Unlocking the Value of SAFETY TECHNOLOGY
TABLE OF CONTENTS:

Introduction.................................................................................................................. 2

Safety Technology Roadmap....................................................................................... 3

Wireless 5G Power Paves Way for Future Safety Applications......................... 5

Preparing for Active Shooters with Safety Technology................................. 7

OSHA Steps Up Use of Drones for Inspections................................................. 9

It’s All in the Numbers: Leverage Organizational Data
to Measure and Improve Safety Performance................................................. 11

Safety At Your Fingertips....................................................................................... 14

Now Loading: The Next Generation of Safe Drivers................................. 17
INTRODUCTION

Advancements in safety technology have provided EHS professionals with new tools to collect data and pinpoint key indicators to mitigate risk. From microlearning to sensors, wearables and drones, EHS professionals now can accurately assess near-misses, observations, worker participation/training and inspections in order to build a more robust safety program.

Safety technology also has provided an avenue for microlearning, a module-based training tool that can be molded to fit workers across multiple demographics. When seconds matter to preventing incidents and loss of life, adapting to and utilizing new technologies can fill the gaps in processes in order to more accurately identify hazards, measure data and allow EHS professionals to reduce injuries and ensure each worker goes home safe each and every day.

This eBook is a guide to implementing technology into your world-class safety processes. Discover how technology will enhance future safety applications. Learn how data can aid continuous improvement in your organization. Read about how OSHA is using safety technology to assist during inspections. We’ll also show you how technology can assist safety professionals with training workers across all generations. With so many devices now at your fingertips, the question is not why you should implement safety technology, but when. Now is the time to adapt for the future of your workers.

EDITOR BIO

Stefanie Valentic is an award-winning editor with EHS Today. She has received accolades from the American Society of Business Publication Editors (ASBPE) and The Press Club of Cleveland. Throughout her career, Valentic has been involved in many facets of the trade publishing industry including content creation, print production, website design, trade shows, newsletters, social media strategy and online events. In 2018, she completed the Kiplinger Program in Public Affairs Journalism fellowship. Stefanie is a graduate of Ohio University’s E.W. Scripps School of Journalism, where she earned a Bachelor of Science in Journalism. She is an active member of the Society of Professional Journalists.
A year ago, I wrote about updating your safety programs and processes to meet the challenges of Industry 4.0 (“Safety 4.0,” April 2018). I mentioned the technologies that are, in part, driving this new industrial revolution. I now would like to challenge each organization to at least begin planning for these new technologies by formulating a projection of which ones should be adopted in what order.

Obviously, such a plan will have to be flexible since the technologies are progressing so rapidly and their prices are dropping so quickly. But such a plan can help provide a potential roadmap for navigating the changes Industry 4.0 will inevitably bring. This is not a list of specific items, but rather the types of items and their potential uses. Many of these will revolutionize current safety efforts and open new possibilities that we have not been able to achieve without them.

Consider the following categories of new technologies and prioritize them by potential contribution to your safety needs.

**MICROLEARNING**

Other than computer-based training (CBT), very little progress has been made from the one-room school days. But now we have microlearning: device-based modules of training utilizing the latest brain sciences and other breakthroughs, and providing follow-up training, easy access to information and tracking of the training-to-performance progression. The training can be delivered to logistically-challenged populations unlike instructor-led classroom training.

Also, it is not just for safety but can be applied to virtually any training need. If training needs updating, this may be your first priority.

**WEARABLES**

Devices that go with the worker can track anything from heart rates and calories burned to location and sudden motion. Falls can be detected and reacted to in real time. EMS can be
called as an accident occurs. Workers can be warned if they are entering areas with new or unusual dangers. Worker behaviors related to safety can be monitored with exacting accuracy and discrete feedback mechanisms.

If your workers are at high risks for falls, consider these early on.

MOBILE COMMUNICATIONS

In a world already full of tablets and cellphones, it makes sense to utilize them for more than interpersonal communication. Training can be delivered on them; cultures can be formed around them; safety manuals which are always up-to-date can be available on them. Incident reporting can be delivered, polls and surveys can be taken, and prompts can be sent to workers to do stretch-and-flex sessions, observations, audits or take breaks.

