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Leading our safety performance in the right direction

An industry-wide leading safety indicators project

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Abstract

In an environment of increasing change, the technical, regulatory and business challenges that keep our industry leaders awake at night are aplenty. Most of these challenges will likely evolve over time as we better understand them and develop innovative ways to deliver our services. But one priority will always be at the top of the agenda, independent of the changes affecting our industry: keeping our people safe.

Our ability to positively influence our industry's safety performance lies in our commitment to share information and take a collaborative approach to improvement. In light of our objective to work together on solutions for a safer electricity system of the future, the EEA is aiming to improve safety performance data sharing across the industry, with a particular focus on meaningful leading indicators.

Leading indicators are measures that help 'lower risk posture' (Loyd, 2013). They are often viewed in opposition to lagging indicators. Where lagging indicators are regarded as 'negative' or 'reactive' because they track harmful outcomes, leading indicators are associated with a more 'positive' or 'proactive' approach to health and safety. They focus on risk and are introduced with the strategic purpose of preventing harm.

Both leading and lagging indicators are key aspects of effective safety monitoring, and their joint implementation is supported widely throughout Australian and New Zealand safety management standards. When they are effectively put in place, leading indicators can contribute to improving lagging safety performance. Conversely, poor safety outcomes may reflect poor safety measures upstream.

The industry has been actively engaged in analysing lagging indicators at national and sector levels for over ten years. More recently, the industry has been advocating for further analysis to complement this work with a particular focus on leading indicators. The purpose would be threefold:

- further promote information sharing and self-management of the industry in its objective to eliminate fatalities and reduce serious harm,
- help ensure the industry exercises its due diligence and complies with the requirements of the new health and safety legislation,
- provide benchmarking opportunities among industry peers.

This paper will present the results of preliminary research on leading safety performance monitoring initiatives among individual industry companies. With this study – the first step in a two year project – we aim to identify commonalities in the monitoring practices currently applied throughout the industry and discuss any practical opportunities for the development of industry-wide leading indicators.

Introduction and project overview

The electricity supply industry (ESI) relies on active information sharing and learning to evaluate and improve their health and safety performance. Information is critical to decision making, and to ensure the relevance of both proactive and reactive safety-related initiatives. Since 2004, part of our industry information sharing effort has revolved around monitoring lagging indicators at national and sector levels through the annual *EEA ESI Safety Performance Indicators Report*. To complement this work, a number of industry health and safety professionals have recently been advocating for further leading indicator analysis in an attempt to more effectively **'lead our industry safety performance in the right direction'**.

The role of industry CEOs in monitoring health and safety has been defined in the Business Leaders' Forum Guide to *Monitoring What Matters*: **ask questions about risks, relationships and resourcing; set indicators; interrogate the information; and take action on improvements**. The importance of active monitoring has been highlighted in long existing standards including NZS 7901, AS/NZS 4801, AS/NZS ISO 31000, and, indirectly, it has been further enhanced through the requirement to exercise due diligence as specified in the Health and Safety at Work Act, which took effect in April last year.

Building on what have been until now rather sporadic and informal discussions, the EEA Safety Standards and Procedure Group (SSPG) agreed in February 2017 to support an industry-wide leading indicators project for occupational health and safety. We expect the project will progress in stepped stages over the next two years.

- Step 1: Understand the industry context
- Step 2: Publish the results of our preliminary research for industry consideration
- Step 3: Propose and agree on the criteria and objectives that leading indicators should meet
- Step 4: Propose a list of industry-wide leading indicators
- Step 5: Decide which indicators to implement
- Step 6: Prepare the industry survey material needed based on chosen indicators
- Step 7: Monitor industry performance
- Step 8: Review the project

As part of project Step 1, the EEA approached a number of ESI companies, with the objective to learn about their safety leading indicator initiatives and identify commonalities in the monitoring practices currently in place in the industry. This paper is presented at the EEA Conference as part of project Step 2, with the intent to inspire industry discussion on any challenges and practical opportunities for the development of industry-wide leading indicators.

We will first briefly discuss the research method and analyse the feedback received, before concluding on a few key points for the industry to consider.

