



Measuring Safety

and HEALTH Performance

A Review of Commonly-Used Performance Indicators

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How an organization measures performance undoubtedly influences organizational behavior. However, measuring safety is difficult because it is difficult to predict the impact that new safety metrics will have on individual behavior, attitudes, and the overall safety climate. Regardless of how difficult it is to measure, a firm's safety performance needs to be measured. Without measurement, accountability becomes meaningless. But before various measurement systems are devised, their purpose and limitations need to be thoroughly understood. This paper describes different types of safety performance measures and their benefits and limitations.

Metric Categories

There are many ways to categorize safety performance measures. They are often classified as trailing or leading indicators, outcome or process oriented, results or activity-based measures, downstream factors or upstream factors, and/or qualitative or quantitative metrics. For the sake of simplicity, the safety metrics described in this paper are classified as outcome or process oriented.

Outcome performance measures are after-the-fact measures. The performance activity occurs then the outcome is measured. Common examples of outcome metrics are injury/illness incident rates and workers' compensation claims data. Process-oriented performance measures, on the other hand, are those measures indicative of action or activities performed. Ideally, process measures should be linked (and statistically validated) to outcome metrics, but this is rarely done. As a result, process metrics do not necessarily predict a program's outcome, but rather, these measures indicate the extent to which an activity or process has been implemented (Janicak, 2003).

In general, there is no single reliable measure of safety and health performance. Instead, a mixture of both outcome-oriented and process-oriented measures are needed to effectively evaluate performance. Furthermore, the types of metrics used should be different for evaluating different levels of the organization. Dan Petersen suggests that only process-oriented metrics be used at the lower managerial or unit levels and activity measures (with some outcome measures) primarily used for the middle-upper management levels. Pure outcome measures should be reserved for the executive level (Petersen, 1996). Ideally, the metrics should be integrated and linked to the overall vision, goals, and objectives of the business.

Outcome-Oriented Measures

Injury/Illness Rates

Traditionally occupational safety and health performance have been measured by focusing on a few select metrics such as injury/illness rates and workers' compensation claims data. However, the most common outcome metrics are based on injury/illness rates (such as the OSHA recordable incident rate). The OSHA recordable incident rate is an outcome metric that measures the number of employees who have sustained an OSHA recordable injury/illness per 100 workers. The benefit of using injury/illness statistics as a safety performance metric is its ease of use and injury/illness data are readily available. Plus, industry OSHA recordable rates by SIC codes are published annually by the Bureau of Labor Statistics, which allows companies to compare their injury/illness rates to their respective industry average.

There are many limitations with using injury/illness rates as a primary performance indicator. These include:

1. Injury/illness rates are inherently linked to bad news. Emphasizing too much on injury/illness rates typically rewards employees for not reporting injuries/illnesses, thus, preventing the root causes of problems to be properly investigated and corrected. This can be potentially the most significant limitation with using injury/illness rates as a performance measure if too much emphasis is placed on achieving a target injury/illness rate, especially if rewards are given for achieving such targets.

2. There can be considerable variations in interpretation and application of OSHA recordkeeping guidelines. Therefore, generalizing the OSHA log information from one company to another is questionable because of the variability of reporting techniques between work places.
3. OSHA recordability, to a large extent, depends on the medical treatment given to the injured employee. OSHA recordability rates can be influenced by how a firm manages the medical treatment received. The medical community is inconsistent in treating injuries.
4. Injury/illness rates provide little feedback for safety improvement. It is not prescriptive in nature, thus, provides little or no information on how a firm can improve.
5. Injury/illness rates often do not reflect the potential severity of an event, merely the consequence. Whether a particular event results in an injury is often a matter of chance. It will not necessarily reflect whether or not a hazard is under control.
6. A low injury rate can lead to complacency.

Likewise, having a single OSHA-recordable injury might cause management to over react.

7. There must be a failure, i.e., injury or illness, in order to get a data point. Injury statistics reflect outcomes, not causes. A low injury rate results in few data points being available.

