Occupational Health & Safety Practitioner

Reading

THE MEASUREMENT OF SAFETY PERFORMANCE

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SafetyLine INSTITUTE®

Contents

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OVERVIEW

The purpose of this reading is to give an understanding of the limitations of accident statistics as indicators of an organisation's safety performance.

Figures often beguile me, particularly when I have the arranging of them myself; in which case the remark attributed to Disraeli would often apply with justice and force: "There are three kinds of lies: lies, damned lies and statistics."

Autobiography of Mark Twain

Objectives

After reading this information you should be able to detail the limitations in the use of accidents as performance indicators.

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Section 1: INTRODUCTION

Glossary of terms

When they are first used, glossary terms are indicated with an asterisk (*). Make sure that you are familiar with the **Glossary of terms** before going any further.

Reliability	The reproducibility of a measurement. In other words, the extent to which a measure will give the same results on successive occasions of use. Where physical measurements (such as mass, density and volume) are involved, the term precision is usually used. Reliability is an issue where judgement is required in the evaluation. Such evaluations may include, for example, safety climate and management system audits. If the judgements of two raters are compared, the degree to which they concur is known as the inter-rater reliability.
Validity	The extent to which what is evaluated is a true measurement of the condition or parameter you attempting to measure. This term is usually applied to measurements of 'abstract' conditions and parameters: things that cannot be directly measured or where there is no "true" value. Validity is of major concern where "safety performance" is concerned. There is no clearly defined or clearly measurable 'safety condition' within organisations. We must therefore develop a concept (known as the **construct)** of what we consider to be "safety", and develop and employ instruments to measure the level of performance.
Face validity	The credibility of abstract measures, including dimensions such as 'safety climate' and 'management commitment', used to infer the level of safety performance within an organisation.

Sensitivity	(of the performance indicator) measurement used to detect changes in the level of performance over time. These changes should preferably lend themselves to statistical analysis. Source: Reason, J.T. (1990).

1.1 What is safety?

In order to assess the reliability* and validity* of accidents as safety performance indicators, an appreciation of "safety" is required.

The term "safe" can be simply defined in terms of level of risk. Something can be "safe" if it complies with statutory requirements or recognised design or performance criteria. For me to say that "I am safe" is to make a judgement about my perceived level of risk. Defining "safety" is not so straightforward. There is no universally accepted definition. Here are a number of examples:

- The potential for the realisation of the unwanted consequences of an event (Rowe, 1977).
- The proper handling of a substance or conduct of a task to eliminate its capacity to cause injury or to do harm (Confer & Confer, 1994).
- Relative protection from exposure to hazards: the antonym of danger (Hammer, 1981).
- The opposite of risk (Harms-Ringdahl, 1993).
- The absence of danger from which harm could result (van Steen, 1996).
- Freedom from danger or risk of injury. A contrivance designed to prevent injury (Oxford Dictionary).

1.2 We focus on what is easily measured

Unlike, for example, the profitability of an organisation, "safety" is not a directly measurable state. Safety is more a construct. It reflects a sphere of activity concerned with the reduction of risk (with "risk" defined as the probability of some unwanted event) and the reduction of the consequences of unwanted events.

Logically, measuring safety should therefore be concerned with the quantity and quality of activity in these areas as well as measuring the unwanted events. In reality, we tend to focus much of our attention upon what we can comfortably measure: accidents, and that particular type of accident, the Lost Time Injury accident (also referred to as a "Disabling Injury accident"). The collation of such accident statistics has occupied a significant proportion of many a Safety Officer's time.

Chapters in numerous safety texts (as well as several readings within this Institute) are also devoted to the analysis and interpretation of accident/injury statistics.

Accident statistics do provide a cost-effective measure of performance (in terms of the costs associated with data collection). However, such statistics do suffer from a number of limitations, which should be taken into account when assessing an organisation's performance. The following sections of this reading are concerned with these limitations.

KEY POINT
Safety as a concept is similar to "cold". Both are subjective states ("I feel cold at this temperature"; "I consider this level of risk to be unsafe"). Both are defined in terms of the absence of something else (cold is an absence of heat; safety is an absence of risk).

Section 2: SAFETY AND ACCIDENT PREVENTION

2.1 Measuring the accidents avoids the problem of defining safety

It would be easy to define safety purely in terms of accident prevention. The prevention of accidents is, after all, one of the safety field's principal aims. There is also a reasonable degree of consensus regarding what an "accident" is. The reading *Accident Recording and Analysis* defines an accident as an undesired event that results in physical harm to people or damage to property. There are other similar definitions.

