

Demonstrating Safety Performance through Leading Indicators

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This session summarizes the findings of a white paper developed at the conclusion of an ASSE Symposium on safety metrics from the fall of 2011. Case studies and tools for developing leading indicators will be discussed.

Introduction

In November, 2011, the American Society of Safety Engineers (ASSE) held a symposium on Safety Metrics entitled “***Prove It.***” The author of this paper was the chair of the task force that created the symposium as well as a symposium speaker. A white paper was developed at the conclusion of the symposium that summarized comments aimed at answering the perpetual question from the safety professional: “What are leading indicators in safety and how to we measure them?” A summary of the presentations from the symposium is found in Appendix A, and a copy of resources submitted by symposium presenters is found in Appendix B.

This paper will begin with a discussion of safety metrics that measure how safety performance impacts organizational goals. The next part of the paper will discuss what is a leading indicator, how they are used in other professions (economics, weather forecasting), and how they specifically relate to safety performance. The discussion will then move to selecting those metrics that help the SHE professional demonstrate the value of safety performance to the business model. Case study/examples are provided in several of the proceedings papers on how safety professionals have successfully determined what metrics to measure and how to use them to demonstrate success to various stakeholders to an organization. The conclusion of the paper provides summary of workshops conducted at the symposium that can be used by the Safety, Health, and Environmental (SH&E) profession to develop their own leading indicators within their organizations.

Take-aways from the session will include:

- Integrate leading indicators for safety into their organization's overall performance goals.
- Prepare and deliver safety program performance reports most appropriate for their organization's senior management.
- Understand common metrics used to measure culture, near misses, employee participation, upper management commitment, audits, and other measures that demonstrate safety program success.
- Recognize metrics used by specific industries.
- Learn basic tools to use to develop leading indicators within your own organization

Traditional Indicators Used in Business

The keynote presentation from day one of the symposium was presented by Mr. Miles Ewing of Deloitte. Miles Ewing is a senior manager in the CFO Services practice of Deloitte Consulting LLP. Mr. Ewing stated that as a general rule, indicators can be categorized according to their predictive qualities:

Lagging indicators — Information that results from past events. For example, financial information is considered lagging because it's results-based and measured after the fact. It confirms the company's performance relative to its peers and expectations of investors. Lagging indicators tell management if the company's performance was good or poor.

Leading indicators — Information that has a predictive quality in that it measures current events highly correlated to the future results or that directly drive future results through cause-and-effect relationships. Leading indicators can actually guide management on how to do a better job.

Coincidental Indicators — Information on events that occur at approximately the same time as the conditions they signify. Using economic indicators as an example, personal income is a coincidental indicator for the economy; high personal income rates will coincide with a strong economy.

Symposium speaker Todd Hohn commented in his presentation that the success or failure of safety programs has typically been measured by indicators that take place after the fact and can be characterized by accidents, injury rates and costs associated with them. These are referred to as lagging or reactive indicators. The growing consensus among many safety professionals is that these lagging indicators, while important, do not truly reflect the health of the safety program. Many companies have sustained low incidence rates over a period of years; however, that in itself does not relate to exposures being effectively controlled. In fact, in the absence of loss, complacency may set in because companies are not actively addressing the issues that caused the losses to occur. That failure to actively manage exposures to loss can be small at first and magnify over time until the inevitable happens—a serious accident or, worse yet, a catastrophic event.

Mr. Hohn also found that in contrast, leading indicators relate to those steps or processes designed to prevent loss and, in some respects, have the added value of predicting that an incident or accident could happen if not addressed. Leading indicators are proactive by their very nature and provide the opportunity to monitor and assess the effectiveness of safety systems and processes, and also the overall health of a company's safety management system or its safety culture. Further, leading indicators can be used to benchmark current practices and can demonstrate continuous improvement over time when compared to the previous benchmark. When setting up a comprehensive program to control exposures to loss we can surmise that lagging indicators tend to be reactive, could be easily manipulated to achieve a desired outcome, and may provide a false sense of security -- especially when losses are low and there are no other metrics to compare to. In contrast, focusing solely on leading indicators alone without trending or correlating to losses may result in a lot of wasted time and effort. Mr. Hohn concludes

by suggesting that a model program should show cause and effect, in other words, the leading indicators can be measured and deemed successful by the outcomes achieved.

Mr. Ewing's keynote presentation attempted to present the need for selecting leading indicators of safety performance based on identifying "drivers" of the performance. He said that while the concept of leading indicators is easy enough to grasp, efforts to "peel the onion" on leading indicator drivers within an enterprise often can produce confusion, analysis paralysis, and delay. For example, customer satisfaction is a driver of repeat business and can be a leading indicator of future sales. Customer satisfaction is driven by many things, including product quality and call center response time. Each of these drivers in turn has its own drivers, e.g. product quality is driven by design, materials, supplier quality, etc. Consequently, there is almost always a preceding action that makes models overly complex and circular. Mr. Ewing concluded his keynote by stating that identifying leading indicators should be viewed as both a science and an art. The "science" aspect is measuring events that have a close correlation with the activity being measured. The "art" of identifying leading indicators is to know when to stop "peeling the onion."

Traditional Safety Metrics

Day two of the "Prove It" symposium on measuring safety performance began with a keynote presentation by Dr. Harold Resnick. Dr. Resnick was adamant about using metrics because as he put it, *"Without measurement there is no feedback, therefore no course corrections. No accountability, therefore no change. No objective analysis, therefore no improvement."* The question then becomes, "what metrics do we use to demonstrate and predict performance"?

Much has been written and presented on leading vs. lagging metrics over the past 15 years. The distinction between leading and lagging indicators may not be readily evident. Some safety scientists and practitioners suggest that the before and after metrics are really more of a continuum rather than two separate entities. Others (Hale, 2009) suggest that the distinction between leading and lagging is not that important. Aubrey Daniels stated in his presentation that incident rates, lost time rates, severity rates and other lagging indicators are poor measures of safety. *"Such measures tell us how many people got hurt and how badly, but they do not tell us how well a company is doing at preventing accidents and incidents."*

Linking Safety Indicators to Business Performance

Metrics for performance should not just be viewed from the SHE professional's point of view. The success of a safety program in the eyes of upper management and other stakeholders requires tying safety performance to overall organizational objectives. Robert Frank and Andy Wilmer of Maple Leaf Frozen Bakery commented in their presentation, "If available to the safety professional, many practitioners advocate incorporation of financial metrics such as workers' compensation costs, overall cost-of-risk (fixed plus loss costs), insurance premium dollars, and etc. should be included into the safety performance equation."