Organizational leaders can send messages of strategy and encouragement that will be received by the entire workforce and be in their voice rather than filtered down through organizational levels (where it is often distorted). Lone workers and drivers can be reached with training and information without travel costs and lost work time. Emergencies can be addressed more quickly, and lessons learned from incidents can be communicated in a timely manner.

If communication is a challenge for your organization, consider how these technologies could help.

SENSORS

In many heavy construction businesses, the most serious injuries and majority of fatalities are caused by workers being hit or crushed by equipment. New sensors can alert heavy-equipment operators of the presence of workers in their blind spots and, in some cases, equipment can react to these alerts more quickly than the operator. Robotic equipment can detect workers in the line of fire and take corrective action.

If you don’t have the budget for these devices, try acquiring them through your supply chain. Many providers can add them as standard equipment on what you purchase or lease them if they know you want or require it.

Other types of sensors can tell you when someone enters a work zone and if they are wearing the proper PPE for that area. They also can have chips built into clothing or equipment to allow you to track and locate any worker. You also can determine if everyone on a shift actually left the workplace at the end of the day. In an emergency, this can be critical.

If these types of accidents have happened in your organization, these may be the answer.

ROBOTICS AND DRONES

Confined space entries are being performed by robots rather than humans in many situations. Inspections at height and aerial surveys are being performed by drones rather than humans. These technologies are taking workers out of harm’s way and allowing them to operate a piece of equipment that takes all the risks.

In many organizations, these are the types of risks with the highest potential of severity.

SMART SIGNAGE

Many cardboard and metal signs are being replaced with tablet-type devices that can be stationed in critical areas and changed or updated online. This allows more control and quicker changes. Some organizations are automating control of either foot or vehicle traffic in construction zones or hazardous areas of manufacturing plants.

If you have had incidents related to incorrect or unreadable signage, consider these.

EXOSKELETONS

There currently are three distinct types of exoskeletons on the market that range from avoiding sprains and strains, to preventing cumulative injuries, to turning a worker into a human forklift. This is a giant step above the wearable technologies mentioned first. These suits provide increased capabilities rather than just information or monitoring.

If workers are doing awkward, repetitive, or exceptionally heavy work, these might be your solution.

The major issues with adopting these technologies will be budget and resistance. The budget problem will largely take care of itself if it has not already done so. Prices on these new technologies are coming down quickly; this is what led to Industry 4.0 in the first place.

The resistance issue will take more time but can be greatly facilitated by adopting a technology roadmap (in sequence rather than all at once) and preparing workers mentally for these inevitable changes.

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BACK TO TABLE OF CONTENTS
The next technological revolution is on the way. We’ve been hearing about the 5G economy for a few years now, but people who don’t closely follow science and technology developments may underestimate its significance. While there were major benefits associated with the launch of 3G and 4G network technologies, 5G represents a far more consequential disruption.

As an article in MIT Technology Review put it a couple of years ago, 5G “is a technological paradigm shift, akin to the shift from typewriter to computer. And it isn’t just a network. 5G will become the underlying fabric of an entire ecosystem of fully connected intelligent sensors and devices, capable of overhauling economic and business policies, and further blurring geographical and cultural borders.”

The effect on business across industries, including manufacturing, will be just as profound. 5G technology has the potential to accelerate growth and supercharge innovation as it generates massive amounts of data and enables seamless connectivity across business applications. MIT estimates that 5G’s contribution to global GDP will be the approximate size of India’s entire economy today.

But to fully realize the vision of the 5G economy, we need a better way to power all of the devices and sensors that will drive its formidable data-generating capabilities. Batteries and wired power connections are holding us back. Fortunately, real wireless power—energy safely delivered over distance to devices—is emerging as a solution. Here are some of the ways it will change manufacturing.

POWERING SENSORS WIRELESSLY

Soon, real wireless power will be as ubiquitous as WiFi, delivering wireless power at a distance to pave the way for billions more devices and sensors.

