

Leading Performance Indicators

Guidance for Effective Use

STEP CHANGE IN SAFETY



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Introduction

The guidance contained in this document was produced after extensive analysis of current practices across industries in the UK Oil and Gas Industry. However if you choose to use this guidance, it is important to realise that it is not a one-off 'fix'. The guidance is intended for ongoing use while effecting a change in the use and application of Performance Indicators and application.

Whilst every effort has been made to ensure the accuracy of the information contained in this publication, neither Step Change in Safety, nor any of its members will assume liability for any use made thereof.

The purpose of these guidelines is to assist Health and Safety Professionals, Advisors, Plan Developers and anyone wishing to understand 'Lagging and Leading Performance Indicators'.

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introduction to leading performance indicators

Indicators and performance measures are important in all aspects of our lives. They provide feedback on what is happening so that we can shape appropriate actions to respond to changing circumstances. They provide information on:

- what is happening around us,
- how well we are doing,
- what has happened so far,
- warning of impending problems or dangers that we may need to take action to avoid.

An example of indicators and performance measure can easily be demonstrated in sailing a boat.

- The wind indicator (anemometer) provides information on wind speed and direction, thus adjustments can be made to sail to maximise speed.
- The compass provides information on the course being steered thus enabling the course to be plotted.
- The log provides information on the boat speed and the distance covered.
- The radar highlights obstructions en-route.

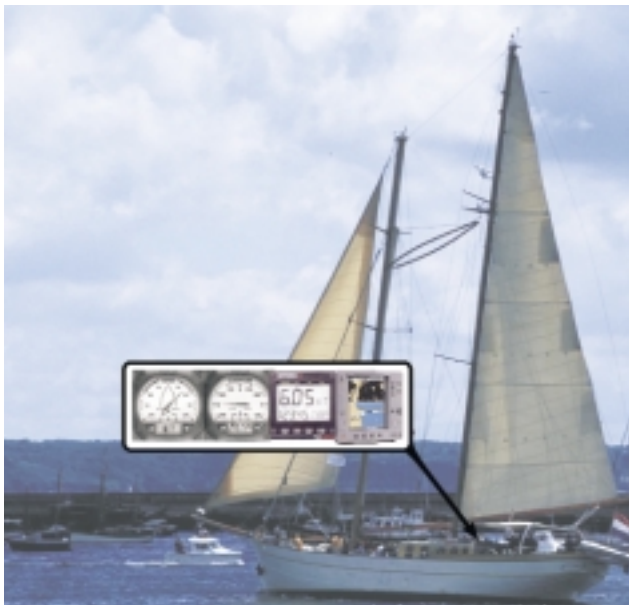


Fig. 1 Yacht with instrumentation providing leading and lagging indicators

Some of the above indicators provide information on the outcomes of our actions. These are referred to as 'lagging' indicators because they measure the outcomes that have

resulted from past actions. In our boat example, the log provides a measure of how far we have travelled. Other indicators provide information about the current situation that may affect future performance. These are referred to as 'leading' indicators as they measure the inputs to the process that will affect future outcomes. In our boat example, the compass, wind indicator and radar provide information that can be used to control the boat to maximise speed in the direction that we want to go avoiding danger. They provide 'leading indicators' as they allow us to take actions that will influence the future speed and distance travelled outcomes.

We all use leading performance indicators in our daily lives. Common examples can be found on the dashboard of a car; the petrol gauge, the temperature gauge and the oil indicator lamp all provide information that allow the driver to take action before the car stops through lack of fuel or engine seizure.



Fig. 2 Leading performance indicators on a car dashboard

Another example is our body weight. Comparing our weight to what it normally is, or to the healthy weight for somebody of our age and height, can provide advance warning of potential future health problems such as heart disease. The warning can encourage changes in diet and life style to reduce the risks.

Why use leading performance indicators?

Although we are often most interested in the 'lagging' performance indicators that measure the final outcomes that result from our activities, the lagging indicators themselves may not provide enough information to guide our actions and ensure success. Reasons why 'lagging' indicators may not be sufficient include:

- The time delay between the actions we take and the outcomes that result: the lagging indicators may provide information too late for us to respond to. For example, by the time problems from smoking are apparent it may be too late to avoid ill health.
- The outcomes are the result of many factors. In this situation the lagging indicators may tell you how well you are doing but may not give information as to why it is happening and where to focus any corrective actions that may be necessary to improve performance.
- The outcome rates being measured are low, e.g. when safety is good and injury rates are low, these measures are not sufficient to provide adequate feedback for effective management of the process, i.e. they provide more 'noise' than 'signal' (Reason, 1997) (1)
- The outcomes are so severe that you can't wait for it to happen to find out that the process is going wrong. For operations where there is the potential for disastrous outcomes but the likelihood of such events is extremely low, the absence of these events (in the lagging performance indicators) may not be a sufficient indicator of good management and that the potential dangers are being avoided.
- Lagging indicators may fail to reveal latent hazards that have a significant potential to result in disaster. The fact that a car's engine is running does not mean that it is not losing oil and will not seize before the next service; regular checking of the oil level is a sensible precaution and a leading indicator.

By measuring the inputs to a process, leading performance indicators can complement the use of lagging indicators and compensate for some of their shortcomings. Leading indicators can be used to monitor the effectiveness of control systems and give advance warning of any developing weaknesses before problems occur; e.g. the radar on the yacht monitoring for potential hazards in the area. One purpose of leading performance indicators is therefore to show the condition of systems before accidents, incidents, harm, damage or failure

occurs. In this way, they can help to control risks and prevent accidents.

Leading performance indicators can also be used to measure the inputs that people are making to the management process. Used in this way, leading performance indicators can have a role in promoting and monitoring a positive culture towards improving performance (Blackmore, 1997) (2).

A 'leading performance indicator' is something that provides information that helps the user respond to changing circumstances and take actions to achieve desired outcomes or avoid unwanted outcomes. Their role is to help improve future performance by promoting action to correct potential weaknesses without waiting for demonstrated failures. This ability to guide actions to influence future performance is an important characteristic of leading performance indicators. However, this characteristic also implies that the indicators should not be used simply as a metric of the current situation. They should be seen as part of a guidance and improvement process.