Mr. Ewing stated in his day one keynote presentation that managers constantly make decisions to better the performance of their businesses. Many of these decisions involve making investment or resource commitments designed to drive improved, long-term performance, and, for these, managers often rely on financial measures. By definition, financial measures are indications of outcomes — the results from past actions of the company, e.g., revenue earned, sales made, dollars spent — and may not be indicative of future performance.

Mr. Ewing found that the use of leading indicators was a strong metric needed by managers when making future investment decisions. He finds that given the limitations of using historical data to make forward-looking plans, many managers have become proponents of Balanced Scorecards, or methods of augmenting financial measures with benchmarks for performance in important non-financial areas such as safety management. Balanced Scorecard users can often fail to discern that the overall "balanced" metrics may be just as "backward-looking" as traditional types of financial information. The real challenge for managers is to identify those operational events that actually drive future performance, using what we call leading indicators.

Jeffery Camplin presented information at the symposium on how to demonstrate a return on investment with resources allocated for SH&E management. Mr. Camplin stated that for executives, a regular task is making decisions about major funding opportunities. Ultimately, an organization's CEO and board of directors will approve its entire budget, which often includes a line item for safety initiatives. These funding decisions are normally made on the basis of the demonstrated value of either previously budgeted allocations or the forecasted value of a requested allocation. When these details or performance metrics are unavailable, decisions are often made based on perceptions rather than hard data. Executives examine the value and costs of the function in the context of what is planned for the future. They try to reach a conclusion as to whether or not the budget request fits their value definition or perception. When data in the form of performance metrics is unavailable, the executives take leaps of faith that the investment level is appropriate. Therefore, the SH&E professional must learn to identify those performance metrics that organizational decision makers can appropriate resources for program success.

In his keynote, Mr. Ewing presented an overview of how the SH&E profession can select leading indicators of safety performance that tie into overall organization objectives and goals. From his perspective, Mr. Ewing finds leading indicators can be identified through understanding the cause-and-effect relationship between operational business drivers and the performance to be measured. Although these drivers are usually financial, the SH&E professional has the challenge of selecting performance metrics that tie back to business drivers (whether financial or not). Effectively incorporating this information into performance management processes, including strategic planning, budgeting, forecasting, and analysis, can enhance management's ability to analyze and effectively direct investment. Further, it can provide a strong basis for investor relations to communicate to Wall Street a clear story on growth and guidance.

Developing Leading Indicators for Safety Performance

Mr. Camplin stressed the importance of selecting performance metrics that demonstrate value to organizational decision makers in his symposium session. He stated that it is crucial that safety programs have enough data to show executives that they are delivering credible value if funds are continue to flow in their direction. This is particularly true in tough economic times when the allocation of scarce resources is even more challenging as budgets tighten. Developing an understanding of value is particularly important for safety and safety training because the output of the group tends to be intangible and difficult to measure in hard dollars. Yet the costs associated with safety training are very tangible and visible.

Unfortunately, research finds that the SH&E professional struggles with linking safety performance metrics to the achievement of the organization's strategic goals. Mr. Camplin provided an overview of the American Society of Safety Engineers' (ASSE) Value of the Safety Profession initiative which has three main areas of focus: repositioning safety, repositioning the safety professional, and preparing the safety professional to be the "value-add" employee. Part of this initiative was a survey of various organizational decision makers on the value of the safety professional to their organization. The survey found that too many hiring professionals and other business professionals still do not understand what safety professionals do or the value they add to an organization. They also believe that safety professionals are too technically focused and these technical skills are under-valued by the organization.

One goal of the symposium was to provide attendees and the greater SH&E professions with the perspective of what metrics organizational decision makers require for allocating resources or investments that achieve organizational goals. A workshop was conducted in the afternoon of day one of the symposium to introduce these concepts to participants. The objective of the workshop was to help attendees apply the process for selecting the right leading indicators presented by Miles Ewing in his keynote presentation. Participants would identify those business drivers of their organization and corresponding leading indicators that link to safety performance. Mr. Ewing began this session with a short presentation reviewing the process for selecting the right leading indicators.

Key Characteristics of Indicators



Figure 1. Miles Ewing keynote on Identifying Key Characteristics of Performance Indicators

Attendees were broken into several tables to create feedback on sound leading indicators of safety performance. Workshop attendees were asked the following:

1. Discuss how members of their table would apply the process presented by Miles Ewing to develop safety-specific leading indicators that are tied to business objectives;
2. Provide suggested safety-specific leading indicator from each participant including the reason why that metric was selected;
3. Identify how the metrics from these leading indicators will bring value to their organizations.

The work product of the exercise was collected by ASSE staff. Insight from this day one symposium workshop work product was mixed. It was clear that the 240+ attendees were having

difficulty understanding how safety performance linked directly or indirectly to overall business objectives. This insight supports quite a bit of existing research that finds the typical SH&E professional does not talk the language of business with performance metrics organizational decision makers understand. The workshop did find that many participants understand metrics for demonstrating safety performance in terms of identifying hazards, associated risks, and abatement of those risks (i.e. reducing incidents and injuries and/or their severity). However, participants had difficulty developing metrics that show the risk abatement strategies contributed to overall business goals.

An overview of responses from the workshop is as follows:

Question 1: How would you apply the process learned this morning for selection of the right leading indicators to the identification of safety-specific leading indicators?

A few of the workshop tables discussed looking at SH&E performance metrics that impact organizational goals in a meaningful way to decision makers. In other words, SH&E professionals are good at generating facts about safety performance but leave organizational stakeholders thinking “so what”. The best insight from the workgroup was to be clear on the organizational goals of the unit or business. Some of the broader ideas for selecting meaningful performance indicators included looking for SH&E metrics that directly or indirectly reduce costs, contribute to profits, increase efficiencies, protect or enhance the organizations image, improve organizational culture, ensure regulatory compliance, improved quality, addresses social responsibility, and promotes organizational sustainability.