> **KEY POINT**
>
> In mathematical terms the level of safety is inversely proportional to the number of accidents: ie. "Safety" ≅ 1/accidents.

Measuring safety in terms of accidents avoids the problem of defining safety. An accident is some kind of measurable event, rather than some abstract concept. Consequently, accidents tend to have more face validity* as performance indicators.

Various Definitions of an Accident

- An undesired and unexpected disturbance of the normal completion of the work process, which is generally brought about by the combination of internal or external factors of a technical, physical, or social nature and which leads to injuries (Neuloh, et. al, 1957).
- An unplanned, not necessarily injurious or damaging event that interrupts the completion of an activity and is invariably preceded by an unsafe act and/or an unsafe condition or some combination of unsafe acts and/or unsafe conditions (Tarrants 1980).
- An unplanned and uncontrolled event that is not necessarily injurious or damaging to an individual, property, or to an operation. Any unplanned event that interrupts or interferes with the orderly progress of a production activity or process (Confer & Confer, 1994).

- An accident is an undesired event that causes damage or injury. An incident is an undesired event that might have caused damage or injury (Harms-Ringdahl, 1993).
- That class of events which involves a low level of expectedness, avoidability and intention (Suchmann 1961).

2.2 A generic definition of an accident

There is a reasonable degree of consensus that an accident is some kind of unplanned event. Where definitions differ is with the type of outcome or consequences. Some authors use the term "incident" to describe such events where no injury occurred.

As a generic definition, an accident may be defined as: *an unplanned event that has the potential to cause adverse consequences*.

ACCIDENT ➚ ➔ ➘ **Potential Adverse Consequences**

Defining an accident in such general terms is important. As will be discussed later, in reality we tend to measure those types of accident that we can easily measure. This limits our view of accidents (and therefore safety) to what we can see and measure. As Brown (1990) put it:

"*Defining the term 'accident' would appear to be a prerequisite. However, this is not often done explicitly, but it is implied by the criteria used for categorizing those events which are to be reported as 'accidents'. Even where an explicit definition is offered, it may simply describe the subset of behavioural outcomes which the reporting procedure can record with an acceptable level of confidence, rather than describing the nature of the malfunctioning itself*" (Brown, 1990, p. 756).

KEY POINT

Safety is concerned with the prevention of accidents. But it is also concerned with the prevention of disease, property damage and anything else that may adversely effect either the organisation or its employees. Using accidents as the only yardstick of performance may lead to these other types of problems being ignored.

2.3 Models of accident causation

There have been numerous attempts to "model" the accident process. These models range from the extremely simple, with a focus upon the direct causes, such as Wigglesworth's (1972) injury causation model, to the extremely complex, with a focus upon the system level, such "MORT" the Management Oversight Risk Tree (Johnson 1980). There is probably no single best model of accident causation. Many models reflect either the professional bias of the author or a particular type of accident or control measure.

Content & Process Models

A useful framework for evaluating models is to classify accident models in terms of their "process" and "content" (Campbell, et. al 1970). The "process" of a model attempts to account for why accidents occur, for example, in terms of failures, errors and inadequacies in management systems. The "content" of a model attempts to account for how accidents occur, for example, in terms of the hazards or the mechanisms by which the injury was sustained.

Some models can be totally process or content oriented (eg. a content model can describe the factors involved but make no assumptions regarding how they inter-relate). Other models make assumptions concerning both process and content. Heinrich's (1931) "Domino Theory" is a good example. The 'process' of the model is the assumption that an accident is the end result of a chain of events. The 'content' of the model is each of the stages. More recent authors (eg. Bird and Loftus 1976) have modified the content of the model, while assuming the same process.

What can be generally said, from a process viewpoint, is that accidents have multiple causes. They are the end result of one or more combinations of factors.