By Doug Stovall

Wireless 5G Power Paves Way for FUTURE SAFETY APPLICATIONS

Estimates vary, but some analysts predict that the total number of IoT connected devices will top 75 billion by 2025, which represents a five-fold increase over a decade. IoT ap-
Applications are already transforming the way manufacturers operate and enhancing supply chains and inventory control systems, but the applications depend on sensors to generate data, and sensors require power.

Factory and warehouse operations that currently deploy IoT assets have to take on the huge cost involved in wiring the area where the assets are located or labor costs for personnel to regularly change or charge the batteries that supply the power. There’s also an enormous environmental toll associated with battery use.

These factors may also prevent manufacturers that would otherwise benefit from greater device connectivity from fully rolling out an IoT strategy. Safe wireless power that keeps devices charged up passively without cords or batteries would be a gamechanger, enabling manufacturers to fully embrace the IoT across operations and benefit from the data generated in countless ways.

WIRELESS POWER FOR SAFETY

Manufacturing companies rightly emphasize safety in all facets of operations. Wired or battery-powered devices feature prominently in maintaining a safe working environment, from smoke or harmful gas detection devices to sensors embedded in equipment to monitor structural integrity under pressure. Wiring these devices and sensors or paying workers to change batteries is expensive.

Wireless power would eliminate that expense, but more importantly, it would enhance safety by ensuring the devices and sensors don’t stop providing alerts or transmitting vital data. Wireless power can also enhance safety by eliminating the need for workers to climb ladders to change or charge batteries and by removing the need for extension cords to power wired safety devices.

WIRELESS POWER TO PREVENT DOWNTIME

Downtime costs manufacturers about $650 billion a year. To minimize downtime, factories and plants deploy sensors on equipment to detect anomalies—this is one of the most basic applications of the IoT and was embraced early because cutting downtime is a top priority. But the costs of wiring factory floors and plants and/or installing, charging and replacing batteries limits the application of these sensors.

Real wireless power that safely transmits energy to sensors without the need for line-of-sight, charging pads or human exclusion zones would make a wider deployment of sensors to power predictive maintenance strategies much more cost-effective.

REAL WIRELESS POWER IS HERE

The 5G economy is on the horizon, and one of the key infrastructure assets that will fuel it — literally — is real wireless power. Forward-thinking manufacturers and warehouse operations leaders are already beginning to deploy wireless power to keep the sensors and devices that streamline workflows and enable seamless data collection charged up and ready to go.

Soon, real wireless power will be as ubiquitous as WiFi, delivering wireless power at a distance to pave the way for billions more devices and sensors. That will change the future of technology, inspiring countless innovations. So, a prediction: 5G will transform the economy and change the future, and it will run on power that is not supplied by wires or batteries. EHS

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BACK TO TABLE OF CONTENTS
gun violence, there are risk factors that are
telling us not if, but more of when a large
scale mass casualty incident will happen,“
Vetter says.

The need for dedicated emergency pre-
paredness professionals was borne out of
the civil defense era, he notes. Before the
terrorist attack on Sept. 11, 2001, retired
military, fire chiefs or police chiefs put on
the metaphorical hat to provide emergency
support for large-scale events. Since then,
the need for such officials has transitioned
into a full-time profession.

“It’s blossomed into a career path spe-
cifically out of the presidential declarations
post-Sept. 11, which now has people with
higher education and degrees focused on
the five phases of emergency management:
prevention, preparedness, response, re-
covery, mitigation,” he explains. “That’s a
change in comparison to back when every-
things was more of a reactive environment
to where now we are posturing, leaning
forward with governmental services and
solutions in a proactive manner.”

The widespread adoption of the Internet,
cell phones and social media has opened
the door to new technology advancements
that are changing the way crucial informa-
tion reaches the public. In a time when the
prevalence of mass shootings in America
touches every citizen in some capacity,
these new platforms are assisting law en-
forcement and emergency management
officials with identifying and broadcasting

IMPLEMENTATION

Suffolk County, the easternmost county in New York state, has
an estimated population of nearly 1.5 million residents. The coastal
county is susceptible to natural disasters such as tropical storms,
hurricanes and flooding.

