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Predicting, Preventing & Eliminating: The 4 Safety Truths from your Inspections, Audits & Observations"

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Introduction

To increase competitiveness, 83% of CIOs have visionary plans that include business intelligence and analytics. (The Essential CIO, IBM 2011)

Business intelligence and analytics will be a part of everyone's jobs, if it is not already. And, there is no other area in organizations that could benefit more from using business intelligence, than our safety departments. The safety field collects a plethora of safety intelligence from training records to safety observations. Unfortunately, this critical safety intelligence is often not used, miss-used, or just plain ignored.

How do organizations assess their safety performance? If one were to ask a safety professional how safe of a company do they have, they typically would respond "Pretty safe". If one were to ask their employees this question, how would they respond? Most likely, the employee would respond by quoting one of many "safety" statistics that have been tracked for generations by organizations and our government (NSC, 1955). Too often, organizations assess their safety performance solely on lagging indicators like recordable rate, total recordable rate, lost workday rate, DART rate, EMR, and fatalities to name a few (BLS, 2012). But, do these numbers assess how safe of an organization we have? These lagging indicators might tell us how risky of an organization we have, but it does not tell us how safe of an organization we have. After all, is it not possible to have no reported incidents and still have a considerable amount of risky occurring on a regular basis? So, I would put forth that many organizations are only using injury metrics and are rarely using safety metrics.

The next evolution of safety will have to move beyond simply counting typical lagging indicators to more advanced business intelligence and analytics focusing on safety statistics. As a discipline, we will never totally move away from reactive lagging indicators like injury rate. However, as more and more safety professionals are looking toward proactive leading indicators to assess their safety performance, we can begin making the shift to actually using this critical data for process improvements. Unlike lagging indicators that generally measure undesirable events that have already occurred, leading indicators are generally activities or conditions that are

desirable and if completed will prevent or alert us to potential lagging indicators. A focus on leading indicators is desirable for three reasons:

1. leading indicators keeps organizations in a "preventative" or "predictive" mindset,
2. leading indicators are achievement oriented whereas lagging metrics are avoidance oriented (Geller, 1996), and
3. many organizations have hit a "basement effect" when it comes to injury rates (they are at such a low level and the metric happens at such a low frequency, that one occurrence is seen as a "special cause" (see Latzko & Saunders, 1995) and is difficult to draw statistical conclusions).

To be better able to predict, prevent and eliminate injuries through leading indicators, organizations will need to understand "Safety Analytics," identify which indicators are sensitive enough to detect culture change, and develop a "Data Use Plan" to act on the data intelligence.

Safety Analytics: The Business Intelligence of Life

Big Data is everywhere, literally. Not only is it a "buzzword" in corporate America, but organizations are collecting more data on our behaviors than ever before. In a report sponsored by IBM (IBM, 2011), the authors state that 90% of all data was created in the last two years alone. We create 2.5 quintillion bytes of data daily (that's 10x18th power here is the US) from multiple data sources. The information captured from Facebook posts, Tweets, Google searches, LinkedIn Likes and repining Pinterest pictures all serve as data for someone to use. As IBM puts is, we are creating a "smarter planet". Through technology advances, inexpensive computer chips and "machine-to-machine" interconnectivity, we are able to add "intelligence" to just about anything. (Zikopoulus, 2012). So, the term Big Data has many beginnings stemming from the disciplines of computer science, statistics, and econometrics (Lohr, 2013). The term Big Data is so pervasive in social media that a study found a 1211% increase in the term over the last three years. Popular movies such as Money Ball and bestselling books like the Signal and the Noise (Silver, 2012) have increased awareness and applications of analytics to a global level. However, some people remain skeptical and we are "more fooled by noise than ever before" (Nassim, 2013). Nassim's use of the word "noise" refers to Silver's title and a main premise of his book. Silver states that with all the data we collect, there is a tremendous amount of noise. Our goal with Big Data is to find the signal within the noise. Safety has a lot of noise.

Safety Analytics is the study of leading indicator data derived from many sources of safety processes and systems. The main difference between Big Data in the business world and in the safety world is that we are not attempting to predict the outcomes of elections, but trying to predict injuries and save lives. The problem is that very few organizations truly look at leading indicators and only focus on the lagging incident rates. Furthermore, some managers simply do not trust the safety data they are presented with. So, before we can get into Safety Analytics, we need to explore safety leading indicators.