Question 2: Suggest safety-specific leading indicators and the reason they were chosen

Participants really struggled with identifying the safety-specific metrics that would link to organizational goals. The inability of participants to identify metrics that demonstrate a positive impact on business goals indicates a need for further research on this topic to improve the value of the safety professional. One of the best comments by the workgroup was to study best-practices from successful organizations. The ASSE Executive Summit at the last few Professional Development Conferences has presented several top executives who “get safety”. These leaders can and have provided great insight into how safety has a positive relationship to organizational goals. Unfortunately, most of the participants in the workshop could not see safety from the perspective of organizational leaders and decision makers.

Some metrics that were closer to supporting organizational goals were identified by a few participants in the workshop. One group recommended identifying metrics associated with increasing employee engagement in the job that drive productivity. Specific indicators that might be considered include results of job observations and job safety analysis, correcting audit findings in a timely manner, and tracking the quality and effectiveness of employee training towards impacting the organization’s bottom-line.

Question 3: How will these safety-specific leading indicators bring value to your organization?

The workshop results for this question did indicate that the SH&E professional understands that safety does impact on the performance of an organization. However the responses by participants indicated that the SH&E professional can’t make the connection to supporting organizational goals. Some of the values listed by participants included increase organizational image, reduce regulatory citations, reduction in medical and insurance costs, a demonstrated return on investment for training and equipment, increased production, increased profitability, ability to qualify with customers/clients with SH&E requirements, improve organizational culture, maintain the supply chain, and better awareness by top management of the value of safety.

The workshop was a great exercise to begin engaging the SH&E profession to think outside of the box on how safety provides value to an organization. More importantly, it opened the eyes of participants to the fact that we may not be prepared with the metrics to ***Prove it!***



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Professional Safety Journal Asks Miles Ewing

PS: Why are leading indicators so important?

ME: Leading indicators are more valuable because they provide insight into future events you are trying to forecast where history may not. A simple sports example illustrates how leading indicators can facilitate the prediction of future performance. If you look at the forecast of a baseball game knowing things about the team in advance can help you. Knowledge of player injuries and the capability of a starting pitcher, for example, are leading indicators and reveal a great deal more about the possible outcome of a game than their win/loss record.

PS: You say that the "art" of identifying leading indicators is to know when to stop "peeling the onion." Can you explain this in more detail please?

ME: You start thinking about drivers. What is the driver of a new sale? Well, it's someone walking into the store. Why? Because he or she saw a sign. Was it the placement of the sign? Or is it because of something else? There's an infinite string you can follow if you keep asking "why". If you have ever peeled an onion, you know that you can keep removing layers until there is nothing left. With drivers, like the onion, you have to figure out when to stop and find the most relevant thing.

PS: Do you think that lagging indicators are necessary to determine trends before using leading indicators?

ME: I wouldn't say lagging indicators are necessary. I think history is a valuable guide to identifying leading indicators. For example, you can use history to identify the relationship between a given leading indicator and performance.

PS: So what does historical performance tell us?

ME: You can ask yourself what the trend in this metric was and what impact did it have on financials? Then we can look at that metric in advance. You know your lead volume well before you know your revenue. With leads, we can forecast what the revenue is going to be based on that.

PS: Can you think of a way you would apply this to safety performance?

ME: Yes, I believe so. I would begin with looking at past performance to identify those metrics which seem to be correlated with safety incidents. Then model the relationship to be used as a forecast method for safety incidents based on the leading indicator. An example might be turnover rate. You may discover that you have an increase in accidents with increased turnover. I would want to look back at my hiring trends by a given department and look back at my safety learning curve: How much does a rookie screw up? What happens if I change out the manager instead of the staff? Can I forecast if I'm going to do a major hiring spree? What do I forecast my safety incidents are going to be based on this plan? You have to monitor to begin to develop your leading indicators. If you're not measuring stuff, it's hard to figure out what is actually happening.

PS: How can an SH&E manager use these indicators to gain management buy-in, commitment and support?

ME: My impression is that management buy-in and support is often best gained via trends and measurement. The ability to present data and to show trends and improvement is how you get management involved. Then you can educate in a way they understand and can take action on. If a trend is a high turnover, you plan for it and you put it in the forecast. It's almost always about being able to make something measurable. The trick often is to go find things that are already measured such as turnover for new hires, then you want to understand what the impact of those decisions are on your safety metrics.

PS: You are involved with integrated performance management. Can you explain what this entails and how an SH&E professional might apply these concepts to safety performance?

ME: Integrated Performance Management (IPM) is the process of identifying metrics that best measure the alignment of the organization's actions to management's strategic objectives, setting targets for those metrics and directing resources to support performance against them. In the case of safety, IPM would presumably work in a similar fashion. The organization would look for metrics that help align the organization to its goals, set targets, measure and direct resources to performance against the metrics. One of the things that may be newer for safety is the quest for leading indicators to help better manage against targets. Leading indicators are helpful because they allow management to take action to effect eventual results.

Figure 2. Interview with Keynote Speaker Miles Ewing in *Professional Safety Journal*.

Leading Indicators for Use by Safety Professionals

Another main goal of the symposium was to assist participants in learning to develop leading indicators of effective safety performance, described by Dr. John Howard, Director of NIOSH as “the next frontier in our efforts to provide a safer workplace”. The symposium taskforce found that the use of leading indicators will help the SH&E profession identify the risk attributes within organizations by moving away from counting lagging indicators to assessing leading indicators that predict safety performance.

Identifying leading indicators may seem overwhelming. However, symposium presenter Dr. Chuck Pettinger stated that if leading indicators are viewed as activities, behaviors or processes that contribute to a positive safety culture, then the only question becomes, which ones do we choose? This sentiment was aligned with the keynote presentation by Dr. Harold Resnick on the second day of the symposium. Dr. Pettinger found that by looking at leading indicators as cultural proxies, this gives better direction to the safety professional. A proxy can be defined as an “authorized substitution”. When we speak of cultural proxies, these may refer to safety-related behaviors, compliance to rules, training activities, safety processes, VPs walking the shop floor, executives attending team meetings and/or monthly safety communications. Thus, when accurately measured, these proxies, or leading indicators, can paint a picture of how strong your organization’s safety culture is.