COMBINATION OF FACTORS	⇨ **ACCIDENT** ➚ ➔ ➘	**Potential Adverse Consequences**

One of the earliest examples was provided by Benjamin Franklin who wrote:

> "*For the want of a nail, the shoe was lost; for the want of a shoe the horse was lost; and for the want of a horse the rider was lost, being overtaken and slain by the enemy, all for the want of care about a horseshoe nail*."
>
> **(*Poor Richard's Almanack* 1758)**

This is an example of what we would today call a 'chain of sequential events' model (Benner, 1984). This type of model treats accidents as the end result of a linear sequence of events or factors (ie. the "process" is A *x* B *x* C *x* D etc.). Heinrich's (1931) "Domino Theory" is probably the best known of this type of model. Other types of model can include multilinear models (ie. the "process" is A & B & C etc.).

Section 3: PROBLEMS WITH USING ACCIDENTS AS PERFORMANCE INDICATORS

3.1 Accidents are a measure of failure, not success

As performance indicators, accidents are a post hoc measure; they measure the failure of accident prevention activities. To prevent accidents, the preferred approach is to identify deficiencies before accidents occur. As Rose (1994) put it at a seminar on positive performance indicators: "*If we are in the business of promoting OHS, why do we use failures as the measure of our success*?" (Quoted in Blewett, 1994).

3.2 Accidents don't always happen

As previously stated, accidents are multi-causal in nature. From a prevention viewpoint, safety is concerned with eliminating these causal factors or interfering with the relationships between them.

Review the examples of multi-causality on the following page.

Some of the relationships between these factors can be quite complex or require close timing between factors for accidents to occur. Consequently, accidents do not always happen. In other words:

- **A** does not always cause **B**.
- **A** does not always occur in the presence of **C**.
- **A** does not always occur immediately after **C** and **D**.

The fact that accidents do not always happen is hardly a disadvantage. However, this creates problems when we try to measure those things that cause accidents by the number of accidents that do occur. The number of accidents that do occur is therefore not a reliable indicator of those factors causing accidents.

Examples of Multi-Causality

A causes **B**.	Inattentiveness causes a forklift driver to hit a wall.
A causes **B** in the presence of **C**.	A dropped cigarette causes a fire in the presence of flammable liquid.
A causes **B** immediately after **C** and **D** occurs.	Failure to wear a safety helmet causes a head injury to an employee walking under a scaffold, immediately after another employee kicks a hammer off the edge of a platform that lacks toe boards.
A causes **B**, while **A** is due to a combination of:	Machine operator carries box down a ramp and slips off:
• **C** (which was caused by **D**)	• Forced to carry box because Storeman damaged trolley.
• **E**	• Ramp design too steep.
• **F**(which occurred due to **G** and **H**)	• Water on ramp due to leak in stormwater pipe above ramp and heavy rain that was falling at the time.
• **I** (which was due to **J**)	• Machine operator did not see water because light bulb above the ramp was faulty and the employee responsible for repairing them was off sick.

3.3 Accidents don't always result in adverse consequences

Accidents tend to have a range of potential adverse consequences:

Likely Consequences	Example
A hazardous situation	An operator activates a tagged out piece of equipment. The technician working on the equipment is at lunch.
Near miss	An employee slips in an oil spill but recovers her balance.
Property damage	The tines of a forklift pierce a carton, destroying the product within it.
Minor injury	Carpenter hit his thumb with a hammer.
Serious injury	Employee's arm is caught by conveyor belt, dragging the arm to a roller and breaking his arm.

Severity of Consequences

The severity of the consequences will depend upon factors such as:

- the nature of the hazard;
- the quantity of hazard involved (eg. airborne concentration of solvent, kinetic energy of flying object);
- the duration of contact or exposure;
- part of body affected; and
- important factors **unrelated to the hazard itself,** eg, luck and individual factors.

Luck

It must be admitted that luck (or 'random variation' if you wish to be scientific) can play an important part in the accident process. This is not to say that accidents are due to 'bad luck' (other than the 1 - 2 % sometimes attributed to "Acts of God"). To say so is the safety profession's equivalent of heresy. However, random or chance factors will often determine whether the "accident" is a near miss or a serious injury. How else do you account for why a falling brick lands on an employee's head killing her, instead of landing near her feet; or why a piece of metal swarf hits an employee's cheek, inflicting a puncture wound, instead of impacting 2 cm higher and blinding the employee in one eye?

Read the examples of good and bad luck on the following pages.