Potential pitfalls in using leading performance indicators

There is good evidence that when leading performance indicators are used correctly, they are effective for improving performance. However, there is also good evidence that they can be misused.

For leading performance indicators to play an effective role in the improvement process, there must be an association between the inputs that the leading performance indicators are measuring and the desired lagging outputs. There needs to be a reasonable belief that the actions taken to improve the leading performance indicator will be followed by an improvement in the associated lagging output indicators. For example, there is a belief that increased investment in research and development or new plant will result in increased profits in the future. However, it is not automatic that these benefits will result.

There are several reasons why an apparent improvement in the selected leading performance indicators may fail to deliver an improvement in the lagging output performance measures. These include:

- Targeting the wrong issues through a lack of understanding of the inputs that really affect output performance, e.g. if hand injuries are occurring it would be reasonable to monitor the use of appropriate gloves as a leading performance indicator. However, if hand injuries are not occurring, this indicator will not add value.
- The selection of leading performance measures that are not sufficiently demanding or which measure things that are already being done to a high level, e.g. if appropriate hand protection is already routinely worn, monitoring the level of use will not provide a useful leading performance indicator to improve performance.
- Leading performance indicators being seen simply as a metric with actions being taken to get a good score rather than being used to guide actions that will correct weaknesses and improve output performance.
- Subjectivity in evaluating the leading performance indicator that allows a degree of self-deception.

Many companies that have used indicators such as 'the number of safety observation cards' or 'the number of near miss reports' will have experience of these types of failures.

The failure of improving performance, as shown by leading performance indicators, to be followed by corresponding improvements in the associated lagging outputs can result in leading performance indicators being discredited and being seen as an excuse and an alternative to really improving performance.

This view is strengthened when performance is measured using a set of leading and lagging performance indicators that are added together in some way to give an overall performance. It may be perceived that a satisfactory overall score is being achieved by using a good leading indicator score to cancel out a poor lagging performance.

The remainder of this document provides guidance on how to use leading performance indicators effectively (**Part 1**). This is followed by specific guidance on leading performance indicators that can be used for safety (**Part 2**) and occupational health (**Part 3**).

1 guidance for the effective use of leading performance indicators

As discussed in the introduction:

- Setting a leading performance indicator and getting a good score does not automatically improve performance.
- The act of collecting and monitoring leading performance indicators will not, in itself, cause improvement.
- It is not the numbers that are important but the quality of the information that is gathered and what is then done with the information that will make the difference.

Returning to the car dashboard example: monitoring the petrol level without responding when the gauge shows near empty, or relying on a faulty gauge that always shows more than half full, will not prevent the car stopping when it runs out of fuel.

On the yacht, the radar, of itself, will not prevent the boat going aground. An appropriate response is required to prevent disaster.



Fig.1.1 Leading Indicators require an appropriate response to be effective.

Leading performance indicators should be seen as part of a process to guide actions that will improve future performance.

1.1 The monitoring, feedback and control process

Performance measurement can be seen as part of a monitoring, feedback and control process as illustrated in figure 1.2a. This is an active process in which output measurements are evaluated and used to take corrective action. In order to determine what control actions are required, there must be a standard against which the performance indicators can be evaluated.

In figure 1.2a, lagging indicators monitor the outputs from the process. Corrective action is taken if the outputs deviate from the required standard. The control is re-active as corrective action can not be initiated until the unwanted outputs have occurred.

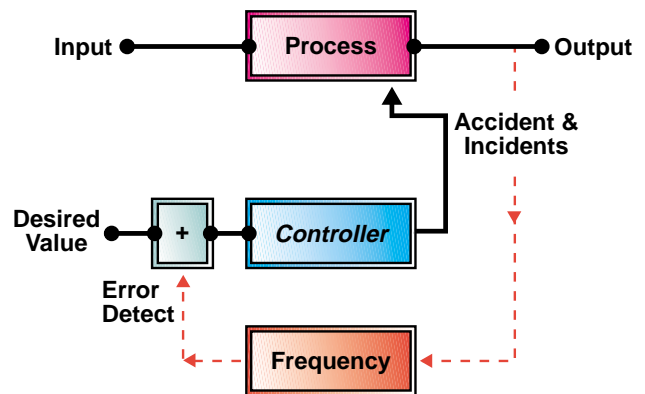


Fig. 1.2a Reactive feedback and control

Leading performance indicators monitor inputs to the process at stages before any adverse outcomes have occurred. Leading performance indicators provide feedback earlier in the process and enable pro-active corrections to be made before any adverse outputs have resulted; figure 1.2b. To do this, performance standards are required for each of the inputs being measured.

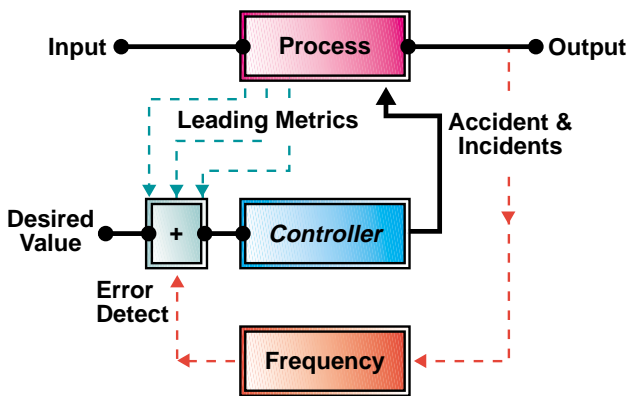


Fig. 1.2b Proactive feedback and control

1.2 Safety culture maturity.

Leading performance indicators can be used as part of a control process. They may also be used as part of a continuous improvement process. One of the Step Change working groups has developed a continuous improvement process for safety culture. The process is based on a five stage safety culture maturity model (SCMM) (3). This is illustrated in figure 1.3.

