive and disincentive policies and practices	https://www.osha.gov/as/opa/whistleblowermemo.html
OHS Online	OSHA's Stance on Safety Incentive Programs	http://ohsonline.com/articles/2012/09/01/oshas-stance-on-safety-incentive-programs.aspx