So if we are indeed going to take the time to create leading indicators of safety then we should take the time to make those metrics meaningful and impactful. Symposium presenter Aubrey Daniels provided the following criteria he finds helpful in guiding you toward better safety metrics. According to Mr. Daniels, leading indicators should:

- Allow you to see small improvements in performance
- Measure the positive: what people are doing versus failing to do
- Enable frequent feedback to all stakeholders
- Be credible to performers
- Be predictive
- Increase constructive problem-solving around safety
- Make it clear what needs to be done to get better
- Track Impact versus Intention

Mr. Daniels finds this last criterion very important stating, “Always ask yourself: what are we trying to accomplish with this component of our safety system? Then ask if your metric is assessing whether you accomplish what you set out to do. Are you measuring the impact or just the good intention?”

Vital Behaviors as Leading Indicators

Day two of the symposium kicked off with a keynote presentation by Dr. Harold Resnick. During his thirty-five years in organizational development, Dr. Resnick has earned international recognition as a leading authority and innovator in organizational transformation and leadership development. Dr. Resnick communicated to attendees that leading indicators are the things that we can observe and then measure in some fashion to help us predict the likelihood of future events. He found that leading indicators can be developed against three categories:

- Attitudes/values/feelings – and how they are manifested in words and behavior

- Behaviors – as demonstrated through activities that people do or do not do
- Events

Leading indicators measure BEHAVIORS that demonstrate whether we are doing the right things to prevent or avoid safety issues including taking positive actions. Dr. Resnick has found that it is the vital behaviors that should be focused on. Vital behaviors are those behaviors that we believe will drive the desired outcome or result – in our case, driving the organization to a safety record with zero accidents or incidents.

Culture drives behavior in an organization more than any other single factor. Therefore, Dr. Resnick presented information on how to align the organizational culture to influence those vital behaviors used as leading indicators (see Figure 3 below).

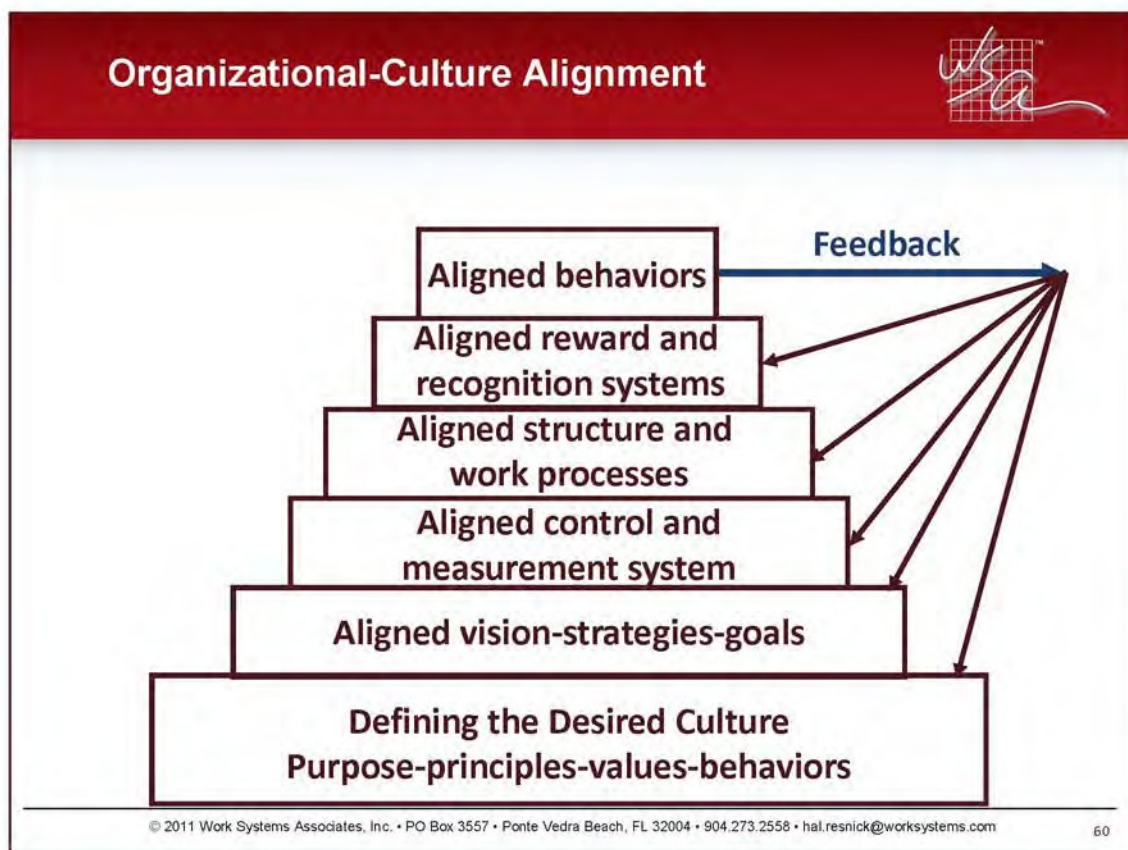


Figure 3. Keynote from Dr. Harold Resnick on Aligning Organizational Culture to Influence Vital Behaviors

Dr. Resnick also presented some definitions of what he considered leading indicators of the vital behaviors of a safety culture:

1. Senior management behavior
 - Time and placement for safety on the executive agenda
 - Senior management words and value statements
 - Senior management reactions to safety data