Seven years ago, Suffolk County’s Department of Fire, Rescue
and Emergency Services (FRES) began using Smart911, a software
that allows citizens to provide 911 call takers and first responders
with critical information. Before the implementation, manual paper
databases and binders were maintained, which caused inefficient
methods of data access during situations when seconds count.

“When a storm came, we had a very tedious process of manually
calling and trying to figure out who needed our help,” Vetter says.

Smart911 allowed the department to be more proactive dur-
ing national disasters and other emergency situations. Once the
platform was built out and dispatchers and other personnel were
trained, Vetter began to research the mechanism needed to propa-
gate messages from FRES to the general public.

Preparing for
ACTIVE
SHOOTERS
with Safety Technology

Mobile technology for
widespread communications
could help save lives during a
mass shooting event.

By Stefanie A. Valentic

For the past 30 years, Joel Vetter, chief of fire rescue services
for Suffolk County, New York, has seen an evolution in the
types of threats that call for emergency preparedness.

He’s observed schools and the American public at large move
from simple procedures such as stop, drop and roll to full-scale
drills to prepare for active shooting situations, or what he considers,
“the new norm.”

“In today’s culture, unfortunately with the threat in our region of
gang violence, the opioid epidemic and the risk of mass shootings or

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Now that Suffolk County had a way of collecting and accessing data with the click of a button, connecting that to alert software was the next step.

In 2018, Vetter spearheaded the implementation of the Rave Mobile Panic smartphone app, which is supported through $2 million of county funding. The measure is aimed directly at enhancing communications in response to potential active shootings in the county’s schools, although it is used in a broader scope of emergencies.

“We use the systems across the board in all kinds of emergencies, whether it’s a weather event and we’re tailoring information to maybe a snow event, or those that have cardiac conditions or other concerns,” Vetter says. “Maybe we’re sending them targeted messaging about safety techniques. It could also be useful in a large, violent situation where we’re pre-notifying the public and connecting the information that we have in seconds or minutes to regional areas to be able to avoid situations.”

Instead of utilizing multiple apps, Panic Button app users can use the integrated system to receive information sent directly from the county as well as National Weather Service alerts. Vetter describes it as a one-stop shop that services Suffolk County residents.

Users of this technology can also send messages directly back to FRES with Eyewitness tip software, which is also interconnected with both Smart911 and Rave Panic, allowing for immediate responses to emergencies.

ADOPTION

Although Suffolk County has invested millions of dollars into transforming emergency management, the challenge remains to convince citizens to utilize these platforms to promulgate urgent information in the event of a mass shooting or disaster.

It’s nearly impossible to have every single person adapt to these new methods of communication. However, with platforms such as Smart911, users can create multiple profiles for parents, children and other family members.

“By me being able to build my parents and my in-laws and grandparents into my profile, it’s something that they don’t have to manage, and I don’t have to go to multiple locations,” Vetter explains. “It’s one family profile.”

FRES also has benefited from municipalities and universities who have already taken strides to invest in these technologies. Stony Brook University, a state school in Suffolk County, is already using Rave. Vetter says it was just a matter of exchanging facility and student profile data that allowed FRES to enhance the immediate response to emergencies at the school.

Since the implementation, the department already has seen the benefits. Vetter recounts a specific example in which a school principal used Rave Panic to assist a bus driver who was in cardiac arrest.

“The principal, who was outside every day doing his job, pushed the medical Panic Button,” he says. “That not only allowed him to connect to 911, it instantaneously notified the school security as well as the school nurse of the incident and where he was.”

By the time the principal connected with 911 operators, the school nurse arrived with an AED along with a security officer. The transportation director also was able to receive an alert to the incident, which allowed him to secure a spare driver, allowing children to depart from school and go home.

As for the driver in cardiac arrest, Vetter says, “The person in medical crisis was able to receive a quicker response and a more appropriate level of care with that information.”

In another instance, Vetter describes how embedded GPS allowed dispatchers to save the life of a paddleboarder who fell off his paddleboard and couldn’t make his way back on it.