Research method

This paper does not intend to provide an exhaustive representation of leading indicator monitoring initiatives currently used in the industry. Nor does our research method pretend to be comprehensive. The information presented here is primarily the result of recent interactions, through email exchanges, phone calls or physical meetings, with 15 different health and safety professionals working in a range of companies in the industry (including four generation companies, one transmission company and ten distribution companies, all of various sizes).

These individual discussions allowed for a reasonably diverse sample of companies to share their experiences in the field. The discussions arising from these exchanges showed a diversity of approaches and initiatives regarding the development of safety leading indicators. The EEA is indebted to the respondents who kindly shared information and their time.

Research results

Open-ended questions were asked in regards to the companies' definitions of 'leading indicators', the indicators selected and why, the references, processes or tools used, as well as the challenges and opportunities experienced through these initiatives.

Leading indicators definition

Our introduction did not include any clear definition of 'leading indicators', as would normally be required in an industry paper. This omission, made on purpose, does not mean to imply that the responding companies all align with a commonly understood definition. We found that the responding companies' own definition of 'leading indicators' seemed to diverge on a few noticeable points.

The close ties between leading and lagging performance indicators were commonly acknowledged across respondents. These close ties, coupled with the lack of any clear definition of a leading or lagging indicator, seem to have resulted in the line between the two becoming blurred. A number of companies mentioned near miss reporting as a leading indicator they use internally, but in some instances this is considered a lagging indicator. This difference seems to arise from:

1. whether the focus for leading indicators lies in the notion of 'positive input' (any safety controls that are proactively monitored, such as certifications), in contrast to lagging indicators being considered 'negative outputs' (any undesirable event or precursor that highlights a failed control), or
2. whether the focus for leading indicators lies in their ability to reduce the risk of harmful events.

In the first situation, near misses would be considered a lagging indicator as they could indicate a number of failed controls, which are undesirable or negative outcomes. In the second case, near misses could be considered leading indicators because of the lessons learnt from analysing these events and for the safety culture it can help nurture in the workplace.

Overseas jurisdictions usually consider both approaches together. This means that leading indicators are defined as measures that help reduce safety risks (approach 2) **and** correspond to positive inputs (approach 1). Because near misses are considered negative outcomes they are therefore excluded from the leading category. Across our industry, it seems that the focus of leading indicators has been placed on their perceived ability to reduce risk. In contrast, it appears that less consideration has been given to whether the measure for leading indicators needs to be a positive input.

Leading indicators monitored

For each company, we categorised their leading indicators by **type** and by **focus area**.

–Leading Indicator Types–

For this paper we chose to use the leading indicator classifications prepared by the Campbell Institute at the National Safety Council (USA)¹. These are Operations, Systems and Behaviour.

Alternative lead indicator groupings exist, for example:

- Classifications used by ScottishPower²: Operational control, Generic and Programme - this is a slightly different but less intuitive approach.
- Classifications used by IChemE Safety Centre³: Knowledge and competence, Engineering and design, Systems and procedures, Assurance, Human factors, Culture - this classification group is too detailed, especially considering the relatively small sample analysed in this paper.

The taxonomy used by the Campbell Institute has the advantages of being clearly defined (as per the definitions below) and broad enough to be used at an industry level, allowing for some general industry commonalities to be observed. For instance, some companies may have developed indicators related to their assets' maintenance while others may have focused on risk assessment processes: the indicators are quite different but they both relate to the company's operations. Note that one single indicator may fall into more than one category.

Definitions from the Campbell Institute's *Practical Guide to Leading Indicators: Metrics, Case Studies & Strategies*:

Operations – indicators that are relevant to the functioning of an organisation's infrastructure (e.g. machinery, operations)

Systems – indicators that relate more to the management of an EHS (environmental, health and safety) system

Behaviour – indicators that measure the behaviour or actions of individuals or groups in the workplace; people-to-people interactions related to supervision and management

–Leading Indicator Focus Areas–

The two focus areas used in this paper, Compliance and Improvement, were derived from the guide developed by the Government of Alberta, Canada, entitled *Leading Indicators for Workplace Health and Safety*. This approach seems intuitive and is used by a variety of organisations overseas.⁴ The Government of Alberta has used these focus area classifications to categorise overall 'workplace environments' or the 'safety performance level' of an organisation, and then suggests that a different set of leading indicators may be required in each situation. As the information we have collected only relates to leading indicators we are not in a position to assess the maturity of each company's safety performance, nor is this the intention of this paper. We also acknowledge that the various elements of a workplace environment may have matured at different rates within an organisation and therefore decided to adapt the focus area definitions to categorise individual leading indicators.