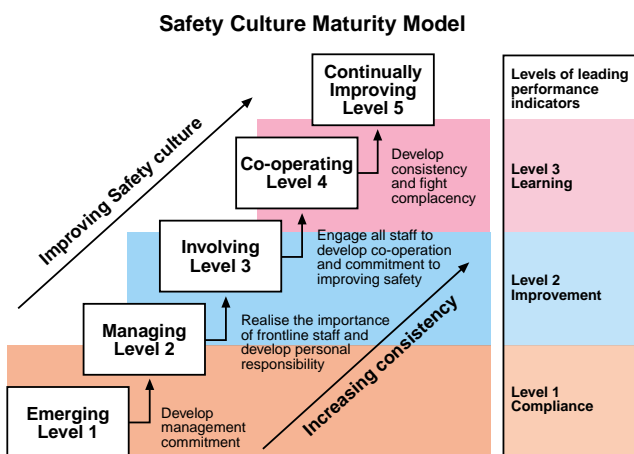


Fig. 1.3 Safety Culture Maturity Model

In this model, organisations and work locations progress through increasing levels of safety culture maturity in a continuous improvement process. At each level of maturity, the issues that are most important for improving performance and actions that will assist in moving to the next level of maturity are different.

The tools and techniques that prove effective for an organisation may not be suitable for others at a different level of maturity. If leading performance indicators are being used to monitor the inputs to the improvement process, this means that leading performance indicators will also need to be different for organisations at different levels of maturity.

Note: Different levels of maturity may exist within an organisation.

The link between the type of indicators that an organisation will find useful and its maturity was made by Dr. Alan Sefton when he was head of the Offshore Safety Division of the HSE. During his keynote address at an IADC conference on Leading Performance Indicators, he observed that ‘...the design standards and safety factors a company adopts is a leading indicator of company values and the quality and sophistication of indicators goes hand in hand with safety management systems and cultural developments’ (Sefton 1997) (4)

Although the SCMM illustrated in Fig. 1.3 uses 5 levels of culture maturity, in these guidance notes the model has been simplified to reduce the number of different levels of leading performance indicator required to three. The 3 levels of leading performance indicators proposed are:

Level 1 - Compliance: The leading performance indicators populating this level will be associated with compliance, in other words ‘is the organisation implementing its management systems and complying with its requirements as stated in legislation?’ This level can be thought of as a compliance culture and is equivalent to levels 1 to 2 in the SCMM.

Level 2 - Improvement: The leading performance indicators at this level will be associated with monitoring the effectiveness of the company’s management systems. At this level managers will use leading performance indicators to indicate areas of weakness and identify where they should be focussing their efforts in order to achieve improvements. This can be considered as an ‘improvement culture’ and is equivalent to levels 2 to 3 in the SCMM.

Level 3 - Learning: At this level, continuous learning and improvement is the norm for all parts of the organisation. An improvement cycle exists in which teams (or work sites) develop their own indicators to assist the improvement process. This level requires the empowerment of the workforce to identify where and how improvements can be made. In such an environment, leading performance indicators will be based around local (workforce) selected issues. This level can be considered as a ‘learning culture’ equivalent to levels 4 to 5 in the SCMM.

The type of indicators that are appropriate at each level are discussed further in the following section.

1.3 Types of leading performance indicators to use at different levels of maturity

A consequence of the previous section is that a single set of indicators will not fit all circumstances. Companies, or work locations, at different levels of maturity will need different types of leading performance indicators to help them improve performance or steer clear of potential dangers: one size won't fit all.

- **At level 1**, with the focus on compliance, there can be a high degree of commonality in the leading performance indicators that are appropriate to different companies in a particular industry and country. This is because the same legal and regulatory requirements will apply and the same principles will tend to be used for the management systems. For example, HS(G) 65, ⁽⁵⁾ is widely used in the UK as the basis for effective safety management systems and the elements of HS(G) 65 can be used as the basis of level 1 leading performance indicators. However, once a system is in place and compliance with legal requirements is largely achieved, new level 2 indicators will need to be introduced if leading performance indicators are to continue to assist the improvement process.
- **Level 2**, indicators will be based on the areas of potential weakness with the greatest potential for improvement. These are likely to be selected by management and applied on a company wide basis. These indicators may focus on the effectiveness of the implementation of the management system (e.g. HS(G) 65). However, there may be divergence between the indicators used by different companies as their areas of weakness will differ, as will their opportunities for greatest improvement. A company at level 2 will continue to use some level 1 indicators but the number may be reduced. When selecting level 1 items, the focus should be on the elements that pose the greatest threat if they are not maintained at a satisfactory level of performance. At even higher levels of maturity, leading indicators may focus on the learning process and the ability to identify and address local issues.
- **Level 3**, As the organisation's cultural maturity develops further and there is more engagement of all parts of the organisation in the improvement process, the areas with greatest opportunity for improvement will vary between work locations and workgroups. Each will identify their own improvement actions and will need to develop local leading performance indicators to monitor their performance and warn them of weaknesses. This will

introduce greater divergence in the level 3 leading performance indicators that are effective for the different workgroups. Organisations and workgroups will need to continue to use some level 1 and level 2 indicators to warn of any weaknesses in these areas. Again, the indicators that are selected will vary according to what is considered to pose the greatest potential threat to performance if not controlled adequately.

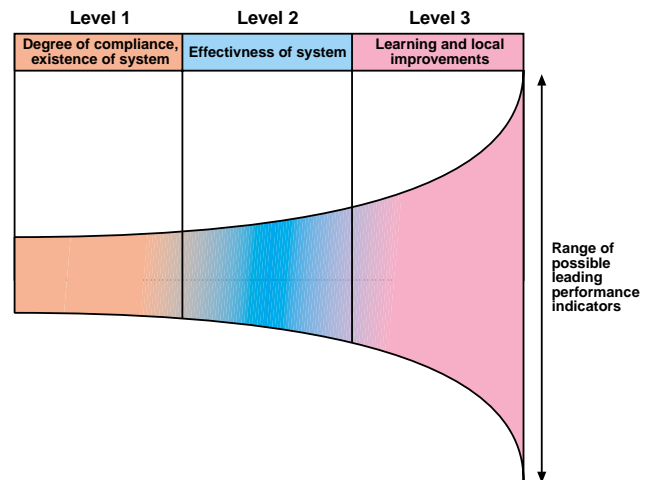


Fig. 1.4 Divergence in range of leading performance indicators.