Safety Leading Indicators via Cultural Proxies

Some safety professionals are continually searching for "true" leading indicators. Thus, identifying leading indicators may be overwhelming and confusing for some. Leading indicators should be viewed as activities, behaviors or processes that contribute to a positive safety culture. Thus, by looking at leading indicators as "cultural proxies," this can give better direction to the safety professional. A proxy can is 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 be used to assess the strength of your organization's safety culture.

6 Key Elements to World-Class Safety

There are 6 key elements to world-class safety. Typically, these elements are found to a certain degree in all organizations, but not all are functioning as well as they could limiting their potential. Some world-class organizations focus on these elements and achieved a "step-change" in their safety cultures. Even more interestingly, those organizations also experience an improvement in production, quality, customer satisfaction and other key organizational excellence factors. When identifying new leading indicators, organizations need to ensure they are considering the below elements:

1. **Culture** (What we do as an organization): Culture impacts the organization in numerous ways. It is the unwritten rules, or like many employees state: "way we've always done things around here". Some aspect of culture can change quickly like with a new CEO, or when an organization is purchased by another. However, even in those cases, merging the cultures is a hefty task. It is more common, however, for cultures to change over time based on well thought out plans and strategic culture change activities. Many organizations (and their employee's) have long memories and a step-change in culture will not come by itself unless specifically planned for and a momentum is built up and sustained. So, to change culture, we need to focus on other elements to help create the needed momentum.
2. **Human Performance** (Why we do what we do): To move our safety culture from good to great, we need to move beyond simply looking at employees who got hurt, identifying what they did, and placing blame. No one tries to get hurt, so we need to understand the principles of Human Performance…why people do the things that they do. By becoming experts in understanding individual behavior and error-likely situations, we can better understand the elements that either made it acceptable for the employee to do the risky behavior (acceptable practice) or understand the things in our processes that facilitated the risky behavior (production demands). Furthermore by broadening our perspective and looking for error-traps or other elements that could possibly cause errors, slips or mistakes, we can try to adjust the systems facilitating those errors or reduce the potential consequences if those errors do occur.
3. **Engagement** (Getting employees/leadership to own safety): Employees' engagement is not only meant for the hourly workers, but also for leadership. To truly see a change in the culture, we need the employees to take a first-hand role in identifying risky behaviors/situations and help to develop strategies for improving those challenges. However, no matter how well intentioned and motivated the employees are, without leadership support, the impact on the culture will be little to none. So, leadership engagement is also critical to achieving a step-change.

4. **Leadership** (Inspiring people to be safety champions): Managers have subordinates, leaders have followers! It is true, however, that good supervision is a combination of management and leadership. As an effective safety champion, one needs to manage behaviors and lead their employees as safety champions themselves. Thus, another critical element in a step-change is getting the leadership team on-board and walk-the-talk. Many leaders say they support safety, but what does that mean? Some leaders are equally stumped at "what more they can do" to support safety? So, to create the momentum we need to move a culture from good to great, we need to provide the leadership team with specific "actionable" activities to demonstrate their level of commitment. The senior level executives then need to hold their direct reports accountable for those behaviors until they become internalized and part of your own "leadership culture."
5. **Communication** (Having the courage and consideration to communicate): One thing in common among all the organizations, here and around the world, is the need for better and more effective communication. As organizations go, productivity, sales, quality, and customer satisfaction are highly communicated because they have direct observable consequences. Safety, on the other hand, is more difficult to manage because we typically don't measure "safety", we measure "injuries." Having injuries is not an intentional behavior, so it is seen as very difficult to measure and communicate in a positive manner. When someone has an injury, organizations typically communicate that occurrence because the result will impact the company's bottom-line directly. So to make a step-change, we need to communicate activities and metrics that when accomplished, will result in a better, safer, and more productive work culture. This impacts not only how we communicate as an organization through official publications, but also how we communicate on a one-on-one basis. We also need to change the way we individually talk about safety with our coworkers to emphasize the importance of safety every day.
6. **Safety Analytics** (Helps you become a more effective and efficient safety leader): The best organizations, athletes, scholars, and even politicians measure themselves to judge their progress. Without feedback, it is very difficult for any organization or person to improve. To be effective, we need to measure how we are doing. However, a "culture" is not measurable directly. So, we need to find "proxies" for culture change. A "Cultural Proxy" may be something as simple as employees' perceptions, their willingness to participate in initiatives, or their willingness to share near-misses. Collecting these leading indicators to identify cultural proxies can also help identify trends and help predict where your next incident may occur.

Leading Indicators through Observation

One common method to gather cultural proxies is though performing safety inspections, audits and/ or behavioral observations. Even though inspections/observations are common in many organizations' safety processes, companies still struggle with: 1) collecting quality information regarding the health of their safety systems, and 2) using the observation intelligence to reduce error-likely situations and/or mitigate the consequences of those errors.

