AUSTRALIAN CONSTRUCTORS ASSOCIATION

Lead Indicators

Safety Measurement in the Construction Industry

1.0 INTRODUCTION

The Australian Constructors Association (ACA) is dedicated to promoting the highest standards of integrity, quality, safety and wellbeing across the construction industry.

1.1 Purpose of this Guideline

Lead indicators (or positive performance indicators) assist organisations to measure upstream safety management activity, which in turn enables an improved understanding of downstream related injury outcomes. Currently lead indicators are not clearly defined, understood or applied consistently across the Australian construction industry.

Lag indicators (such as fatality rates, lost time injury rates and medical injury rates) are widely used across the Australian construction industry as a sole measurement of safety performance. However, lag indicators have low predictive value.

A more proactive suite of indicators is required to provide an improved measure of both actual and potential safety performance.

This guideline provides information to assist organisations in understanding, developing and implementing lead indicators for safety performance measurement in the construction industry.

1.2 Definitions

The ACA defines lead and lag indicators for the purpose of this Guideline in the following way:

Lead Indicators: the proactive measures that organisations undertake to assist in improving their safety outcomes.

Lag Indicators: events that have already occurred that cause harm to the people that work in an organisation that are measured as an indicator of safety performance.

2.0 WHY LEAD INDICATORS ARE NEEDED

2.1 The Business Case for Lead Indicators

The use of lead indicators as a measure of safety performance helps to prioritise where effort is needed in order to reduce the potential for injury to people. Lead indicators used in this way become important tools for risk avoidance and minimisation across any business.

The business case for the use of lead indicators for safety performance measurement is based on:

- The poor predictive value of lag indicators for identifying high-consequence/low-frequency events that have most potential to harm people and assets, and

- The benefits from identifying and monitoring the precursors of unwanted safety outcomes relating to:
    - organisational culture and leadership,
    - system maturity and its application,

- technical and administrative processes, and
- peoples' knowledge, skill level, behaviour and ownership of safety.

Lag indicators only measure what has happened, or past events. Lead indicators assist in predicting potential outcomes, through the identification of weakness or failures in upstream management activity, which can have potential downstream consequences.

2.2 The Complexity of Business

Because organisations in the construction industry are at different levels of safety maturity, lead indicators should be developed, applied and revised as individual organisations mature.

3.0 FEATURES OF A LEAD INDICATOR

Lead indicators should act as predictive (rather than after the fact) indicators of safety performance, and must drive future behaviour and outcomes through informing decisions and actions.

To be effective, lead indicators should:

- Be game changing,
- Clearly explain how and why the indicator will produce better results and improve overall business outcomes,
- Have a quantitative basis wherever possible and support correct analysis and conclusions,
- Be well understood by everyone especially those responsible for acting on information provided by the indicators,
- Measure what they are supposed to consistently, accurately and reliably,
- Prompt an appropriate response leading to consistent focus on implementing positive safety change,
- Assist in identifying potential negative outcomes so they can be eliminated or mitigated,
- Be integrated/linked with other company management systems (as the essential factors related to a safety outcome may lie within another system, e.g. such as finance, human resources, procurement or engineering).

Table 1: Key differences between lead and lag indicators

Lead Indicators	Lag Indicators
Are actionable, predictive and relevant to objectives	Are retrospective, focusing on past behaviours and incidents
Identify hazards before an incident occurs	Identify hazards after an incident occurs
Allow preventative actions before the hazard manifests itself as an incident	Require corrective actions to prevent another incident
Allow response to changing circumstances through implementing control measure before an incident	Indicate that circumstances have changed require control measures to be implemented after the incident
Measure effectiveness of control systems	Measures failure of control systems
Measures inputs and conditions	Measures outcomes
Direct toward and influence a wanted outcome or away from an unwanted outcome	Measure the current outcome without influencing it
Give indications of system conditions	Measure system failures
Measure what might go wrong and why	Measure what has gone wrong
Provide proactive monitoring of desired state	Provide reactive monitoring of undesired effects
Are useful for internal tracking of a performance	Can be useful for external benchmarking
Identify weaknesses through risk control systems	Identify weaknesses through incidents
Are challenging to identify and measure	Are easy to identify and measure
Evolve as organisational needs change	Are static and measure past incidents

Source: Adapted from 'Overview of Leading Indicators for Occupational Health and Safety in Mining', International Council on Mining & Metals 2012.