“The 911 operators in fire rescue were able to plot and ping his phone as he drifted in the water,” he says. “Instead of sending the boats to where we think they are, when a dispatcher says, ‘Where are you exactly in the water?’ someone can tell them, ‘I think I’m six or seven miles off of this spot.’ We knew his exact location, and we were able to send the boats to where he was drifting to and not where he was.”

Vetter goes onto say, “It drastically took a process that might be extensive, and it shrunk it down to a very small footprint. We have usage like that almost on a weekly basis to where the communication center has now chalked it up to this is just them doing their job. But the technology is definitely improving the response times and the outcomes to situations.”

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BACK TO TABLE OF CONTENTS
OSHA is stepping up its use of drones to inspect worksites. As it does so, the practice places employers in an uncomfortable position between the proverbial rock and a hard place.

Should you give OSHA permission to use drones on your property not knowing what they will find, or withhold consent and look like you have something to hide?

We first reported on the practice when the news surfaced late last year that the agency had put procedures in place for the use of these unmanned craft as another tool in the inspection process. OSHA reportedly used drones with cameras to conduct at least nine inspections of employer facilities in 2018, and has conducted an additional nine such inspections so far this year.

As of now, OSHA has used drones only with employers’ permission, at worksites where an accident occurred and the area was considered too dangerous for inspectors to enter (such as collapsed buildings, chemical fires and oil rigs).

We can expect greater use of drones for this purpose in the future, according to Wes Gerrie, an attorney with the law firm of Goldberg Segalla LLP. “With the increased prevalence of drones in day-to-day life, one can only expect that number to increase.”

Currently, it is up to the OSHA regional administrators to determine whether their region will act to institute a drone compliance inspection program. Any region wishing to do so must establish a regional drone program manager and organize a drone inspection team consisting of a remote pilot in command, visual observer and a safety monitor.

The visual observer must be an OSHA employee and the pilot makes all flight determinations. The program must also comply with all Federal Aviation Administration (FAA) regulations, including strict registration, certification and reporting. Finally, the pilot must always maintain line-of-sight with the drone and the team must notify all people on-site before a flight.

One of the most obvious tensions created by these procedures arises when an OSHA drone inspection runs up against...
a business’s protections against unauthorized searches, Gerrie points out. “While such an issue will likely be heavily litigated in the future, OSHA currently requires employer’s consent before conducting a drone compliance inspection.”

OSHA currently is seeking a blanket public certificate of waiver/authorization from the FAA to use drones anywhere in the country without requiring consent, Gerrie reports. But at present, the agency can only conduct a drone compliance inspection with the consent of the employer, keeping some control within the hands of the business entity subject to the inspection.

**CONSENT A DOUBLE-EDGED SWORD**

At this time, if an employer consents to drone inspections by OSHA, it should continually monitor the drone flight, and make sure that compliance takes place in regard to both the FAA and OSHA’s own policies and regulations, and that the consented-to flight plan is consistently adhered to.

“Notably, an employer can refuse such an inspection,” Gerrie says. “However, as a practical matter, it may create the appearance of impropriety and such a decision should be considered carefully.”

If you are approached by OSHA regarding a potential drone inspection, Gerrie stresses that it is important to consider these points:

- The definition of “in plain view” is greatly expanded by drone use. Where previously, an inspector may have to look through a fence or even from outside the property for an apparent violation, a drone can reach and see other areas, making a larger portion of the worksite available for inspection.

- While denying a request for drone inspection may create the perception of a compliance issue, in serious injury cases (such as a loss of limb or fatality), it may be important to consider denying the request until the safety officer, legal counsel and senior management can get on site.

- Drones flying over a worksite may inadvertently capture trade secrets or Environmental Protection Agency (EPA) violations, which may be shared between agencies or be available via Freedom of Information Act requests.

- Before consenting, an employer should consider the site itself and whether a drone flight would be safe or risk causing damage to equipment or work products.

- An employer can work with OSHA on developing a specific flight plan and get copies of the data collected.

- During a typical OSHA inspection, an agent of the employer usually accompanies the inspector, which is not possible during a drone flight.