¹ Campbell Institute: Centre of excellence within the National Safety Council, a not-for-profit membership-based organisation whose mission is to promote health and safety and whose head office is located in the United States.

² ScottishPower: Vertically integrated electricity and gas company involved in energy generation, transmission, distribution and retail. Based in Scotland, the company is a subsidiary of global utility Iberdrola.

³ IChemE Safety Centre: Institution of Chemical Engineers Safety Centre, a global not-for-profit membership-based organisation representing the chemical, process and bioprocess industry, and whose head office is based in the United Kingdom, with branches in Australia and New Zealand.

⁴ For instance, the Australian Constructors Association, another reference considered by the EEA, uses the same scale to define the maturity of safety culture.

Definitions:

Compliance – indicators that focus on traditional approaches to safety and can help an organisation meet the minimum requirements to comply with safety standards and legislation.

Improvement – indicators that go beyond simple compliance, and can help an organisation improve their existing safety management systems and work practices, and better control key safety risks.

The matrix proposed by the Government of Alberta included a third category called *Continuous learning*, which we decided not to use. There may be a fine line between indicators that focus on improvement and those focusing on continuous learning, making a clear cut difficult to implement with the limited information we have. Rather, we will touch upon a few innovative leading indicator monitoring approaches currently implemented in the industry and that we think could help drive companies towards a mature, ‘continuous learning’ path.

A summary analysis of the responding ESI companies’ leading indicators is provided in Table 1 below. Note that this summary has been prepared as per the EEA’s understanding of the information provided by each company. The table is not intended to be an exact representation of the sample companies’ approaches but is used as a broad overview of industry practices.

Table 1. Electricity supply industry sample companies – analysis of leading indicators initiatives

Sector	Company size	Type of leading indicators monitored				Focus area	
		No indicators	Operations	Systems	Behaviour	Compliance	Improvement
Generation / Retail	Small (x1)		Operations	Systems		Compliance	Improvement
	Large (x3)		Operations	Systems	Behaviour	Compliance	Improvement
				Systems		Compliance	Improvement
Transmission	Large (x1)		Operations	Systems	Behaviour	Compliance	Improvement
Distribution	Small (x3)		Operations			Compliance	Improvement
			Operations		Behaviour	Compliance	Improvement
			Operations	Systems	Behaviour	Compliance	Improvement
	Medium (x5)		Operations	Systems	Behaviour	Compliance	Improvement
				Systems		Compliance	Improvement
					Behaviour	Compliance	Improvement
				Systems	Behaviour	Compliance	Improvement
	Large (x2)		Operations	Systems		Compliance	Improvement
			Operations	Systems	Behaviour	Compliance	Improvement

The preceding table supports the conclusions we reached through our analysis:

- A wide variety of leading indicator initiatives were observed, although most companies seem to apply this exercise to developing systems-related leading indicators with a focus on compliance.
- Systems-related indicators are understandably easier to roll up at a company level, whereas operations-related indicators are potentially more meaningful at a site level. Behaviour-based indicators may be more difficult or sensitive to monitor.
- The type and focus area of the leading indicators monitored do not depend on a company's size. This would suggest that a strong management buy-in for the development of leading indicators could help foster leading safety performance monitoring.

Leading indicator monitoring approaches

A variety of approaches were discovered during the one-on-one discussions with industry H&S professionals. The sample of approaches presented below highlight a number of challenges currently experienced by ESI companies, but they also provide insight into the possibilities ahead for those wanting to develop or improve their internal leading safety indicators framework.