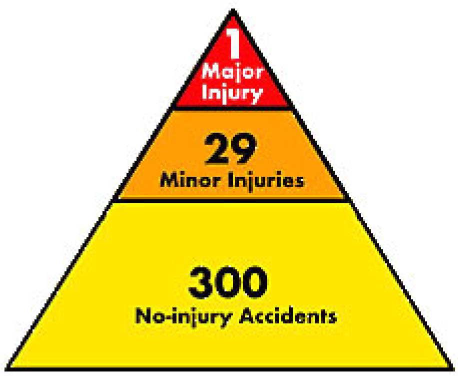
Individual Pre-Disposing Factors

Identical accidents (eg. a slip and fall on the same level) will result in varying degrees of injury in different people. This can be due to factors such as age and pre-existing injury.

Heinrich's Injury Pyramid

The variation in accident consequences was recognised early this century by Heinrich (1931) with his injury pyramid.

These figures relate to a group of 330 similar accidents. They demonstrate the degree of variation involved with one type of hazard. They should not be considered to be definitive. Other authors, such as Heinrich, Petersen and Roos (1980) and Hoyos and Zimolong (1988), quote different ratios.



Example of Good Luck
Parachutist Lives after 1100 Metre Fall
(Source: West Australian Newspaper, 10 August 1993)

AUCKLAND: A novice skydiver cheated death at the weekend by plunging 1100 metres into a duck pond after his two parachutes failed to open. Klint Freemantle, 22, amazed onlookers, including his father, Terry, and sister by walking away with one small cut over his left eye.

The accident happened on Saturday at Hawke's Bay Airport on New Zealand's North Island as Mr Freemantle was making his seventh jump from a static line. A static line is attached to the aircraft and automatically opens the parachute at a safe distance from the plane. Skydiving instructor Tim Russell looked on horrified as his pupil battled to gain some kind of control. But the main parachute's safety line became entangled in the reserve parachute. Mr Russell said" "Klint went for that pond like a guided missile. The Grim Reaper had got him, but then Klint gave the Grim Reaper a head-butt in the face. It was a freak, one-in-a-billion accident."

Mr Freemantle said five seconds after he jumped from the plane he looked up to see his main parachute had failed to open. "I pulled the handle for the emergency chute, but when I checked that, I saw it had got tangled up," he said. "I began spinning my body as I had been trained to try to untangle the lines. It didn't work, and nothing happened when I pulled on the brake handles." His father, Terry, said at first he thought his son was just clowning around. "But then it got pretty serious. I could see some of the jumpmasters getting very upset. One of them got on his phone and asked for an ambulance to go immediately to the site," he said. "I just watched him and thought: 'C'mon Klint c'mon, get that thing open'."

Mr Freemantle said he realised he would probably hit the metre-deep duck pond. "I just leaned back and undid my harness. If I was going to survive by hitting the water there was no way I was going to drown," he said. "I splashed down before I thought I would. The first thing I did was stand up and say 'Yes!', then I reeled the 'chute in." Mr Freemantle said ambulance staff were on the scene quickly after he landed and were happy to be sent away. Mr Russell first knew Mr Freemantle had hit the water when he saw ducks take off from the pond.

Example of Bad Luck
Woman gets $470,000 for Trip on Cord
(Source: West Australian Newspaper, 28 May 1992)

A former employee of the Perth Inner City Youth Service has been awarded more than $470,000 for injuries sustained when she tripped over telephone cords seven years ago. Judge Jim Whelan awarded Marie Cecilia Wheatland $470,166 after finding that she had suffered both physically and financially as a result of the accident and would continue to do so. Mrs Wheatland requires crutches and suffers what was described by a doctor in evidence as intense pain.

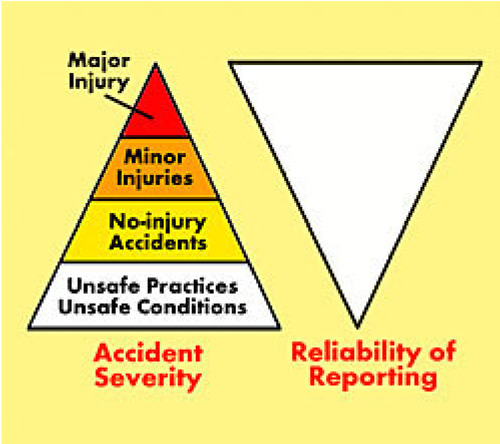
In January 1985, while working as an administrative assistant with the youth service, Mrs Wheatland, 48, tripped over telephone cords on the workplace floor. She fell heavily on her knees and left side, resulting in a condition known as reflex dystrophy. Liability in negligence was admitted by the youth service.