8. Smaller companies with fewer man-hours are more susceptible to wide fluctuations in injury rates. OSHA recordable incidents account for a small number of workplace accidents. The causes of such incidents may not represent the norm.

Most safety professionals agree with the many pitfalls with using these traditional outcome metrics as the primary performance indicator. However, many stakeholders (such as customers, upper management, etc.) object to the removal of such outcome metrics. OSHA also requires recordable injuries to be logged and tracked. Therefore, it is unlikely that these traditional performance metrics will ever be eliminated. The key is to develop additional, more useful performance indicators in an effort to shift the focus away from the traditional, less useful outcome metrics.



Insurance Claims Data

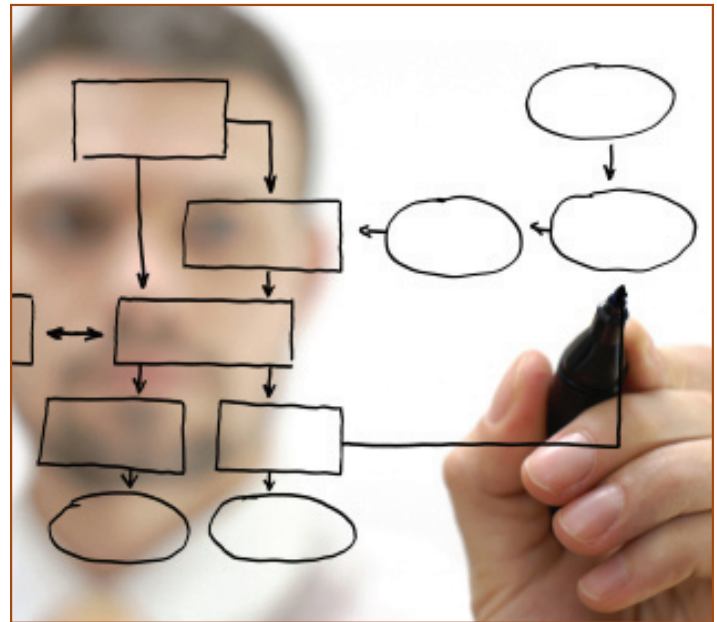
Financial calculations based on insurance claims data (e.g., experience modification rate, loss ratio, total losses incurred, etc.) are other popular sources for outcome measures. The experience modification rate (EMR) is a factor applied to the manual premium to either increase or decrease the insured's final premium. It is determined by the National Council on Compensation Insurance (NCCI) or other insurance rating groups. The EMR calculation is based upon the type of work the perform performs and their past loss history. The average for an industry is represented by an EMR of 1.00. Companies with EMRs greater than 1.00 are paying a workers' compensation premium that is greater than the industry average, while companies with an EMR less than 1.00 are paying premiums less than the industry average.

The loss ratio is a formula used by insurers to relate loss expenses to income and is closely related to the EMR. The loss ratio is calculated by the following formula:

$$\frac{[\text{incurred losses} + \text{adjustment expenses}]}{\text{earned premium}}$$

If the loss ratio is greater than one, the insurance carrier is paying more to provide coverage for the insured than it received in premiums.

The primary benefit of using the EMR as a performance indicator is that it is directly related to operational costs. The rate has also already been normalized for company size, payroll data, nature of operations, and other factors; therefore, no other data is needed for comparison. However, there are some limitations of using EMR as a sole performance indicator. The rate is averaged over a significant period of time. Thus, an employer who has improved safety performance may still suffer the impact of previous years of poor performance, while an employer with a good EMR who has let safety decline will have a lower EMR until losses enter the formula. Additionally, when a claim occurs, the insurer establishes a reserve, which may equal the maximum probable loss from that injury. However, claims-reserving practices differ among insurance carriers, which is another limitation of the EMR or other measures based on insurance claims data.



reliable information. However, research questions the validity of accepting audits as a measure of excellence unless these audits have passed some rigorous tests (Petersen, 1998).