From the feedback received, it seems that in many cases, companies may implement leading indicators that are easy to track and/or readily available through their existing safety reporting system or software. For instance, many leading indicators commonly monitored in the industry, such as the number of safety meetings, toolbox talks, audits, emergency drills and observations, are all listed under the Vault software – a system used in the electricity supply industry by ten different asset owners, three contracting/consulting companies and one equipment supplier. While such tools can help a company start implementing leading indicators, one needs to remain mindful of the reasons behind the selection and monitoring of leading indicators in the first place, as well as what they mean and are supposed to achieve.

Some companies are seeking guidance for the development of leading safety indicators. In one such example, the company developed leading and lagging performance indicators for public safety using relevant standards and EEA guidance, however leading indicators for occupational health and safety, although recorded to some extent, have yet to be formalised. A number of companies have also expressed interest in understanding their peers' approach to leading indicators as a way to help them develop or improve their own.

One company insisted on the topical nature of their leading safety indicators, which are linked to specific key H&S projects or initiatives. Having such a dynamic set of indicators may be a challenge in itself as it requires flexibility and renewed engagement from staff, but this approach goes a step further than traditional leading safety performance monitoring practices in the way it targets the leading indicators and guarantees their relevance to the organisation's activities.

Finally, we also received feedback from one company whose leading indicators monitoring approach is more comprehensive. The leading performance indicators they developed encompass the general company culture as a whole. Health and safety indicators are included, but measures relating to customer service, work delivery and asset health are also monitored. Another particularity of this framework is that it has been prepared in the context of a principal-contractor relationship, and financial incentives and disincentives have been included depending on the principal or contractor's ability to reach specified targets or requirements.

Concluding remarks for industry consideration_____

The results of this research have highlighted that a variety of measures and approaches are currently being applied in the electricity supply industry. Considering the diversity of company profiles, implementing meaningful industry-wide leading indicators will take time and engagement. Nonetheless, industry collaboration on this topic, and ultimately well-conceived benchmarking, can certainly be a strong enabler for improving safety performance monitoring across the board.

Ensuring that the ESI shares a common understanding of leading safety indicators

To ensure that this industry project progresses smoothly, the first action on the agenda will be to work on developing a consistent, common understanding of leading safety indicators. This includes ensuring that the industry shares the same definition of leading indicators, and agreeing on the purpose and criteria that leading indicators need to meet (see Step 3 of the project).

One recommendation included in *NZS 7901:2014 Safety Management Systems for Public Safety* states: ‘The definitions of KPIs used for benchmarking in the New Zealand electricity and gas industries shall be consistent and aligned as far as possible with those produced by other similar energy organisations overseas.’ This recommendation can equally be applied to occupational health and safety, as far as practicable.

The EEA has identified a number of overseas sources that could provide guidance for the New Zealand electricity supply industry. A list of publications are referenced at the end of this document for readers wanting to research this topic further. These include publications from the IChemE Safety Centre, the Energy Institute⁵ and ScottishPower.

Closer to us, but similar to overseas guidance on leading indicators, the EEA / GANZ *Safety Management Systems (SMS) for Public Safety to NZS 7901:2014 – Handbook for ESI and GSI companies* defines leading indicators as follows: ‘KPIs may also be used to indicate progress with the improvement of the SMS or its implementation over a past period with a view to improving the safety related outputs. In such cases the KPIs are termed leading since they should be indicative of safety related results to be expected in the future. For example, where there are known deficiencies that require remedy over time, a KPI could be used to record the percentage of total deficiencies still remaining to be remedied with the target percentage lessening annually until none remain.’ Such indicators focus on the number of controls that have been put in place (e.g. hazards identified, accident investigations completed, safety awareness campaigns, certification updates).

The above comments should give an overview of the direction leading indicator developments are currently heading globally, a trend that the EEA would recommend the industry consider in order to standardise our approach to leading indicator reporting.

As mentioned earlier in this paper, the global trend is for near miss reporting to be included in the category of lagging indicators. Be that as it may, we are not suggesting that near miss reporting should be discarded – on the contrary. Even if this project is focusing on the development of high-level ESI leading indicators, one should remain aware of the importance of producing a mix of both lagging and leading indicators for a meaningful overview of industry safety performance. Near miss reporting, be it considered lagging or leading, remains a key indicator and valuable learning tool for the industry.