- Senior management reaction to incidents
2. Management behavior
 - Management words and actions
 - Safety goals are set for management
 - Management reaction to data and incidents
 - Whether shortcuts are allowed
 - Whether time or schedule pressures are allowed to override safety procedures
 3. Safety goals are driven down through the organization
 4. Corporate cultural representation
 - Safety is built into the vision, mission or value statements
 5. Safety is built into the measurement and control system
 - At the corporate or organizational level
 - Built into the Balanced Scorecard or dashboard
 - Driven down into management goals and the performance management system
 6. Safety accountability
 - Line managers are personally held accountable for safety
 - Consequences are implemented for failing to implement preventive safety actions
 - Recognition and reward is provided for high safety performance
 7. Policies and procedures
 - There is clarity and completeness of corporate safety policies
 - Completeness of safety processes and procedures
 - Conformance to safety procedures
 8. Investment
 - Investment in infrastructure and tools required to ensure safe work
 - Relentless investment in training
 - Investment in reinforcing communications
 9. A culture of candor

- Safety incidents and near misses are reported and corrective action taken
- Employees at all levels are encouraged and rewarded for speaking up to the organization when they see potential safety issues
- Employees at all levels are encouraged and rewarded for speaking across the organization as well

Dr. Resnick concluded his keynote presentation with a discussion of how to implement those leading indicators that influence safety performance. His five step implementation framework is as follows:

1. Step One – Identify the leading indicator VITAL BEHAVIORS

- What are the vital behaviors based on positive deviance?
- What are the activities that drive those vital behaviors?
- How do you build support mechanisms at all three levels to reinforce those vital behaviors on a personal, social, and structural level?

2. Step Two – Establish the MEASURES to indicate the degree to which these leading indicators vital behaviors are occurring

3. Step Three – Identify the leading indicator attributes of the SAFETY CULTURE that will support these vital behaviors

4. Step Four – Establish the MEASURES for these cultural attributes

5. Step Five – Establish ongoing monitoring/feedback systems for leading behaviors

After lunch of day two of the symposium Dr. Resnick facilitated a workshop on developing industry specific leading indicators. Various processes for selecting the right leading indicators and using these metrics had been presented in the symposium. It was our goal to take advantage of the opportunity to accomplish something unique and that is producing a list of industry- specific leading indicators. Attendees were broken into several tables to create feedback on sound leading indicators of safety performance. Workshop attendees were asked to discuss and document the following:

1. Approaches to selecting leading indicators presented at the symposium
2. The metrics that would be most valued by their industry

The goal of the workshop was to have each table (broken down by industry) to suggest at least three industry-specific leading indicators, the reasons why those metrics were selected, and how the metrics from these leading indicators will bring value to their industry.

Participation and discussions were vigorous during this exercise. Dr. Resnick circulated amongst the industry tables to offer insight and advice to each group. Some of the industry- specific metrics identified during the workshop included:

Table: **Construction**

Most Appropriate Indicators

Physical hazards

- 80% of open issues corrected within 48 hours
- Setting of minimum # of inspection/observation
- Measurement on the #of interventions

- Prequalifications of subcontractors
 - 100% of subcontractors qualify for a project
 - Assessment process in place/achievement of compliance

- Pre-task analysis (prior to start of project)
 - 100% completion by all subcontractors and vendors
 - Quality assessment – after subcontractor plan in use one month on project

- Rework to determine if it is occurring and determine the hours and type of rework
- Daily retask meetings – are they being conducted?
- Hiring metrics
 - Work in progress
 - Backlog
 - Quotes

Why Valued by the Industry

- Identify and correct unsafe conditions before an accident occurs
 - Ensure the safety contractor is the one hired for the project
 - Ensure hazards and work practices for the contracted work is understood and managed through training, education and engineering of the exposure
 - Rework - % putting employees at higher risk (not planned/higher hazard)
 - Addressing the work and physical hazards expected to be encountered on that particular day
 - Help identify training needs for the company and preparation for hazards to be countered
-

Table: **Oil and Gas**

Most Appropriate Indicators:

Put culture in place to support focusing on leading indicators and not just lagging indicators

1. How often does the company work outside own “procedures” especially with short-term or emergency “contracts” to protect the company’s reputation resulting in issue variances against own procedures/non-conform
2. Executive management/senior management inspections/contact in field (specific criteria) should positively affect lagging indicators include LTI, TRR, etc. Should be held accountable by workforce – what would you like to see done by executives? What should your boss be doing?

Selecting Indicators:

- Look at cross sections of industries – distribution, construction, extraction, transport
- Engage line employees; what’s important to them rather than top-down approach
- Fit indicators for specific company, not just industry – what’s valuable; customization

- System and culture of organization and industry will drive to assess and focus on leading/lagging indicators – where is management system in relation to analyzing/interpreting/implementing data
- Industry rates, sub-contractors, etc. still on lagging indicators as well, “punishes” them for arbitrary number
- Metric must be meaningful and achieve a goal; limited to no manipulation

Why Valued by the Industry

- Meaningful and actively works toward achieving goals
- Specific to industry and can be applied to different areas of industry while being valuable and informative opportunities to tailor indicators to company requirements
- Standardization for training could be useful and possible next step especially for contractors working in all aspects of industry

Table: **Chemical and Pharmaceutical Mfg.**

Most Appropriate Indicators:

- Vital behaviors – follow procedures, speak up, listen up, take actions
- Industry-specific risks
 - Line and equipment opening – improve activities, develop, train, use procedures for opening, use pressurized systems –
 - Fire or explosion from chemical manufacturing using flammables - activity : all program elements associated with PSM
 - Serious injury or fatality from confined spaces, falls, lockout/tagout, - activities: permits and procedures
 - Exposure to potent, toxic compounds – activities: risk assessment and exposure control plans
 - Musculoskeletal injuries – activities: all program elements, ergonomics

Why Valued by the Industry:

The above steps will help manage the high risks associated with the chemical and pharmaceutical industry and result in:

- Competitive advantage
- Productivity/up-time
- Workers’ compensation cost reduction
- Supply chain reliability and integrity
- Business continuity, cycle time and reliability of R&D and manufacturing

Maximize return on investment in highly skilled employees

Conclusion

The symposium on safety performance metrics was well attended with over 230 participants. The keynote speakers on both days were supplemented by a number of sessions that provided a framework for developing metrics to: a) communicate the value of safety to organizational goals, and; b) develop metrics of vital behaviors that positively influence safety performance. The two workshops identified the SH&E professions inability to define metrics that are recognized by organizational leaders and decision makers that demonstrate safety as helping to achieve organizational goals. We look forward to the challenge of examining this issue further with a follow-up symposium down the road.