Pain management specialist Philip Finch, describing the suffering of Mrs Wheatland to Judge Wheland, said the condition often drove its sufferers to almost suicide. "It is one of the most unpleasant conditions you can have," he said. In mid-1986, Dr Finch diagnosed Mrs Wheatland as severely disabled and totally unable to work in any occupation. She had had several operations and suffered from neck and back pain connected with her condition. She will continue to require crutches. Dr Finch said Mrs Wheatland would have the condition for the rest of her life.

In his judgement, handed down yesterday, Judge Wheland said Mrs Wheatland was not able to do simple recreational activities such as walking, dancing and sport. The award included $77,000 for lost earnings, $38,250 for interest on the earnings and $150,000 for future loss of earning capacity. Future medical treatment was set at $20,000. Non-economic loss was set at $80,000 while special damages of $10,741 plus interest thereon of $2,258 was in part for spinal pain resulting from the use of arm crutches. Gross workers' compensation to be repaid was $91,916.

Inverted Reporting Pyramid

Another issue is that we are rarely able to measure the number of accidents that actually occur. We measure the number of accidents that are reported. In general, the less severe the resultant injury, the less likely it will be reported. Alongside Heinrich's "injury pyramid" there therefore exists an inverted "reporting pyramid". For every near miss that is reported, there are hundreds to thousands of lost time injuries that are reported.



KEY POINT

If a change occurs in the number of reported injuries this may be due to:

- a genuine change in number of accidents which are occurring;
- a random change in the number of accidents which resulted in injury; or
- a random change in the severity of the injuries, resulting in a change in reporting; or
- a change in employee attitudes towards reporting.

3.4 Safety is not just accidents

A distinction has been made between accidents and their adverse consequences. Although safety has as its primary aim the prevention of accidents, it is also concerned with the minimisation of any likely adverse consequences. Safety is concerned for example, with prevention of fires. But it is also concerned with the provision of fire fighting equipment and emergency evacuation procedures. Accidents, therefore, are not a valid performance indicator of activities in areas such as:

- First Aid
- Fire Safety
- Disaster Planning

3.5 Accidents are not always good indicators of low frequency, high severity accidents

Accidents are a sensitive performance indicator only when a reasonable frequency of accidents is occurring. Reducing the number of eye injuries in a factory from 88 in one year to 40 in the next year, for example, would be an indication of improved performance in the area of eye safety. Conversely if zero ambulance officers were diagnosed with HIV during a year, this would not be a good indication of the performance of the ambulance service in the area of biological safety.

3.6 Not all OHS problems are due to accidents

Many authors overlook this issue when discussing accident causation and accident investigation. Many OHS problems are either chronic in nature or have a long latency period. Sprain and strain injuries due to manual handling activities are the most common example. These account in some industrialised countries for over 30 % of all reported accidents.

Such problems frequently do not have an 'accident' associated with their onset. If an accident is reported, it bears little relationship to the severity of the problem (eg. "bent down to pick up spanner, felt pain in back" and off work for 3 months). The accident itself may even be contrived by employee's suffering from chronic problems in order to increase the likelihood of gaining compensation.

Section 4: PROBLEMS WITH LOST TIME INJURIES

4.1 What is an LTI?

Lost Time Injuries (LTIs) or Disabling Injuries are work-related accidents that result in an injury requiring a minimum of one day or shift off work. They have long been used in industry as the standard safety performance indicator and have the benefit of being reasonably clearly defined. However, there can still be ambiguity in terms of what constitutes a full day/shift. Australian Standard AS 1885 *Recording and measuring work injury experience* was quite explicit: a lost time injury was one in which one complete day/shift was lost. The revised version of this Standard, AS 1885.1 *Workplace injury and disease recording standard*, is silent on this matter (ie. is one day a full day, or the sum total of the time lost?).

In addition to the problems outlined in the previous section, LTIs have other problems associated with their use and interpretation, as follows.

4.2 Under-reporting and over-reporting can occur

There is no clearly defined degree of injury severity which must result in an employee taking one or more days/shifts off work. There is a substantial grey area in which factors such as job satisfaction and organisation climate can play a role. Consequently, both under-reporting and over-reporting of LTIs can occur.

Over-reporting can occur during industrial disputes and periods of organisational uncertainty.