1.4 Uses of leading performance indicators

Possible uses for leading performance indicators include:

- As part of a process for identifying what is important for improving performance and increasing engagement in improvement activities,
- Giving positive reinforcement of the efforts being made to improve performance and more direct and rapid feedback on what is being achieved. Leading performance indicators can improve the visibility of the efforts being made to improve performance and increase confidence that these are making a difference,
- As part of incentive schemes to recognise implementation of activities that it is believed will lead to improved performance,
- Providing early warning of the health of a process and prompting early corrective action,
- Improving the sensitivity of performance monitoring if the number of output events is low,
- Providing metrics to monitor industry performance or as part of industry benchmarking.

From use 1) to use 6) there is an increasing demand for commonality in the leading performance indicators that are

used by different organisations. However, from section 1.3, it is expected that the leading performance indicators that are most effective for individual companies or worksites will diverge with increasing level of maturity.

The divergence introduced as maturity develops is not a problem when leading performance indicators are being used to drive engagement and reinforce the improvement processes. When used for this purpose, individual companies, organisations or work locations are free to select leading performance indicators that are most appropriate to their (local) level of maturity and to target the issues that are of highest priority to them. However, for benchmarking, all organisations that wish to participate must use the same indicators and performance standards.

The leading performance indicators selected by individual companies are unlikely to be suitable for benchmarking as these indicators will have been tailored to suit the circumstances of each company. However, leading performance indicators may still be used for industry benchmarking. This can be done using a set of leading performance indicators that are based on the actions that are considered to be of most importance for improving the performance of the industry as a whole. Performance standards will need to be based around the desired level of industry performance.

Although the leading performance indicators used in an industry benchmarking study will not be optimised for an organisation's own improvement efforts, the benchmarking process will help to identify areas of weakness compared to other organisations and opportunities for improvement. These can provide a fruitful source of items that can be developed further in the organisation's own leading performance indicators.

1.5 Characteristics of good indicators.

For any performance indicator to be effective, it is important that it is:

- a) Objective and easy to measure and collect,
- b) Relevant to the organisation or workgroup whose performance is being measured,
- c) Providing immediate and reliable indications of the level of performance,
- d) Cost efficient in terms of the equipment, personnel and additional technology required to gather the information,
- e) Understood and owned by the workgroup whose performance is being measured.

In addition to these general requirements, the examples

used in the introduction demonstrate some additional characteristics that leading performance indicators must have if they are to be useful:

- There must be a connection between the leading information and the outcomes that are of interest.
- The reasons behind the indicators and their benefit must be understood by line management and the workforce affected.
- The indicators must provide information that can guide future actions to either improve desired outcomes, or provide warning of potential weaknesses and allow action to avoid undesirable outcomes.

Therefore, in addition to the points above, effective leading performance indicators must also:

- f) relate to activities considered to be important for future performance
- g) be amenable to intervention / influence by the workgroup whose performance is being measured
- h) relate to something where there is scope to improve
- i) Provide a clear indication of a means to improve performance.

The focus on using leading performance measures to influence future actions means that it is important to think about leading performance indicators as part of a process, and careful thought is required to identify what information will be most useful.

1.6 Selection of leading performance indicators

The range of possible leading performance indicators that can be identified is far too large for any organisation to contemplate using all of them. The selection of the most appropriate leading performance indicators is an important part of the process for effective use. This requires users to assess their current situation to identify the areas of their activities that present the greatest threat to performance or opportunity for improvement. Leading performance indicators should then be designed to focus on a manageable number of these areas. This process should involve members of the workforce who will be required to implement the actions to improve performance.

A selection of approximately 10 leading performance indicators should provide reasonable cover of the main process inputs whilst still being manageable.

The criteria for selecting a suitable set of leading indicators are:

- Cover all items from the management system that pose significant threat
- Cover areas with the greatest opportunity for improvement
- Be objective and measurable
- Provide information that guides action to improve performance
- Under control of workgroup to influence performance

The sources of potential leading performance indicators will change with the level of the organisation's maturity and the level of indicators that are selected. At level one, the legislation and regulatory framework for the industry will define minimum requirements. Resources or activities undertaken to comply with these requirements may form the basis of level one leading performance indicators. At level two, management systems and business plans can be useful sources of leading performance indicators. At level three, indicators can be based on the local implementation of the management system and business plan.

Different companies, work locations and work teams are likely to have different sets of leading performance indicators; no two sets are likely to be the same. The divergence will increase as more level three indicators are selected.

- At a low level of maturity a company might select 10 level 1 indicators,
- At a higher level of maturity a company might select 5 level 1 and 5 level 2 indicators,
- At an even higher level of maturity a company might select 2 level 1, 3 level 2 and 5 level 3 indicators

In each case, the company will select indicators that monitor activities that are most relevant to their improvement process or which pose the greatest risk to them if failure occurs.

The process of selecting leading performance indicators is not a one-off exercise. The indicators are part of a continuous improvement process. As progress is achieved, it will be necessary to review the indicators selected and revisit the performance standards set in order to maintain their effectiveness and adapt them to changing circumstance. Periodic review of the indicators and performance standards should be incorporated into the annual business planning process.

'Thinking' and 'evaluation of what is beneficial' are essential parts of the process for effective use of leading performance indicators. The divergence that this introduces has important implications for some of the uses of leading performance listed in section 1.4.

Further examples of specific indicators that can be used for the safety management process are given in part two of the guidance.