Process-Oriented Measures

Safety Audits

Safety audits are a method of obtaining data with regards to the current status of the safety program. Safety audits can be external or internal. Internal audits are initiated by organization. External audits are conducted by personnel outside the organization. Additional classes of audits are planned, unplanned, and continuous. Planned audits occur periodically in the organization on a schedule that is known to the company. Unplanned audits occur with no prior announcement to the organization or site.

Compliance to laws, regulations, and company policies and procedure is measured effectively by audits. Many companies have constructed audits using a scoring system in an effort to measure and track audit results by location, department, manager/supervisor, and audit category. Self-audits can be effective if done objectively and if the audit process produces valid and

Other limitations of safety audits as a measurement tool include:

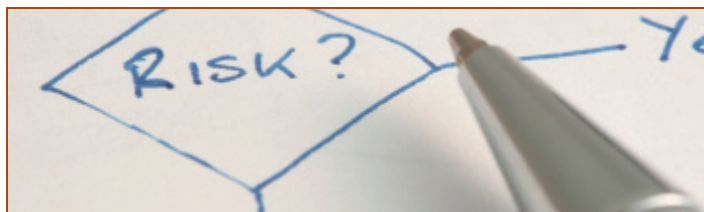
- The audit process generally represents only a small sampling of the corporate population over a very short period of time.
- The effectiveness is limited by the auditor's knowledge and design of the audit instrument.
- The benefits found in the audit report findings and recommendations are often directly proportional to the auditor's knowledge and skill. Therefore, selecting a competent auditor is a key factor.
- Selection of the audit instruments is critical, as some are distinctly better than others.
- Few audit instruments have a system focus and therefore fail to answer the question why deficiencies exist and how well the system is functioning.
- Safety audits can be construed as fault-finding. They may also produce merely a superficial list of deficiencies and/or produce no remedial (or inadequate) remedial action (Janicak, 2003) if the deficiencies identified from the audit are not investigated to the root cause(s).

Behavior-Based Safety

Behavior-based safety is a safety performance process that has increased in popularity over the past 20 years. Typically, employees develop lists of critical work behaviors, observe peers performing work, report observations to peers, and help develop appropriate corrective actions. Based on the philosophy that the vast majority of accidents are attributed to unsafe behaviors, this approach focuses on identifying, measuring, and correcting critical behaviors. Another philosophical basis for this approach is that behavior, attitudes, and culture are interdependent. However, attitudes are intrinsic and therefore, cannot be observed, whereas, behaviors are extrinsic, thus, can be observed and more readily measured. As a result, focusing on behaviors as opposed to attitudes is the primary emphasis with a behavior-based safety process, which has a logical basis as a safety performance measure.

The primary limitations and considerations involved with a behavior-based safety process include the following:

1. A considerable amount of time, training, and investment in company resources is required to implement and sustain the process.
2. Demonstrated leadership from both management and labor is critical in order to be effectively implemented and sustained.
3. Timely feedback of observation results is critical to success.
4. Many employees feel uncomfortable providing feedback to peers, especially negative feedback.
5. Critical behaviors must be objectively defined. Different observers may yield different results from observations based on knowledge and experience if critical behaviors are poorly defined.
6. The cause-and-effect relationship between the critical behaviors and risk of injury are rarely quantified. As a result, critical behaviors identified for measurement and tracking are often subjectively identified based on management and employee feedback and knowledge of past incidents or injuries.



Safety Perception Surveys

Safety perception surveys are used in assessing the safety climate in an organization. Recall, the safety climate is influenced by both behavior and attitude. A behavior-safety process focuses on measuring employee behaviors, whereas, safety perception surveys focus on attitudes and beliefs held by management, supervisors, and workers.

- A good perception survey should (Petersen, 1998):
- Evaluate the firm’s perception of management systems that affect safety performance.
 - Ask the same questions of managers and employees at different levels within the organization.
 - Be easily and economically administered, analyzed, and evaluated.
 - Facilitate comparisons of specific departments and divisions while maintaining respondent anonymity.
 - Provide managers with data in a format that allows for definitive comparisons to facilitate decision making.