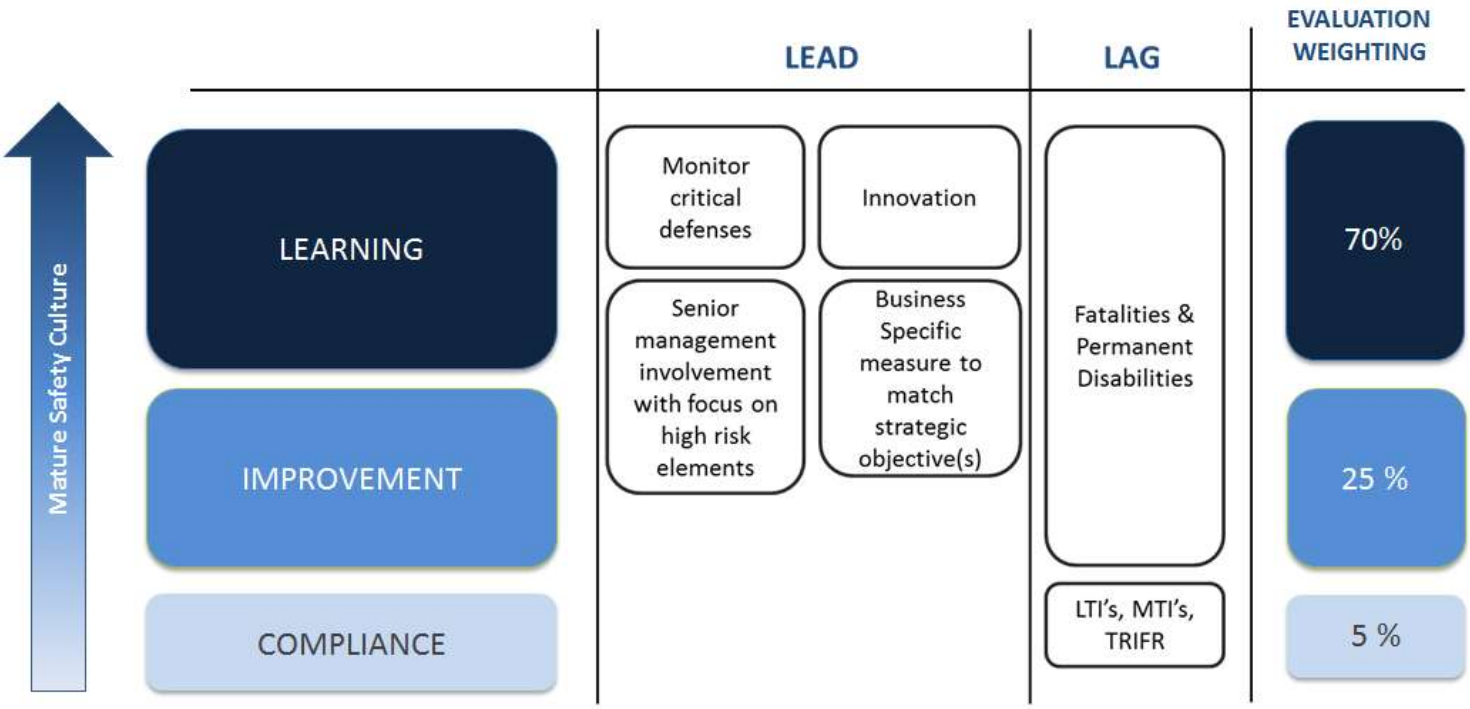
The development and proper use of lead indicators establishes a continual improvement cycle.