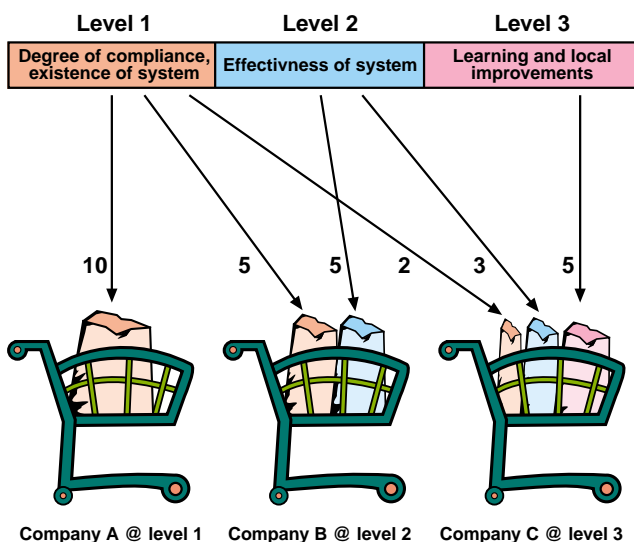


Fig. 1.5 Selection of leading performance indicators.

Figure 1.5 illustrates how, if each company or work location is selecting a set of 10 leading performance indicators, there will be increasing divergence between the indicators that are selected as maturity develops and the areas with greatest opportunity for improving performance will change. For example:

1.7 Importance of analysis

Most management systems are complex with many inputs and many outputs. This is particularly true for health and safety where several inputs (or lack of inputs) may contribute to the final outcomes. The effectiveness of leading performance indicators can be improved by better understanding the contribution that different inputs make to the desired output performance. When using leading performance indicators, it is important to periodically analyse the relationships between the leading and lagging indicators that are being used.

Statistical analysis should be used to verify /identify the cause and effect links between inputs that are monitored, the performance standards that are set, and outcomes that result. This should be done before any of the performance indicators are combined together to produce an index that might be used to indicate the overall performance. Such combination may be desirable and useful to simplify communication of overall performance. However, if such

combination is to be meaningful, the way in which the leading performance indicators are combined, and the weighting that is given to individual indicators needs to be based on a sound understanding of the effect of the different inputs.

1.8 Presentation of Leading Performance Indicators

Section 1.7 emphasised the importance of analysing information from leading and lagging indicators to confirm / identify cause and effect relationships. However, once this is done, the number of different indicators that are monitored can make it difficult to communicate effectively whether the overall performance is better or worse. To overcome this, the separate indicators are sometimes combined together to produce an overall performance index. However, this practice is open to the criticism that good results from leading performance indicator are simply being used to cancel out poor lagging performance, e.g.

Leading performance indicator score	= x
Lagging performance indicator score	= y
Overall performance score	= (x+y) / 2

An alternative form of presentation is to keep the leading and lagging indicators separate and plot them against each other as shown in figure 1.6. This form of presentation helps to visually confirm the connection between the leading indicators and the lagging outputs, and to demonstrate that the leading performance indicators are being used effectively.

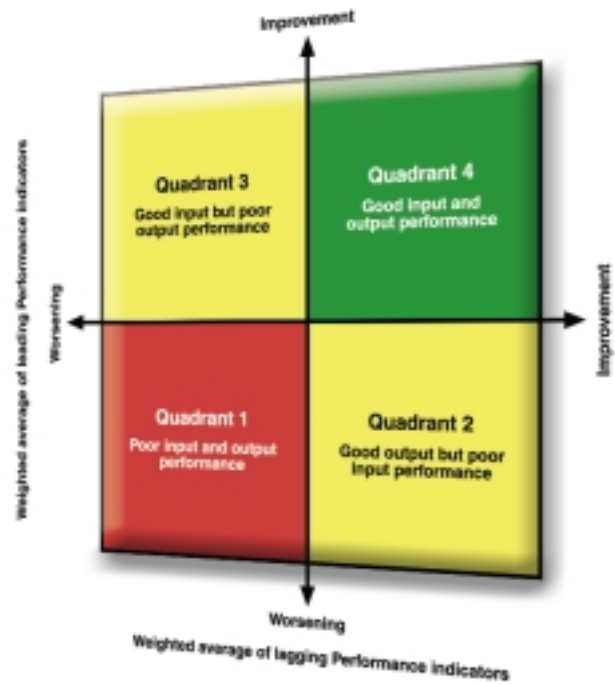


Fig. 1.6 Presentation of Leading and Lagging Performance Indicators

Once plotted, the results can be interpreted as follows:

1. Results plotted in quadrant 1 represent poor performance on inputs (leading indicators) and poor performance on outputs (lagging indicators): serious attention is required in all areas to improve performance.
2. Quadrant 2 represents poor input performance but good output performance. As there is always an element of luck as to whether inadequately controlled hazards actually result in harm, performance in this quadrant represents an organisation that has been lucky. However, one can not rely on luck. Future performance may not be so good and more attention to input is required to maintain the performance.

3. Performance in quadrant 3 represents good input performance that is not resulting in good output performance. Possible reasons for this are:

- There is a time delay between making improved inputs and the benefits being seen in the lagging output performance, and insufficient time has lapsed for the improved inputs to have their effect,
- Inappropriate inputs are being measured or the targets being set are too low,
- The organisation is going 'through the motions'. Actions are being taken to achieve a good score in a way that does not achieve actual benefits: e.g. generating safety observation cards to make up numbers without attention to quality or following up with adequate corrective action to improve safety.

Organisations in this quadrant need to review the inputs that they are making and the leading performance indicators that they are using to measure input performance.

4. Performance in quadrant 4 represents good input performance and good output results. The organisation is achieving good performance now and has reassurance that they are making the necessary efforts to sustain and further improve their performance.

This method of presentation avoids the criticism of good leading performance indicator results being simply used to cancel out poor lagging performance indicators. An organisation can not set easy input targets to balance poor output performance as a high leading indicator score without a corresponding improvement in output performance simply moves the organisation from quadrant 1 to quadrant 3.

Also, under reporting, or temporary good luck, will tend to move an organisation to quadrant 2, not quadrant 4. Genuine, effective efforts to use leading performance indicators should result in improvements in a 'North Easterly' direction.

This ability to discriminate between effective use of leading performance indicators and inappropriate or ineffective use will help to address the existing scepticism about the utility and benefits of leading performance indicators as described in the introduction.