Appendix A: General Information on the Symposium

PROVE IT!

MEASURING SAFETY PERFORMANCE



SYMPOSIUM

November 17-18, 2011 | Hyatt Regency | Cambridge, MA



Demonstrate the performance of your safety program and the value of safety. This symposium will show you how and the rewards are great. Join us to:

- Develop leading indicators specific to safety
- Learn what and how to measure
- Use metrics to improve safety performance



PROVE IT!

MEASURING SAFETY PERFORMANCE



SYMPOSIUM

Develop leading indicators
specific to safety



Learn what and how
to measure



Use metrics to improve
safety performance

Learn to:

- Produce leading indicators customized to evaluate safety performance
- Use metrics and analytics to improve safety in your workplace
- Integrate safety leading indicators with your organization's performance goals
- Prepare and deliver safety program performance reports most appropriate for your senior management

HIGHLIGHTS

- Miles Ewing, Principle of Deloitte Consulting will show you how to construct high-quality leading indicators specific to safety
- Dr. Harold S. Resnick, recognized authority and innovator in organizational transformation will present a process for using the safety knowledge you capture through performance measurement tools to make that data work for safety
- Take away ideas, examples and strategies on performance measurement with emphasis on developing leading indicators specific to safety
- Gain insight from authorities on measuring performance for the greater success of your safety management systems and your organization
- Participate in an effort to standardize leading indicators for your industry and benchmark safety experience with others in similar organizations

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Keynote Presentation

Thursday, November 17

Developing Leading Indicators: It Can Be Done!

All organizations want to demonstrate to various stakeholders that proactive safety management efforts have positive results. Using metrics resulting from leading indicators will point you in the direction of this success. However, safety professionals have traditionally relied upon lagging indicators produced after the fact to measure the success of their safety programs. The perception of the coveted leading indicators for forecasting or predicting the success of investments in safety seems as easy as winning the lottery. It's a struggle! Miles Ewing, Principal of Deloitte Consulting has an approach that will stand up to the challenge.

Utilizing the science and art of developing leading indicators, Mr. Ewing has applied both to develop an approach to help identify high-quality predictive information. He will take you through this process resulting in a framework for you to use in, first, developing generic leading indicators to learn the process. Then he will then guide you through tailoring these leading indicators for safety to produce the metrics that can give you a more accurate forecast for your programs.

Miles Ewing
Principal, Deloitte Consulting LLP
Seattle, WA

General Session Presentation

Friday, November 18

Performance Measurement: Taking Control of What Lies Ahead

With the abundance of metrics from high-quality leading indicators you will learn at this symposium, you will develop the ability to create meaningful insight into what was previously the unexpected. This knowledge can help you develop programs that can reduce the probabilities of potential safety incidents, anticipate more reliable outcomes, demonstrate the value of your safety system initiatives, and execute a performance measurement tracking system that can take your safety efforts to the next level.

Dr. Harold S. Resnick, recognized authority and innovator in organizational transformation will present a process for using the safety knowledge you capture through performance measurement tools to make that data work to improve safety in your organization.

Harold S. Resnick, Ed. D.
CEO
Work Systems Associates
Ponte Vedra Beach, FL



CONCURRENT-SESSIONS

Work Group Activity

Thursday, November 17

Developing Safety-Specific Leading Indicators

In the keynote presentation by Miles Ewing, you will learn a process for identifying high-quality leading indicators.

In this roundtable workshop, Mr. Ewing will follow on his presentation to facilitate using his process to develop leading indicators that are effective in achieving a more accurate safety forecast.

Round I:

Developing Leading Indicators

1. Analytics: A New Approach to Performance Measurement

Safety analytics is an emerging science that can drive improvements not only in workforce safety and health programs, but also in overall business performance. Today's software solutions and systems have simplified the gathering, analysis and reporting of increasing amounts and types of data, enabling you to create leading indicators of your organization's risks. In this session, you will learn how to access the information needed for these analytics, how to develop these metrics and the benefits experienced by companies that use them.

Todd Hohn, CSP

Vice President of Strategic Resources
PureSafety, Franklin, TN

Dave Duden

Director
Deloitte, Hartford, CT

2. Using Safety Audits as a Leading Indicator

While safety audits are a required task, there is a side benefit to this effort – the results provide a body of knowledge for the development of leading indicators. Learn how the Boston Globe implemented a system using safety audit data and how this system is operating today to reduce their organization's total recordable and lost-time injuries by 80%, resulting in multi-million dollar savings.

Anthony R. Schiavi MBA, CSP, PE, ARM

Director, Safety and Environmental Affairs
Boston Globe, Boston, MA

3. Developing Leading Indicators at Suncor Energy

Safety is the only profession that measures success based on how little we have failed. Typical lagging metrics such as total injury frequency, recordable injuries and injury severity too often drive safety goals and cause us to change operational focus from injury prevention to injury classification management. Leading indicators can take us to a more proactive position in safety management. Learn about the successful transformation to safety management by leading indicators within In Situ Drilling, Completions and Logistics at Suncor Energy.

Martin Mudryk CRSP, RPF

HSE Supervisor
Suncor Energy; In Situ Drilling, Completions & Logistics
Calgary, AL Canada



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Thursday, November 17

4. Leading Indicators: The Golden Eggs

Many companies search for true leading indicators, essential for moving safety cultures from good to great. Much leading indicator data is gathered from inspections/observations, however, organizations often struggle to produce quality leading indicators from this effort. You will find the 'golden eggs' through a case study and statistical research on over 100 million observations. This will help provide a gauge of your safety culture and ultimately may help predict your next incident.

Chuck Pettinger Ph.D.
Implementation & Change Manager
Predictive Solutions (formerly DBO2),
Blacksburg, VA

Round II:

What/How to Measure

5. Are You Tracking the Right Indicators?

While leading indicators can produce metrics that enable a more proactive vision for safety management, not all leading indicators will produce this result. You need to select and measure the actions that produce the best evidence of a safer workplace. In this session, you will learn criteria that will help you determine what to measure to provide the most accurate picture of the results of your safety efforts. As a takeaway, you will receive ideas for effective measures and measurement tools that will support proactive safety management.