In order to maintain continual improvement, lead indicators should be implemented as business critical tools and be fully integrated with other relevant business management systems. That is, they should not be a stand-alone safety initiative.

Lead indicators should be dynamic and continually challenge management processes. The scope of any lead indicator should match the level of safety maturity of an organisation.

Figure 1 outlines the types of indicators (and the evaluation weight to be given to these indicators) used in organisations of differing safety maturity. As safety maturity improves, organisations move from using compliance based lag indicators (e.g. LTI, MTI) through to lead indicators focusing on safety improvement and learning.

Figure 1: Indicators and safety maturity



3.1 The Role of Leadership, Culture and Beliefs

Safety performance is highly dependent on levels of trust in any organisation. Supervisor support for safety is a much stronger predictor of positive safety behaviours than work mate support, reinforcing the old saying that 'what interests the boss fascinates me'.

Leaders are the primary determinants of safety culture and belief. The positive safety climate they create and foster should be distinct and measurable using lead indicators appropriate for the level of maturity of the organisation.

4.0 IMPLEMENTING LEAD INDICATORS

The key steps to implementing lead indicators include:

1. Identify all areas of safety performance and set or revise goals and objectives,
2. Identify lead indicators and define measurement parameters,
3. Determine target performance levels,
4. Collect and assess data comparing actual results with targets,
5. Analyse, report on and act on findings, and provide feedback.

5.0 KEY POINTS TO CONSIDER

Some key points to consider when developing lead indicators for an organisation include:

- Lead and lag indicators should be used in an appropriate mix to provide a composite measure of safety performance.

- Companies should address risks at their source.
- The risk, and therefore lead indicators, can be different within and across companies.
- Lead indicators should evolve. There is no end date to the process.
- The implementation of lead indicators for safety must be top led and bottom driven, involve all levels of an organisation and be able to demonstrate alignment with the core values of an organisation.
- Extensive education and awareness is required to embed the use of lead indicators to ensure that the right messages are moving up and down the organisation, supporting continual improvement in safety.
- Starting with a few lead indicators should help in gaining acceptance of their use in driving safety improvement - in this space less can be more helpful.

6.0 SUMMARY

The use of lead indicators based on the safety maturity of a company should ensure that companies stay focussed on reducing low-frequency/high-impact events that can have significant negative impacts on an organisation and all persons involved.

7.0 EXAMPLE SUITE OF LEAD INDICATORS

The ACA has produced an example suite of lead indicators which industry participants may find useful in developing their organisation's lead indicators.

This suite is indicative only, and organisations should tailor lead indicators to suit their own safety performance and needs.

Suggested Lead Indicators					
Maturity Level	**Indicator**	**Definition**	**Intent**	**Frequency**	**Example**
CULTURE	Survey	Measurement of culture / leadership / engagement using a recognised, tested and controlled survey tool. Employee opinion surveys to include questions on safety. E.g.- • I have no doubt that, if there were a conflict between safety and other business objectives, safety would take priority. • My immediate manager takes appropriate action when unsafe conditions are brought to his attention. • I know people don't have to take short cuts on safety procedures to get jobs done. • I am satisfied with the health and safety conditions at my place of work or within my work area. • I believe that if a significant incident or near-miss occurred in my area it would	To baseline and then measure improvement of culture / leadership / engagement in the workplace over time	Annual	% increase in culture / leadership / engagement using a defined tool

		be reported. • I am comfortable raising safety concerns with my immediate manager. • I feel free to refuse to participate in work activities that are unsafe			
		Employee opinion survey which includes safety	Simplistic measure to help gauge culture	Annual	% of respondents who undertake the survey. % increase in positive culture improvement
LEARNING	Leadership	Planned, scheduled and documented interactions with design and planning procurements supervisors on new bid/opportunity	Projects set up for success	By project	
	Safe Behaviour Observations	Workplace observations of frontline employees to access safe / unsafe practices & safe / unsafe conditions	To understand the workforces capability to perform work safely and to maintain safe conditions. To feedback in real time the observations identified (positive and negative) and agree corrective or positive improvement actions	Weekly	One SBO per supervisor per week
	Frontline Supervisor Safety Training	The percentage of frontline supervisors (and managers) who have completed Supervisor Safety Training	To ensure frontline supervisors have the competency to implement the company's safe systems of work.	Monthly / Annually	Planned vs completed or % of Supervisors trained