An example of how this can be used is given in Appendix 1.

1.9 Incentive and recognition schemes

Many companies have used awards, incentives and recognition schemes to encourage improved performance. Incentive schemes that are based on the inputs and efforts that are being made to improve performance are more likely to have the desired effect than schemes that rely on output measures that are not under the direct control of the workgroup.

Leading performance indicators are ideally suited for use in incentive schemes. The process for identifying suitable indicators helps to increase workforce engagement and develops ownership of the scheme. Using leading performance indicators will help to ensure that improved motivation is focused on the activities that are considered to be most important. Their use can also help to improve the perceived 'fairness' of the scheme by increasing the 'transparency' of the linkage between the actions that participants take and the recognition that they receive.

Some elements for success of an incentive and recognition system include:

- Actions required to achieve recognition should be specified and perceived as achievable.
- Requirements should be perceived as being relevant to improving performance by participants; this will generally preclude a 'one size fits all' solution.
- Awards should not recognise one group at the expense of another.
- Recognition / reward should be available to everybody who achieves the criteria.
- Progress towards achieving awards should be monitored and reported to all participants.
- Groups should not be penalised for failure by an individual.

1.10 Summary of process for effective use of leading performance indicators

The process for effective use of leading performance indicators can be summarised as:

- Identify main threats to future performance and opportunities for improvement
- Identify actions that can be taken to remove threats or develop opportunities
- Create performance indicators based on the actions to be taken
- Set a performance standard for each indicator

- Monitor performance against the desired standards
- Take corrective actions to improve performance against standards as necessary
- Periodically review linkage between performance against leading indicators and lagging performance indicators
- Once performance standards are met, consider raising the standards required, developing alternative improvement actions, or identifying other threats and opportunities that could be addressed.

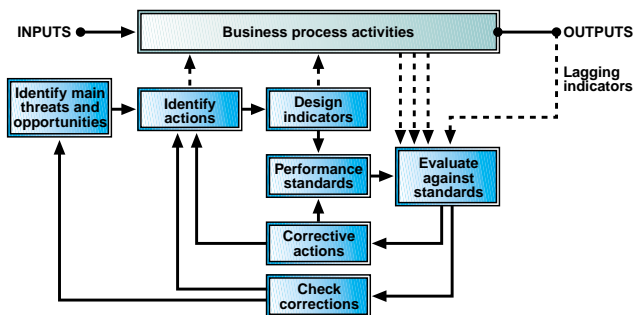


Fig. 1.7 Process for using leading performance indicators

The process must be understood and owned by those who will implement the actions. They must be involved in the process of identifying the actions and setting the

performance standards. They must receive regular feedback on their performance against the standards.

Effective use of leading performance indicators can help to take the 'luck' out of managing health and safety.

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- (5) Health and Safety Executive (1997) - Successful Health and Safety Management HS(G)65. HSE Books: Sudbury

2 leading performance indicators for safety

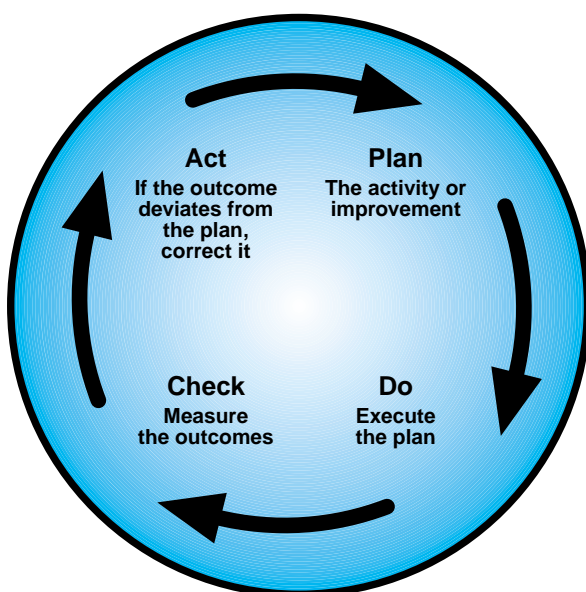
2.1 What is safety?

Safety can be defined as the absence of danger. This makes actual safety difficult to measure. What is normally measured to indicate the level of safety are the failures that have resulted in unwanted incidents. Acceptably low numbers of such failures are used to infer that the activities are acceptably safe. However, this is not always the case. Sometimes it is only luck that has prevented an accident from occurring; yet!

Leading performance indicators are particularly useful for safety as they can help to take the luck out of managing safety by giving more recognition to the actions that are necessary to reduce risks and improve performance.

The general use of leading performance indicators has been described in part one of these guidance notes. The process for effective use of leading performance indicators can be summarised as one of:

- Identify where there are potential weaknesses or opportunities for improvement
- Identify what can be done to counter weaknesses or deliver improvement
- Set performance standards for the actions identified
- Monitor performance against the standards
- Take corrective actions to improve performance
- Repeat the process, using the continual improvement model:



In this part of the guidance, more detail is given on how leading performance indicators can be used for safety.

2.2 Motivation for improving safety

When accident rates are low, there is a problem collecting the necessary 'safety intelligence' in order to make continuing improvements in safety. Accidents and incidents may well be thoroughly investigated and areas for reform and initiative identified from the subsequent analysis, however, when these adverse occurrences are rare it becomes increasingly difficult to identify areas for improvement. There is also the danger that a lack of adverse events can lead to a feeling of complacency within the organisation. Leading performance indicators can play an important role in motivating a continuous improvement process, by focussing on areas that have the potential to cause an accident, before the accident itself is realised. In this way they can be used as a form of 'safety condition monitoring' in much the same way as engineers' carry out 'machine-condition monitoring'. Leading performance indicators can also be used to enhance safety by clarifying actions and setting performance standards for the level of action required. In addition, they can be used to measure the inputs that are being made to achieve the performance standards.

2.3 Leading performance indicators for safety

For safety, it is recommended that leading performance indicators are based on the inputs and actions that organisations or individuals take to manage risks and improve performance.

