

The Predictive Process: Drivers/Data/Dashboards

Hazards are ever-present in the steel plant environment, and a heightened awareness and emphasis on safety is a necessary priority for our industry. This monthly column, coordinated by members of the AIST Safety & Health Technology Committee, focuses on procedures and practices to promote a safe working environment for everyone.



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We've all probably seen some wordplay on the words "no" and "know." In case you have not, the following serves as the premise behind this article: No Data = No Knowledge; Know Data = Know Knowledge.

Safety has been defined through the years in many ways, but the common understanding is: "the planned avoidance of loss." That definition sets this article up for a casual conversation about leading indicators, and the predictability of incidents as well as their associated prevention. Real-time and even near-real-time data is better than traditional lagging/reactive responses. The more information available, the better help can be offered to team members and the safer workplaces can be.

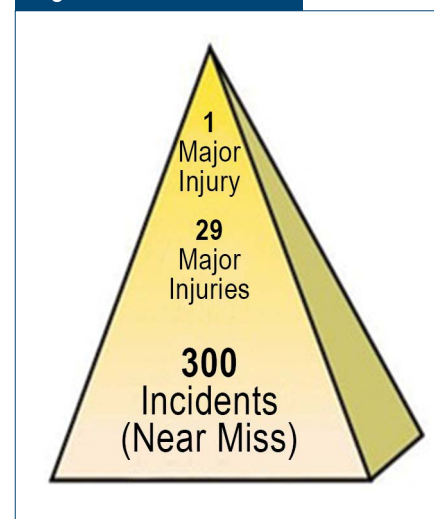
Where does traditional causation and prevention data come from? Traditionally, it comes from incident reviews and reactions. To this end, an incident must occur to identify the unsafe and/or undesired behaviors that either contributed to or caused the incident. This type of data is commonly referred to as "lagging" because it can help prevent the next accident or near miss but does nothing for what has already occurred. In short, it is too late to prevent what has already happened.

Another source of lagging data is teammate driven and requires peer-to-peer observation and subsequent reporting. Hundreds of thousands of observations go into systems that sort and, perhaps if sophisticated enough, populate a spreadsheet or dashboard designed primarily to count and classify occurrences in hopes to prevent incident recurrence. Again, this data is collected too late to predict or prevent the initial incident.

How Can We Do Better?

Most importantly, more data is needed. More data is needed about teammates and what they are doing, thinking, feeling and, most importantly, how they are acting, especially when no one is watching. After all, some safety issues and injuries cannot be predicted, but it can be beneficial to know more to prevent them. This thinking is like William Heinrich's safety pyramid (as shown in Fig. 1). This reference is not intended to start a debate or delve into the mixed interpretations that exist between 1930 and 1970 or even later in the 1970s to present-day understandings. The comparison is merely to note the simple fact that more risk increases the potential for

Figure 1



William Heinrich's safety pyramid.

Comments are welcome.

If you have questions about this topic or other safety issues, please contact safetyfirst@aist.org.

Please include your full name, company name, mailing address and email in all correspondence.

an incident and for subsequent and associated injuries alike. More leading information surrounding human performance before incidents occur is needed. Is obtaining that even possible?

Let's Take a Minute to Discuss Some "What Ifs?"

What if cameras, sensors and technology could be used to identify both desired and undesired behaviors? What if all these behaviors could be recorded and reported in real time or near real time? What if a sensor-fusion based artificial intelligence (AI) could be used to identify, evaluate, segregate and quantify said behaviors to heighten awareness of a potential incident? What if an intelligent system could send a near-real-time alert to a teammate (or their manager) who is demonstrating the undesired behaviors before an incident occurs?

This can be the next level of safety that executives and safety professionals have been looking for to reach the collective goal of a zero-incident steel industry.

If the "what-ifs" can be seen, captured, notified and reported, it could be possible to systematically reduce the frequency of incidents created by the causal effects of distractions, complacency, horseplay, contentment and fatigue. True predictive and preventive powers rest in this data. As the saying goes, "We don't know what we don't know," but a system that allows workers to see more could change the way safety is approached.

There are new programs on the market that monitor these "what-ifs." They use AI and real-time location services that can provide live, actionable oversight to help prevent accidents before they happen. In some systems, the more data collected, the more it "learns," giving it a greater ability to recognize improvements. While observing and encouraging worker health and safety 24/7/365, it also provides managers and safety professionals data to see trends and find solutions to reoccurring infractions.

Most safety management systems contain the U.S. Occupational Safety and Health Administration's four main elements for excellence: commitment and involvement, analysis, prevention and training. For years, worksite analysis has been interpreted as "wall-to-wall" inspections of those areas and, in most cases, they are focused on finding and fixing hazardous conditions. We have all become experts in hazard recognition and control; however, serious injuries and fatalities continue happening even in worksites that have active and successful analysis programs. The problem — but also opportunity — is to evaluate the actions, attitudes and lack of awareness that lead to surprises and injuries and to eliminate them

altogether. Remember: surprises lead to incidents and incidents lead to injuries.

It is safe to say that there is a need for a better way to identify, evaluate and communicate near misses. Also, there is a need to ensure that identifying, evaluating and communicating data is consistent so it can accurately predict heightened risk.

One of the misconceptions of the safety pyramid was that 88% of all incidents are the result of unsafe acts. Many safety greats have opined that the number is too large. However, others say that most, if not all, incidents are the result of an unsafe act. Now, this is not placing blame or saying that teammates are intentionally creating errors that cause incidents and injuries. Actions, attitudes and awareness might just not be up to par at the time of the incident. However, the exciting part is that this paradigm can be changed.

Causation: Conditions or Behaviors?

Incidents and injuries in general are caused primarily by unsafe acts. Teammates and employees at large are not intentionally creating incidents, accidents or injuries. So, it is safe to say that if something that had been identified as a precedent to an incident, accident or injury the action, activity or attitude could be stopped and successfully prevented in the future. Truth be told, injuries are the result of both unsafe conditions and unsafe acts. More data is needed to better identify, predict and prevent incidents.

These AI systems focused on industrial safety that are programmable and teachable will revolutionize the safety industry. A good safety program will remind us all that as humans, we are each responsible for the safety of ourselves and our teammates. But as humans, we just cannot process enough data fast enough to recognize the upcoming incident before it occurs. Herein lies the power of an assist by AI. Gathering real-time data, processing it, and reporting it back out to workers and supervisors alike to finally be able to proactively prevent injuries and incidents is our proverbial "next level." ♦