Opportunities for and from benchmarking

When leading indicators are being selected, they are customarily accompanied by a target or objective that helps analyse the evolution of an organisation’s safety performance. The

⁵ Energy Institute: Global chartered professional membership organisation whose mission is to promote safety, environmental consideration and efficiency in the energy industry and whose headquarters are in the United Kingdom.

importance of setting reasonable yet meaningful targets has been highlighted by a number of companies, which also commented on the difficulty of setting appropriate objectives when there are no shared points of reference. This is where one of the greatest opportunities from having an industry leading benchmarking framework lies: common measures and references to identify how well a company is performing relative to their peers.

However, this does not come without a set of cautionary observations. Some would argue that the diversity of company profiles in the industry would inherently preclude the prospect of meaningful industry-wide leading safety indicators. Depending on the indicators discussed and company particularities considered, the discussion could in such instances refocus on sector or profile-specific measures and objectives. This would still allow for relevant benchmarking to take place.

When developing industry-wide indicators, every effort should be made to ensure that they promote and nurture meaningful industry safety performance monitoring without diverting attention away from successful health and safety practices already run internally by each ESI company.

An opportunity for industry-led discussion and solutions

The EEA wishes to take this opportunity to encourage further industry discussion on this topic. Conducting this research showed evidence that many companies are interested in learning from each other and keen to exchange views and ideas about their own lagging and leading safety performance monitoring practices. We need to work together on solutions for a safer electricity system now and in the future. Regardless of whether this project successfully leads to industry benchmarking or the publication of further guidance, general industry discussion, during the EEA Conference and beyond, is key to providing new insights to companies wanting to improve their current monitoring framework.

Any comments are welcome and should be addressed to the author at marion@eea.co.nz.

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Appendix

Examples of leading safety indicators mentioned by industry respondents

This list is not exhaustive of all indicators mentioned by respondents. Similar indicators with different wordings have been grouped together into one single indicator. Note that some indicators in this list may be considered lagging (cf. definition discussed in the paper, pp.4 and 9).

Audits / inspections

- Number of site audits (internal and external)
- Number of inspections completed against planned

Incident investigation

- ICAM / root cause investigation progress (under action, completed, overdue)
- Corrective action progress (under action, completed, overdue)
- Time to resolve and investigate incidents

Management

- Field visits by management, executive and officers
- Number of leadership site safety observations and number of associated actions completed
- Management consultation meetings with workers and/or H&S representatives

Risk assessment

- Percentage of tailgates completed
- Number of tailgate audits
- Percentage of major capital projects utilising site risk management plans

Training and competency

- Training courses and refresher training completed (inductions, first aid, etc.)
- Core competencies kept up-to-date (no expired certifications)

Safety awareness and learning

- Number of H&S meetings – number of attendees
- Number of external H&S meetings attended

Engagement

- Number of team meetings that included conversations on incident reporting
- Number of safety recognition awards presented
- Number of safety initiatives raised by staff and resolved

Safety reporting

- Number of safety alerts or safety newsletters distributed to staff
- Number of safety reports reviewed for currency
- Number of high risk potential near miss reports
- Number of near miss reports
- Task observations (including safe and unsafe observations)
- Number of significant safety breaches or non-conformance events
- Number of new significant hazards identified

Staff wellbeing and fitness to work

- Number of health screenings conducted for occupational illness
- Number of staff receiving flu vaccinations during the year
- Number of drug and alcohol tests
- Number of employment assistance programme visits
- Percentage of new staff who have received workstation assessments

Contractor management

- Contractor participation to health and safety meetings
- Number of contractor assessments and audits
- Number of contractors who have received refresher work permit training

Emergency response

- Fire and emergency response drills

Guidance

- Number of published H&S documents and review status (completed, due, overdue)
- Number of safety guidelines communicated

Asset condition and maintenance

- Number of assets trialled with evaluation
- Number of assets deployed with evaluation
- Accuracy of asset information
- Number of asset failure and fault reports
- Percentage of vegetation reports completed within 24 hours
- Number of proactive maintenance schedules completed
- Number of designs reviewed for H&S improvements

Site security

- Percentage of sites reviewed for boundary security
- Number of reviews of security card allocations undertaken during the year

Travelling

- Number of overspeed events recorded