The following sections provide examples of leading performance indicators for each of the three levels described in section 1.3 of these guidance notes.

2.4 Level 1 leading performance indicators

At level 1, the legislation and regulatory framework for the industry will define the minimum safety requirements for the industry. Activities undertaken to comply with these requirements may form the basis of level 1 leading performance indicators.

Examples of level 1 leading performance indicators for safety include:

- Whether a safety policy has been published.
- % of applicable legislation addressed by Company procedures.
- % statutory training completed (e.g. COSHH assessors; DGSA; etc).
- Extent of communications of statutory requirements to employees.
- Number of training hours logged per period.
- % management and supervisors job descriptions that contain specific health and safety responsibilities.
- % of Safety Management System that is compliant with current guidance (e.g. HS(G)65; BS 8800; OHSAS18001).
- Number of completed monitor/ audit/ review activities versus number planned.
- Number of management safety visits completed against number planned.
- Trend of non-compliances noted from working practices.
- % COSHH, Manual Handling, VDU assessments reviewed per period.

2.5 Level 2 leading performance indicators

At level 2, the organisation's health and safety management system and associated plans will provide the basis for most leading performance indicators. The indicators selected should be objective and specific so that they are readily understood and easily monitored in an unambiguous way.

Examples of level 2 leading performance indicators for safety include:

- Whether a safety policy has been adequately communicated
- Perceptions of management commitment to safety
- Number and effectiveness of senior managers' safety tours
- The extent to which plans and objectives have been set and achieved
- The percentage of planned safety training completed
- Number of risk assessments updated as a result of changes in work-scope
- Number of manual handling assessments completed as percentage of those required

- Extent of compliance with risk control measures
- Number of suggestions for safety improvements
- Number of safety audits planned and completed
- Safety audit recommendations closed out on time
- Time to implement action on complaints or suggestions
- Frequency and effectiveness of safety briefings
- Number of additional control measures identified at site during execution of work

There are a variety of documents that describe health and safety management systems (e.g. HSE(G)65 - Successful Health and Safety Management). These provide many examples of items that can form the basis of action plans and corresponding level 2 leading performance indicators.

2.6 Level 3 leading performance indicators

At level 3 the performance indicators are developed locally by work sites or work teams. The workforce is empowered to identify where and how improvements can be made. The leading performance indicators will be based around local (workforce) selected issues, and the actions that have been identified to improve performance. These should focus on those issues that represent greatest threats or offer greatest potential for improvement regarding the safety activities of the work group. Because of the large number of possible improvement areas, there is likely to be a large degree of divergence between the level 3 indicators selected by different organisations.

The worksite or work team may develop local action plans to assist in the delivery of the organisation's overall Health and Safety plan. These local action plans may then be used as the basis for level 3 performance indicators. The work team may also set a target for their performance indicator (e.g. 95% complete) based on the improvement they want to achieve.

Thus level 3 indicators may be based on level 2 indicators but interpreted more specifically to increase their relevance to local conditions and activities.

Examples of level 3 leading performance indicators for safety include:

- % of staff with agreed Safety Case responsibilities & accountabilities
- % of jobs with defined NVQ requirements
- % of planned training courses completed
- % of identified competency gaps addressed

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- % of planned equipment tests meeting performance criteria, e.g. % of ESD valves that close in required time
 - Number of critical drawings awaiting updating
 - Number of issues from technical concerns register that have been closed out.
 - Number of safety improvement actions per offshore inspection
 - % of jobs for which risk assessments are carried out
 - % reduction in exposure hours for hazardous activities
 - % of work site inspections carried out against planned requirement
 - % of jobs with hazard assessments
 - % of permits to work reviewed and controls found to meet requirements
 - % of computer work places with completed DSE (display screen equipment) user assessments completed.

3 leading performance indicators for occupational health

3.1 Introduction

“Occupational health is about protecting the physical and mental health of workers and ensuring their welfare in the workplace. It deals with the relationship between someone’s state of health and his or her job.” (OIAC 1979). This definition approaches occupational health as being concerned with the effects of work on health and the effects of health on work. This encompasses three aspects of occupational health.

- Initial and continuing fitness for the job (including pre-employment fitness to work medicals, health surveillance, welfare in the workplace);
- Protection from occupational health risks (including recognition of the hazard, risk assessment, control of health risks); and
- Mitigation when controls fail (including first-aid, emergency treatment and evacuation, counseling, rehabilitation)

All of these generate potential performance indicators.

It is also important not to ignore the influence of events outside the workplace. There is always a potential interaction between occupational health stressors encountered both at and away from work, these may be specific exposures (examples are noise which may occur at work or at leisure events, and the interaction of stress at work and home) or as a result of lifestyle choices (e.g. the synergistic effect between smoking and exposure to asbestos). Many of these interactions are so close that it can become meaningless to try and separate them. Although there may be a variety of reasons for separating ill health into work and non-work-related categories. For the employer and employee there are a variety of “costs” irrespective of the cause of ill health.

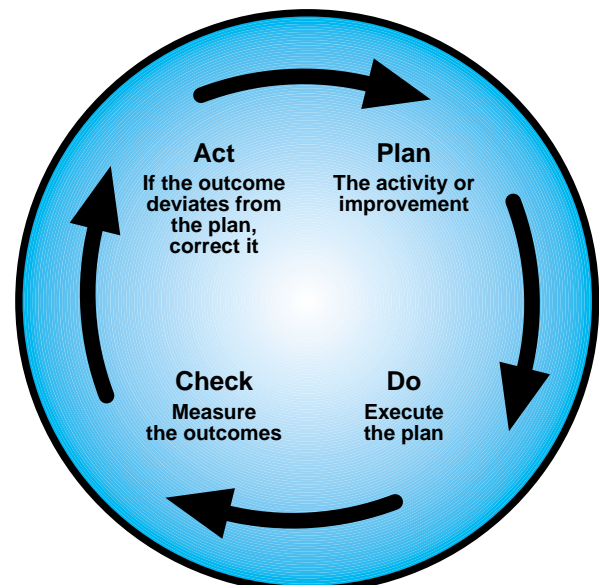
In considering potential leading performance indicators for occupational health it is useful to bear in mind the World Health Organisation’s definition of health: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Thinking of occupational health in these broader terms can generate a wider range of indicators. For example, meeting performance indicators on general health education and

promotion may lead to long term reduction of ill health, but what is being done may not be directly related to the work or the work place.