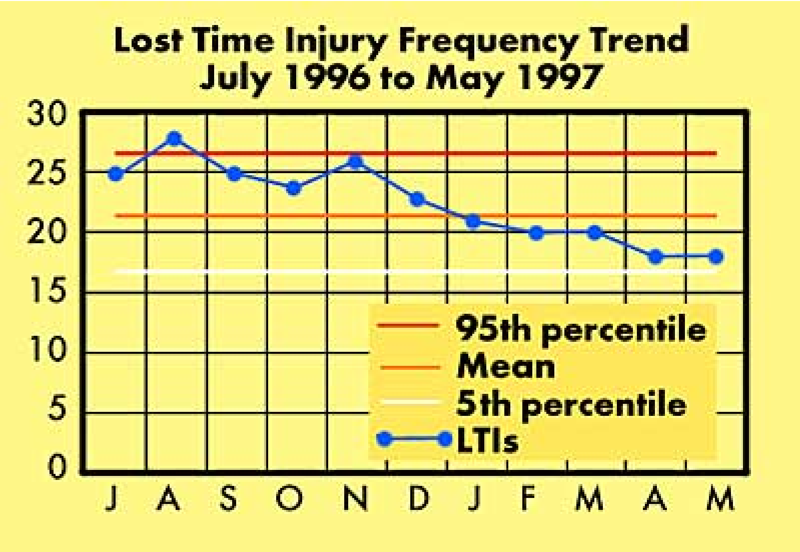
Under-reporting can occur when employees believe they may be adversely treated if they make a report. It is commonly believed, for example, that nurses tend to under-report back injuries due to a belief that a history of back injury may adversely affect their careers. Under-reporting can also occur when incentives are offered for LTI free periods.

4.3 Injuries are counted, not accidents

Some accidents may result in injury to more than one employee (eg. a scaffold collapses, causing 6 employees to fall). Although counting the number of injuries rather than the accidents may reflect the severity potential of the hazard, it over-estimates the frequency of problems.

4.4 Considerable variation in frequency

In the previous section, it was stated that accidents are multi-causal events. They don't always happen and they don't always result in injury. Consequently, in a 'steady-state' organisation, with no change in its 'safety', there will be considerable variation in the number of LTIs that occur. This variability affects the sensitivity* of LTIs as performance indicators. It makes detecting 'real' changes in performance difficult to identify. Consider the LTI frequency in the following graph. Is there a 'real' improvement?



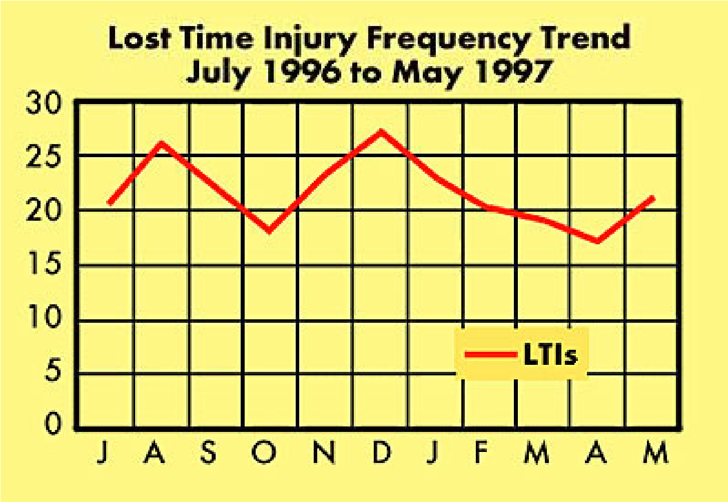
A solution to this problem is to test the results for statistical significance. This involves measuring the confidence limits for a baseline period and plotting the subsequent performance against this. The graph below employs the same data used in the graph above. The first year's data was taken as the baseline. An analysis of the total monthly number of LTIs gave the following results:

Mean = 21.7

95th percentile confidence limit = 27

5th percentile confidence limit = 17

For any changes in the second year's performance to be statistically significant, they must exceed these confidence limits. The last 5 months in the following graph show a downward trend, but this decrease is not statistically significant.



4.5 Injury rates have limitations

When using LTIs as performance indicators they are often expressed in terms of a rate of injury, either as a Frequency Rate or an Incidence Rate. The intent of these rates is to better reflect changes in exposure within an organisation and to permit comparisons between organisations. Their use, however, does have some limitations.