Over the years, companies have instituted some form of inspection process to assess compliance with rules/regulations and policies/procedures (See Factories Act of 1833; Raouf, & Dhillon, 1994; Weindling, 1985; Wilson, 1985). More recently, companies have begun to add an observation process to focus on safety-related behaviors (Geller, 1996; Komaki, Barwick, & Scott, 1978; Krause, Hidley, & Hodson, 1996). Having an inspection and observation process can, by themselves, increase safety awareness and impact the organization's safety culture

(Tuncel, Lotlikar, Salem, & Daraiseh, 2006). But, while these methodologies are an essential part of a dynamic proactive safety culture, they do not guarantee world-class safety performance. In fact, some practitioners question the validity and effectiveness of the intelligence collected from their inspections/observations (Guastello, 1993).

Safety Inspections: Assessing Compliance.

Inspection processes are commonly used to proactively identify holes in organizations safety systems. Many inspection processes have safety professionals walking their organizations and/or worksites checking off boxes on a paper checklist to indicate compliance with policies, procedures, rules and/or regulations. In some cases, the organization's leadership team or formal Safety Committee is also tasked with performing compliance inspections. Following the inspections, the "observation intelligence" is either filed away in case they are needed to demonstrate due diligence, or is entered into some form of a database for analysis and examination for potential trends (i.e., holes in safety systems).

There are many benefits of a well-implemented safety inspection process. First, the simple act of using a checklist as a guide (or activator) helps direct the safety practitioner to focus on critically important safety systems and assess their compliance. An additional benefit is the visibility of the inspectors. The simple act of walking the work floor, performing a ride-a-long, or inspecting the project, can send a strong message to all employees that safety is a critical business issue while additionally acting as a safety reminder (the inspector IS the Activator). Furthermore, the information gathered can not only identify holes in your safety systems, but can also be used as a positive safety metric to be shared with employees.

However, not all inspection processes are well implemented. Many, in fact, have little or no impact of the health and safety of their organizations. Guastello (1993) found that management inspections alone only reduced injuries by 19%. One explanation for the low impact of inspections may be the simple quantity of inspections completed. If safety personnel only perform monthly (announced) inspections, we only capture a small percentage of the opportunity for errors and thus limit our analysis of those safety systems keeping our employees safe. One additional issue with many inspection processes is that the information obtained is seldom used to address system-wide issues and thus demonstrate value to the inspectors walking the site. For instance, Manager A might be well intentioned and complete a detailed inspection noting many risky issues and many safe observations as well. Manager A writes several comments detailing the issues and creates action items for follow-up. From that point two things can happen to derail an inspection process. The most common problem is the issues are never followed up on and/or action items are not closed out (or neither of these is communicated back to Manager A). This lack of communication is systemic in organizations and dramatically decreases the quality of future inspections performed by Manager A. The second thing to derail the inspection process is that instead of getting praised for finding potential holes in our safety systems, well intentioned Manager A gets the critical eye turned toward his department and as a result gets either more work, or more visits from the corporate office…either of which will decrease the probability of Manager A ever turning in anything other than a sterling inspection!

Safety Observations: Assessing Behaviors.

A focus on safety related behaviors is another methodology to help identify holes in safety processes and assess safety performance (Geller, 1996; Komaki, Heinzmann, Lawson, 1980; Krause, Hidley, & Hodson, 1996). Unlike inspections, observations specifically focus on the

observable acts of the employees, not whether they are in compliance with rules or regulations. This is an important distinction in that it is possible for an employee to follow all the rules, regulations, policies, and procedures and still be doing something that is putting himself at risk for an injury. Thus, observations fill the gap inspections may create by focusing on what the employee does, not on whether rules are being followed. Another distinction between inspection and observation processes is that in observations processes, safety related feedback is an integral part of the process (Daniels, 1989; Petersen, 1989). This is not to say that compliance-based inspections do not provide feedback, many do.

There are many organizations that have found much success with behavioral observations. In the infancy of behavioral safety, Guastello (1993) found a dramatic 60% reduction in injury rates by using a behavioral observation process. Additionally, a well-designed behavioral observation process has many benefits. One of the largest benefits is the opportunity for employee engagement. As opposed to the compliance-based inspections, which can be misinterpreted as a method for catching an employee doing something wrong, behavioral-based observations focus on looking out for the health and safety of your coworker (e.g., Actively Caring, see Geller, 1991). Another benefit is that the observers are the ones who are most likely performing the work (or have performed the work in the past) and know where some "holes" may be hiding and thus be in a better position to recommend solutions. The final benefit of a behavioral observation process is the quantity of observations completed. In general, behavioral observations are performed by many different employees who observe many different tasks, with the resulting information helping to assess the health of their safety systems. Whereas a compliance inspection is typically done less frequently, by a limited number of inspectors.