IMPROVEMENT	Leadership Walk / Visits	Attendance at risk workshops and safe design workshops and audits Planned, scheduled and documented interactions with frontline employees about workplace safety	For senior managers, executives and Boards to engage employees in discussions about workplace conditions and behaviour	Weekly / Monthly	12 pa Executives Weekly for PMs
	Task Observations	Planned, scheduled and documented review of high risk construction work tasks in the field	To verify that the high risk construction work tasks are performed in accordance with the corresponding SWMS / JHA / Risk Assessment. To understand the effectiveness of controls and explore improvement opportunities with the work crew performing the task (with a focus on surfacing the gaps between work as planned and work as performed)	Weekly	One per manager / supervisor per week
	Observing & discussing critical risk work task	Infield observation of frontline employees to assess safe/unsafe practices and safe/unsafe conditions	To understand the workforce's capability to perform work safely and maintain safe conditions. To feedback in real time the observations identified (positive and negative) and agree corrective or positive improvement actions	Weekly	One SBO per supervisor per week
	Training Needs	Training needs analysis completed based on risk profile	To verify the competency needs of individuals with safety roles	Annual	TNA completed. % of training completed to the requirements of the TNA
COMPLIANCE	Audits	The number of audits completed vs. planned according to the published annual audit schedule	To verify audits were completed as per the plan	Monthly / Quarterly / Annually	Planned vs Completed audits in the period
	Inspections	The number of inspections completed vs planned according to the published annual monitoring schedule	To verify inspections were completed as per the plan	Monthly / Quarterly / Annually	Planned vs Completed in the period
	Hazards	The number of hazards raised in the period vs the number of hazards closed	A measure of the management effort to close out hazards	Monthly / Quarterly / Annually	% hazards closed in the period

	Actions Close Out	Number of actions closed on time	A measure of the management effort to close out actions on time from hazards, incidents, audits and inspections	Monthly / Quarterly / Annually	% Actions closed on time, or % Actions overdue

Suggested Lag Indicators			
Indicator	**Definition**	**Intent**	**Frequency**
Total recordable Injury Frequency Rate (TRIFR)	Number of reportable injuries per million hours worked. Calculated by the number of LTIs + MTIs + Alternate Work Injuries (AWI) divided by the number of working hours in the period multiplies by 1,000,000	A relative measure of the number of reportable injuries vs hours worked, indicating a level of injury performance & enabling a comparable benchmark	Monthly / Quarterly / Annually
Potential Class One Frequency Rate (PC1FR)	Number of Potential Class One injuries (PC1s) (includes HPIs, Critical Incidents) per million hours worked. Calculated by the number of PC1s divided by the number of working hours in the period multiplied by 1,000,000	A relative measure of the number of PC1s (includes HPIs, Critical Incidents) vs hours worked, indicating a level of critical performance and enabling a comparable benchmark	Monthly / Quarterly / Annually
Note: Some difficulties arise when using the data obtained by these indicators for comparison purposes. Outside factors (such as a strong safety reporting culture) may impact upon these results, limiting their reliability for benchmarking.			

The Game Changer			
Indicator	**Definition**	**Intent**	**Frequency**
Critical Event Learning	Sustainably preventing the potential for a repeat critical event (near miss) by eliminating, substituting or engineering out the risk. Demonstrated by sharing the solution at quarterly ACA meeting	To permanently resolve the repeat causes of fatalities in our industry from ACA member critical safety events and adopting their learnings by applying the higher order controls.	Quarterly