They are of use only in relatively large organisations

An organisation of 10 employees, with one LTI, has the same Incidence Rate as an organisation of 5,000 employees with 500 LTIs. The Australian Standard AS 1885.1-1990 *Workplace injury and disease recording standard* recommends that rates are not used for organisations that have less than 200 employees. For rates to be statistically significant, Glendon and McKenna (1995) suggest the rates should not be used unless the organisation has either a minimum of 50 LTIs or 1,000,000 hours worked per year.

Do you use employees or "full time equivalents"?

The number of employees exposed can be expressed in two ways: either as the total number of employees who work in the area in question, or as an equivalent number of full time employees (FTEs). Australian Standard AS 1885.1, for example, recommends the use of total employees. Consequently, an organisation that employs only full time employees will have a higher incidence rate for the same number of LTIs than an organisation that employs the equivalent full time establishment of part time employees.

4.6 Does the number of LTIs relate to the number of hours worked or number of employees?

On a more fundamental level, there is also the validity of the assumption that the number of LTIs is directly related to either the number of employees exposed or to the number of hours worked. Variations in the risk of injury may be related, for example, more to changes in plant and work practices rather than variations in exposure.

The tables below are the results of a study undertaken by the author. They are correlation matrices for two divisions of a large organisation (total employees in each division > 1,000). They correlate the total number of LTIs with the number of wages and salaried employee numbers and hours worked.

A breakdown of wages/salaried LTIs was not possible. Nevertheless, it may be reasonably assumed that the majority of the LTIs involved the wages employees. This shortcoming highlights a practical problem with using injury rates, namely the difficulty in getting detailed denominator data. Common problems include:

- the number of employees are not available;
- the hours worked are for pay periods, not months; and
- the hours worked are based upon hours paid and so include employees on leave, etc.

•

Division "A"		
Variable	**Correlation (r)**	**Level of Significance (p)**
Number of Salaried Employees	0.08	0.30
Salaried Regular Hours Worked	0.12	0.25
Salaried Overtime Hours Worked	0.14	0.20
Total Salaried Hours Worked	0.12	0.24
Number of Wages Employees	0.18	0.15
Wages Regular Hours Worked	0.25	0.07
Wages Overtime Hours Worked	0.21	0.11
Total Wages Hours Worked	0.25	0.07
Total Number of Employees	0.16	0.17
Total Number of Hours Worked	0.24	0.08

Division "B"		
Variable	Correlation (r)	Level of Significance (p)
Number of Salaried Employees	- 0.33	0.02
Salaried Regular Hours Worked	0.12	0.24
Salaried Overtime Hours Worked	0.20	0.12
Total Salaried Hours Worked	0.13	0.23
Number of Wages Employees	- 0.49	0.00
Wages Regular Hours Worked	- 0.10	0.29
Wages Overtime Hours Worked	0.10	0.28
Total Wages Hours Worked	- 0.08	0.31
Total Number of Employees	- 0.48	0.00
Total Number of Hours Worked	- 0.02	0.45

In Division "A", no result is statistically significant. Only the "Wages hours worked" approach significance. In Division "B", a very different situation exists. While the relationship between LTIs and hours of exposure is not significant, there is a significant **negative** correlation between employees and LTIs.

There is insufficient information to draw any conclusions from this analysis, other than to say that the relationship between LTIs and the number of hours worked and the number of employees is not always straightforward.

4.7 Does the number of LTIs relate to output?

Other types of denominator that could be used may reflect the 'outputs' of the organisation, such as number of widgets manufactured. The resultant injury rate may have more face validity with the organisation. But the same problem remains: output may not relate to risk. In many manufacturing organisations the high-risk activities may be associated with maintenance during shutdowns. In such situations, there would be an inverse relationship between LTIs and output.

CONCLUSION

Accidents and, in particular, those accidents that result in Lost Time/Disabling injuries are commonly used as performance indicators. Their consequences can be seen. They can be easily measured. They have dollar costs associated with them. They are therefore very attractive as performance indicators.

But as performance indicators, they should be used with caution. Accidents don't always occur. Even when they do occur they may not be noticed, or if they are noticed they may not be reported. Changes in the "safety performance" of an organisation may therefore not be immediately reflected in changes in the number of reported accidents.

Your feedback

WorkSafe is committed to continuous improvement. If you take the time to complete the online Feedback Form at the SafetyLine Institute website you will assist us to maintain and improve our high standards.

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