Why Inspections and Observations Fail: The Venomous Cycle.

Both behavioral observations and inspections have their challenges. However, one common downfall for both methodologies is inaction. If the information collected by inspections and observations is not used, or used in a way to blame employees, the subsequent observations will be of lesser quality and even may be "pencil-whipped" (or made up on the spot). This "venomous cycle" can dramatically impact the reliability of information collected, as well as the potential for predicting and preventing injuries. Here is a common scenario: Employee Bob has just finished conducting his safety inspection and Manager Don is in the process of reviewing all their inspections. Bob may be thinking "I'm tired of collecting observations that no one does anything with. Why do I need to write this stuff down? It just wastes time in my already busy day." Similarly, Don could be thinking: "I don't know if I can trust this information. Is it really possible that this group has not found a single risky condition in over six weeks? People are still getting hurt and nobody has seen anything risky…are we doing the inspections correctly? What are we doing with all these inspections anyway? Is anyone following-up and closing out these issues?" This downward spiral of frustration repeats itself thousands of times daily in well-intentioned organizations. Over time, this leads to disillusionment, decreasing participation and deteriorated observation quality with the result that the safety professional must go back to begging employees and his fellow managers to observe and pleading with managers to act on the information they do not trust. Frustration, anxiety and fear mount as more people get hurt. The safety professional is put in a no-win situation.

Creating a Data Use Plan: Using Safety Analytics to Predict, Prevent and Eliminate

Many organizations from around the world are making better use of their critical business information. In safety, there are many pieces of critical information that are underutilized in terms of predictive analytics. The "Big Data" is used to describe information that is too vast for individuals to get a clear picture or assess trends though simple spreadsheets. Predictive analytics continues to revolutionize many industries like in biotechnology with the mapping the human genome and in everyday use such as in an internet Google search. Safety professionals now have the tools, though predictive analytics, to make use of this big data.

One good example of Big Data in the safety field is the information gathered from safety inspections and observations as described above. By using predictive analytics on their inspection and observation information, safety professionals can develop true leading indicators and move beyond lagging indicators to assess safety performance. However, only recently has technology evolved to the point where it is readily available which will allow organizations to review leading indicators in real time, providing safety professionals with a new perspective and suite of tools from which to predict injuries. One problem, however, is getting organizations to act on the safety analytics derived from inspections and observations.

The Data Use Plan: Creating a Virtuous Cycle

There is a four-step process in creating a safety step-change to move your organization from great to world-class:

1. First, identify and collect pertinent leading indicators (e.g., cultural proxies).
2. Next, use Safety Analytics on the intelligence gained to identify weaknesses in your safety systems.
3. Put in place a solution to address the issues in a timely manner.
4. Finally, communicate the fix to the whole organization – demonstrate the value of collecting the leading indicators.

Once employees start collecting information that is turned into action that not only makes their jobs safer, but may also improve their productivity and quality, the employees feel engaged. Once the employees are engaged in safety, the quality of the leading indicators collected improves. This improvement gives the leadership a keen insight into their culture they may never had in the past. When the leadership begins to trust the data, they are more willing to act on said data and provide the needed resources identified by their employees. Once the employees begin to see the value placed on their data and the subsequent resources implemented, many communication barriers are removed and as a result, a step-change in your safety culture. This evolution in data usage can often reverse the negative Venomous Cycle with the more engaged Virtuous Cycle simply by creating a data use plan and using the intelligence you have.

Summary

Many corporate executives and government officials look to lagging indicators to assess the health of organizations' safety systems. While injury rate is a metric, many organization search

for other safety statistics that can help predict and prevent injuries and improve their safety cultures. These "next-generation" leading indicators help the safety professional assess their safety performance by looking for "holes" in their safety systems and other potentials for incidents. By taking your inspection and/or observation processes to their next evolutions, organizations can better assess quality and provide value to the organization. Once the quality of these leading indicators are improved, the safety practitioner can make use of predictive analytics to identify where their next injury is likely to occur, focus their resources to eliminate or mitigate the hazards and truly make a difference in their safety cultures. When this evolution occurs and we can begin to accurately predict, prevent and eliminate injuries, we can ultimately end death in the workplace.

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