Aubrey Daniels and Judy Agnew
Founder (Daniels)
Sr. Vice President of Safety Solutions (Agnew)
Aubrey Daniels International
Atlanta, GA

6. A Special Metric to Manage Serious Injuries and Fatalities

Many organizations improve their occupational injury rates while, at the same time, experience level or even increasing numbers of fatalities and serious injuries (SIF). Traditional thinking suggests this should not happen. To more effectively manage SIF, you need to be able to measure your organization's exposure to these types of incidents. Join this session to learn how to create a new metric – the Potential SIF – that will enable you

to classify your SIF risks and tailor your safety efforts to focus on these exposures. You will take away a classification tool to assist you in developing this metric.

R. Scott Stricoff CSP
President
BST, Ojai, CA

7. Don't Leave Management Guessing About Safety Training Results

Training is often relied upon by organizations to achieve regulatory compliance and improve the overall safety at the workplace. Top executives shape the nature, scope, and extent of safety management and related training in an organization and, very importantly, provide the funding. Therefore, it is critical that the return on their investment be presented to them in a manner that meets their expectations. In this session, you will learn how top management views typical safety training metrics and steps you can take to improve these metrics to assure continued support of your efforts.

Jeffery Camplin MS, CSP, CPEA
President
Camplin Environmental Services, Inc.
Rosemont, IL

8. The Chemtura Dashboard

The Chemtura Corporation has created a data accumulation system where all global sites enter their monthly SH&E information into an Excel spreadsheet on a corporate SharePoint portal. The information is then automatically reconfigured into a single spreadsheet which is uploaded into Crystal Reports to create a monthly dashboard. Using this tool, Chemtura SH&E staff are experiencing improved performance. Attendees at this session will learn the process for developing a similar dashboard and have a very powerful tool to analyze SH&E data.

Robert Franko
Corporate Director, Health, Safety and Security
Chemtura
Middlebury, CT

SCHEDULE

Thursday, November 17

8:15-8:30AM	Opening Remarks
8:30-9:30AM	Keynote Presentation <i>Developing Leading Indicators: It Can Be Done!</i>
9:30-9:45AM	Break
9:45-10:45AM	Concurrent Sessions Round I <i>Developing Leading Indicators</i> <ol style="list-style-type: none">1. Analytics: A New Approach to Performance Measurement2. Using Safety Audits as a Leading Indicator3. Developing Leading Indicators at Suncor Energy4. Leading Indicators: The Golden Eggs
10:55 -11:55AM	Concurrent Sessions (Repeat Round I Sessions)
12:00 -1:00PM	Luncheon
1:00-2:00PM	Work Group Activity <i>Developing Safety-Specific Leading Indicators</i>
2:10-3:10PM	Concurrent Sessions Round II <i>What/How to Measure</i> <ol style="list-style-type: none">5. Are You Tracking the Right Indicators?6. A Special Metric to Manage Serious Injuries and Fatalities7. Don't Leave Management Guessing About Safety Training Results8. The Chemtura Dashboard
3:10-3:30PM	Break
3:30-4:30PM	Concurrent Sessions (Repeat Round II Sessions)



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Friday, November 18

- 8:15-8:30AM **Recap/Overview**
- 8:30-9:30AM **General Session Presentation**
***Performance Measurement:
Taking Control of What Lies Ahead***
- 9:30-9:45AM **Break**
- 9:45-10:45AM **Concurrent Sessions Round III**
Using Metrics to Improve Safety Performance
- 9. Using Safety Leading Indicators to Predict Safety Lagging Indicator Performance
 - 10. The Balanced Scorecard: A Powerful Tool for Risk Management
 - 11. Making Metrics Work
 - 12. The Business Case for Safety
- 10:55-11:55AM **Concurrent Sessions**
(Repeat Round III Sessions)
- 12:00-1:00PM **Luncheon**
- 1:00-2:15PM **Work Group Activity**
***Taking the Lead in Developing
Industry-Specific Leading Indicators***
- 2:15-2:30PM **Break**
- 2:30-3:30PM **Concurrent Sessions Round IV**
Using Metrics to Improve Safety Performance
- 13. Getting the Right Things Done
 - 14. Using Readily-Customizable Software for Managing Performance Data
 - 15. Putting Performance Measurement Tools to Work at Maple Leaf Foods



Work Group Activity

Friday, November 18

Taking the Lead in Developing Industry-Specific Leading Indicators

At this symposium, you will be accumulating proven techniques to identify meaningful data that will help you to better manage safety and prove the value of safety to your organization. Adding another dimension to your efforts, at this roundtable session, Dr. Harold Resnick will facilitate you and your industry peers in developing measurement tools that can be applied specifically to your organization's industry.

CONCURRENT-SESSIONS

Rounds III and IV: Using Metrics to Improve Safety Performance

9. Using Safety Leading Indicators to Predict Safety Lagging Indicator Performance

Just as medical symptoms predict illness and meteorological conditions predict weather, safety leading indicators such as near misses, unsafe acts or unstable environmental conditions can be used to predict safety lagging indicator performance. This is not a typical scenario for the use of leading indicators, but can provide another dimension of insight for proactivity before an incident or accident occurs.

V J Marchesani Ph.D.
Senior Associate
Topf Initiatives, Bonita Springs, FL

10. The Balanced Scorecard: A Powerful Tool for Risk Management

The Balanced Scorecard concept, from Kaplan and Norton, Harvard 1992, is used widely by many organizations as a more integrated system of performance measures. Valuable insight can be gained when applying this concept to potential leading SH&E metrics. In this session, you will learn how this process was implemented by a Fortune 500 company, integrating elements of OHSAS 18000 and ANSI Z-10 to define, design and measure risk management. You will take away a copy of the scorecard used by this organization.