The primary limitations of perception surveys include the possible complexities of constructing and administering the survey and analyzing the resulting data. Also, since employee perceptions are the key indicators in the survey, some managers may be resistant in receiving unfiltered information and data about safety issues, potential risks, and the possible employee-management disconnect. This resistance may be a reason why safety perception surveys are not as widely conducted among industry as it should.

Safety Training Measurements

Safety training is one of the most important components of any safety program. It is an antecedent to employee behavior, thus, to some degree influences employee behaviors. Therefore, it seems appropriate to measure safety training effectiveness. According to Phillips (1991), training should be evaluated to so that the organization can:

- Assess participant satisfaction with the training.
- Assess the application of the training to the job.
- Evaluate organizational performance.
- Test for skills development.

Tests and quizzes given before and after training can measure knowledge transfer of the training. Periodic random tests and quizzes can also be an effective tool to track employee safety knowledge and retention on an on-going basis. If hands-on skills are required,

a standardized practical (or functional) test can be developed and used to measure skill level. Participant satisfaction can be assessed using a training evaluation questionnaire. Application of training to the job can be assessed through audits and observations.



Corrective Action Measurements

Devising and performing a corrective action is the only way to prevent a potential future accident from occurring (Veley, et al., 2004). Therefore, the effectiveness of corrective actions tends to be an essential item to measure. A corrective action is defined as what the person in charge will do to ensure behavior changes. A corrective action is a line management activity that increases the probability of things happening as intended (Veley et al., 2004).

Before devising and performing corrective actions, root causes of injuries, incidents, or essentially any organizational problem need to be identified. Therefore, having a process of measuring corrective actions implemented go hand-in-hand with an effective incident investigation and root cause analysis program. Safety audits and inspections are other good tools for identifying organizational problems and determining their root causes needed for devising, performing, and tracking corrective actions.

The Balanced Scorecard

Often, safety metrics do not tell senior managers how the safety effort correlates to their goals and objectives for the business. According to Birkner (1999), a set of metrics is useless if manage-

ment does not believe it is credible and sufficiently tied to the organization's bottom line. Linking health and safety to the organization's primary and supporting activities automatically ties it to the business strategy, which is the premise for the Balance Scorecard approach.

The Balanced Scorecard is a strategic management concept that was presented by Dr. Robert S. Kaplan and Dr. D.P. Norton (1996). The balanced scorecard can monitor short-term performance from four perspectives – financial, customer, internal business processes, and learning and growth – and evaluate the business strategy in light of recent performance. Objectives, measures, targets, and initiatives are described for each perspective by answering the following questions (Kaplan and Norton, 1996):

- Financial: "To succeed financially, how should we appear to our shareholders?"
- Customer: "To achieve our vision, how should we appear to our customers?"
- Internal business processes: "To satisfy our shareholders and customers, what business processes must we excel at?"
- Learning and growth: "To achieve our vision, how will we sustain our ability to change and improve?"

To link safety activities to core business functions, health and safety professionals must develop an explicit understanding of the organization's vision, strategy, and value chain. The advantage of the scorecard to health and safety professionals is that it forces managers to consider all the important operational measures in a single package. Thus, the balanced scorecard helps create the integration necessary for health and safety to be managed like any other part of the business process (Birkner and Birkner, 1999).

Ideally, organizations should implement the scorecard technique for both the business as well as safety. In this way, total alignment is possible. If that is not possible, then consider implementing a scorecard for safety alone. Though this will not provide complete alignment, it will provide for focused strategy implementation, targeted interventions, as well as progress and process metrics (Furst, 2006).

Conclusion

In summary, continuous improvement requires business functions and processes to be measured. However, keep in mind that safety is not about numbers, it is about protecting people of injuries and illnesses. Therefore, steps should be taken to avoid pitting locations and departments against each other in a numbers game. Effective measurement should be predictive as well as prescriptive in nature in order to provide information for managing performance (Furst, 2006). Ideally, safety performance metrics should be integrated and linked to the overall vision, goals, and objectives of the business. Finally, choose measurements that are meaningful to the firm and avoid overly complicated metrics and indices; just because it can be measured, does not mean it is a useful measurement.



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