3.2 The Use Of Leading Performance Indicators

The process for effective use of leading performance indicators for occupational health is the same as that summarised in Section 2 (safety):

- Identify where there are potential weaknesses or opportunities for improvement
- Identify what can be done to counter weaknesses or deliver improvement
- Set performance standards for the actions identified
- Monitor performance against the standards
- Take corrective actions to improve performance
- Repeat the process, using the continual improvement model:



3.3 Some special features regarding Occupational Health LPIs

There are some special features about work related ill health, its causes and outcomes, which need to be borne in mind when considering occupational health leading performance indicators.

- The latency period between exposure and the appearance and diagnosis of a work related disease is often long e.g. asbestos related diseases may appear many years after exposure.
- Line managers may not be involved in the investigation of the causes of ill health in the way that they are involved in investigating causes of accidents. This may be related to difficulties surrounding medical confidentiality. The result can be that feedback to line managers may be slow and indirect. This can influence both the type of occupational health performance indicators available to managers and their view of how useful they are.
- Some health performance indicators may depend on assessing an individual, in some way (e.g. various forms of health surveillance). This may not necessarily involve any medical intervention but is nevertheless very personal and needs to be handled sensitively.

3.4 Sources of leading performance indicators

Leading performance indicators for occupational health are related to the organisations' level of maturity and may vary accordingly.

Caution should be taken when developing occupational health leading performance indicators to ensure that their focus is on health issues and not an expansion of a current safety leading performance indicator.

3.5 Level 1 leading performance indicators

At level one, the legislation and regulatory framework for the industry and any agreed pan-industry standards will define the minimum health requirements. Activities undertaken to comply with legislation and industry standards will form the basis of level 1 leading performance indicators.

Examples of level 1 occupational health leading performance indicators include:

- A health and safety policy has been published and distributed
- A health plan has been developed to meet regulatory requirements
- All personnel working offshore have been assessed for fitness for work through pre-work/periodic medicals
- Employees in jobs (e.g. food handlers) requiring special medical assessment have been assessed
- Initial training of food handlers commensurate with their work
- Health related risk assessments and reassessments as required by legislation have been carried out and controls installed as necessary (e.g. COSHH, Noise at Work Regulations, Display Screen equipment, food HACCP, etc.).
- Maintenance regimes required by legislation are in place (e.g. for LEV under COSHH)
- Medics and first-aiders refreshers are done in time
- Necessary health surveillance is in place.

3.6 Level 2 leading performance indicators

At level 2, the organisation's health and safety management system and associated plans will provide the basis for most leading performance indicators. The indicators selected should be objective and specific so that they are readily understood and easily monitored in an unambiguous way.

Examples of level 2 occupational health leading performance indicators include:

- Whether a health and safety policy has been adequately communicated
- Staff perceptions of management commitment to health
- The extent to which health related plans and objectives have been set and achieved
- Inclusion of health in senior managers' safety tours
- Reduction of health risks at design stage by including standards (e.g. for noise and substance emissions) in purchasing policy
- The effectiveness of health related training (e.g. the use of RPE and hearing protection, skin protection systems, etc).
- Number of health related risk assessments completed
- Staff understanding of health risks and risk controls
- Extent of compliance with risk control measures (e.g. the use of LEV and PPE)
- Health related audit recommendations closed out on time
- Frequency and effectiveness of staff health promotion briefings
- Medic consultations for health surveillance issues

3.7 Level 3 leading performance indicators

At level 3 the performance indicators are developed locally by work sites or work teams. The workforce is empowered to identify where and how improvements can be made. The leading performance indicators will be based around local (workforce) selected issues, and the actions that have been identified to improve occupational health performance.

Examples of level 3 occupational health leading performance indicators are:

- % of staff with agreed health related responsibilities
- % of planned training courses completed
- Number of corrective actions per offshore catering inspection
- Changes in periodic water analysis
- % of jobs for which health risk assessments are carried out
- % reduction in exposure hours for hazardous activities (e.g. reduction in exposure to noise, vibration or chemicals)
- % reduction in the use of PPE (RPE and HP) as control at source improves
- % of tool box talks with a health element
- % of permits to work reviewed and controls found to meet health requirements
- % of computer work places with completed DSE user assessments completed
- Numbers of people stopping smoking after a health campaign
- Change towards healthier eating habits recorded by caterers
- Number of people attending Medic for personal health assessments

Appendix 1

Example of Presentation of Leading and Lagging Performance Indicators



SYSTEM PRINCIPLES

- The SPI Scheme:
- Focuses Improvement Efforts
 - Involves Personnel
 - Combines Leading & Lagging Indicators
 - Reflects Actual Performance
 - Promotes Continuous Improvement

Leading Indicators Weighting

- Management Visits 5
- Planned Activities 1
- Action Close-out 1

Logging Indicators Weighting

- Reportable Events 20
- Very High Potential Events 20
- Overdue Actions 2

Indicator	Jan	Feb	Mar	Apr	
Management Visits	10	0	10	15	
Planned Activities	10	27	21	20	● Based on Annual Plan
Action Close-out	11	10	14	17	
Leading Indicator Total	31	37	45	52	● Rolling Average plotted on grid
Reportable Events	0	0	20	0	● RIDOR Reportable Injuries and Dangerous Occurrences
VH Potential Events	20	20	40	0	● Very High Potential as per HELP report
Overdue Actions	0	10	8	4	● Includes actions in backlog
Lagging Indicator Total	20	30	68	4	● Rolling Average plotted on grid

This information updated monthly using input from sites. Leading & Logging totals transferred to plot in relevant quadrant.

The above figures are used for illustrative purposes only

Information above supplied by Talisman Energy (UK) Limited



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