Paul Esposito CIH, CSP
Vice President
ESIS HSE Consulting, Annapolis, MD

11. Making Metrics Work

To emerge from the recession, many companies were forced to scale back on sacred cows, including health and safety. In these difficult times, safety employed LEAN Manufacturing, Kaizen, DMAIC processes, Kepner-Tregoe problem solving and other tools to increase efficiency and eliminate waste. All of these programs have presented the safety professional with a lot of good and bad metrics to digest. In this session, you will learn how to best use the predictive information from these programs, with LEAN Manufacturing as the example, to maximize safety efforts.

Paul English ASP
EHS Manager
E-ONE, Inc., Ocala, FL

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Friday, November 18

12. The Business Case for Safety

Is safety more important than schedule and budget? If you answered yes, you have already established an obstacle to implementation of a more successful safety program. A key to improving safety can be how you evaluate the results of your management systems for integration of safety to your organization's business goals. Learn how companies that have taken these steps are extraordinarily successful.

Garrett Burke CSP

EH&S Associate Director, Instructor Harvard School of Public Health
Harvard University, Cambridge, MA

13. Getting the Right Things Done

When you have the right leading indicators, you are halfway there. You have a powerful tool, but the next step is to use it to produce meaningful results. In this session, you will receive the 4 Quadrants, a tool to help you drill deeper beyond the obvious for unfolding systemic problems and solutions, and apply them to your metrics toward the optimization of quality for your safety and health program.

Covena K Hilford CSP, CRSP

EHS North America Division
ABB Inc., Raleigh, NC

14. Using Readily-Customizable So—ware for Managing Performance Data

Several enterprise-wide systems are available to manage safety data. While these systems may be designed for specific tasks including the accumulation and analysis of safety metrics, they may present a challenge as they are not easily customized to fit your organization's needs and changes may require upcharges. For some organizations, better results are achieved through the use of readily-customizable software for maintenance of a safety management system such as those that are Microsoft-based (i.e., SharePoint, InfoPath and Excel). In this session, you will learn how to make this happen.

Steve Skipper and Glen Bianchi

Senior Project Managers
EnSafe Inc., Knoxville, TN

15. Putting Performance Measurement Tools to Work at Maple Leaf Foods

By incorporating leading indicators and other performance measurement tools, Maple Leaf Foods, USA, a manufacturing organization, achieved sustained improvement in safety performance. Learn how the front-line supervisors and management use upstream metrics to evaluate their efforts to reduce workplace accidents and strengthen their overall commitment to the organization's safety programs. You will take away a flash drive containing the tools and templates used for performance measurement in this organization including supervisor safety scorecards, a safety business plan, balanced scorecard models and references to guides on leading indicators.

Robert (Bob) Frank CSP, CPEA

Director Safety & Risk Management
Maple Leaf Foods, Des Plaines, IL



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Whenever possible, arrangements will be made for physically challenged registrants provided ASSE receives 45 days advance notice. Please write a letter of explanation, your name and phone number, and attach to the registration form. ASSE will contact you.

CORPORATE PRIME TIME

This is a special program for companies wishing to have a tailored private education program for their employees before or after the symposium. Companies bringing 10 or more employees to this symposium will receive discounted registration fees when they also contract for a private seminar under the Corporate Prime Time program. Please contact +01.847.768.3429 for more information.



Appendix B: Resources Provided by Symposium Speakers

Sources of Information

1. *Guidance on the Use of Positive Performance Indicators*, November 2005
Australian Government, Dept. of Employment and Workplace Relations
Link: <http://www.safeworkaustralia.gov.au>
43 page pdf:
http://www.safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/150/GuidanceOnUseOfPPIs_2005_PDF.pdf
Comments: provides information on what health and safety performance is, for what purposes it is measured, and how PPIs can be used to drive and monitor improvements in the management of health and safety at work.
2. *Indicators of Safety Culture – Selection and Utilization of Leading Safety Performance Indicators*, March 2010
Swedish Radiation Safety Authority
Link: <http://www.stralsakerhetsmyndigheten.se/Publikationer/Rapport/Sakerhat-vidkarnkraftverken/2010/201007>
72 page pdf: <http://www.stralsakerhetsmyndigheten.se/Global/Publikationer/Rapport/Sakerhet-vidkarnkraftverken/2010/SSM-Rapport-2010-07.pdf>
Comments: Overview of the selection and effects of leading safety indicators for the nuclear safety domain.
3. *Measuring Health & Safety Performance*, 2010
Jerome E. Spear, CSP, CIH
Link: http://www.jespear.com/articles/10-01-article-safety_metrics.pdf
6 page pdf
4. *Leading Indicators Best Practice Presentation*, May 2004
Construction Owners Association of Alberta
Link: <http://coaa.ab.ca/Safety/CompletedInitiatives/LeadingIndicators.aspx>
5. *Indicators of Performance in Safety Management*, Date unknown
Neil Budworth BSc MSc MRSC Cchem AMIEMgt FIOSH RSP
Link: <http://www.governancetoday.com/Exchange/Features/papers/INDPERH.doc>
6. *Safety Metrics – Tools & Techniques for Measuring Safety Performance*, 2003
Author: Christopher Janicak, Ph.D., CSP, ARM is a Professor of Safety and Graduate Program Coordinator at Indiana University of Pennsylvania, Department of Safety Sciences
Link: <https://www.asse.org/cartpage.php?link=11018>
7. *Performance Metrics – Leading Indicators Deliver Sustainable Results*, July 2009
ASSE Safety 2009, San Antonio. Session 612
Link: <http://www.onepetro.org/mslib/servlet/onepetropreview?id=ASSE-09-612&soc=ASSE&speAppNameCookie=ONEPETRO>
8. *Setting Strategic Objectives and Measurement Plans Using the Balanced Scorecard* June 2001
ASSE 2001 PDC, Anaheim. Session 611
Link: <http://www.onepetro.org/mslib/servlet/onepetropreview?id=ASSE-01-611&soc=ASSE&speAppNameCookie=ONEPETRO>
9. Proceedings of ASSE’s “*Measuring Performance for Safety Success Symposium*”
March 29 – 30, 2007, Costa Mesa, CA
10. *ORC Worldwide* (now Mercer)
Occupational Safety & Health Group
Link: <http://orc-dc.com/>