Given these considerations, Gerrie suggests that the conventional approach of simply allowing OSHA to inspect a site may be turned on its head in favor of an employer requesting that OSHA provide a warrant first.

“Should the employer provide consent, it is extremely important that the employer and OSHA agree upon a specific flight plan and that each of the above bullet points are discussed and considered within the flight plan,” he recommends.

“Further, it may be prudent to consult with legal counsel when agreeing to a specific flight plan.”

David Sparkman is founding editor of ACWI Advance (www.acwi.org) and contributing editor to EHS Today.

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When it comes to improving safety performance, your most important asset is the data within your organization.

By Mauri Paz

For decades, workplace injuries and fatalities have been primarily assigned to human error. Fair or unfair, right or wrong, this result is largely due to the subjective nature of root cause analyses and a lack of data to demonstrate the incident occurred for other reasons. Today, safety professionals have more data at their fingertips than ever before, which means they need the tools to leverage it, so they can accurately identify root causes, trends in the data, and, most importantly, take proactive measures that drive safety performance.

Improving your organization’s safety performance is a team effort based on a quantifiable number of metrics that can be monitored and measured to prioritize and understand where your safety programs will have the most impact. It is confirming or discovering which situations and human factors could elevate risk to the worker.

When it comes to improving safety performance, the most important asset you can lean on is the data within your organization. In fact, a recent study asked EHS managers how they would like to use data and/or analytics to improve their safety performance in the future (see Figure 1). Respondents cited the most important reasons were to:

1. Predict workplace injuries
2. Monitor and benchmark their safety culture
3. Improve their compliance
4. Tie safety to productivity.

WHERE TO START

If you’re like most organizations, you have two immediate challenges:

• Identifying and collecting all the unused and untapped data within your organization—think metadata.
• Ensuring that the data you’re using to develop your safety performance score on is “clean”—this includes ensuring your data is complete (all relevant fields are entered) and accurate (the information in the fields makes sense).

As with any new project, it’s important to crawl before you walk and...
walk before you run. Whether your organization is in its infancy or has mature processes in place, there is a roadmap from simplified reporting to future perspective analysis.

There are a number of data analytics solutions and business intelligence offerings on the market that will allow you to visualize the safety outcomes and potential safety issues in ways that are easy to understand and identify. From there, you can do the hard work, which is embedding safety into your company’s core values. Leveraging these tools will enable you to identify risks so that you can plan targeted interventions and correctly allocate your safety spend. These outcomes can then be used to drive operational efficiencies and allow for more precision when asking questions about your business.

When you look to take your data and transform it into a model, it’s important to integrate information to gain a 360-degree view of safety processes. This can include additional enterprise data from ERP systems, equipment maintenance systems as well as third-party information from weather reports, geospatial information from imagery, etc. From there, you can use predictive modeling to compare data between leading versus lagging indicators to allow for more precision when asking questions about your business.

According to LNS Research, the evolution of interpreting EHS data includes:

- A descriptive context in which data can be used to tell what happened.
- A diagnostic tool which can explain why something happened (by looking at leading and lagging indicators).
- Predictive analytics can be used to manipulate variables that can be used to test the hypothesis of what will happen.
- Being able to use the information in a prescriptive manner. This will then provide tactical direction on which actions to take to prevent an injury or incident.

With any successful program, the foundation for change needs to occur in the intersection between where people, processes and technology come together. And, with any project, it is a fine balance in determining the correct measures and efforts required to get it right. In this topic, we are looking at the technology and information it collects while getting usage and adoption right.

SAFETY CULTURE IS THE PEOPLE COMPONENT OF OPERATIONAL EXCELLENCE

As we have seen, safety culture is directly related to safety performance. It’s not separate from overall organizational culture, and it is not a policy, program, or procedure. We can define safety culture as the shared basic values, attitudes, motivations and knowledge that affect the extent to which safety is emphasized over competing organizational priorities.

Below are several examples of safety performance and safety culture metrics. See if you can spot the differences and how these might play into building and sustaining a strong safety culture within your organization:

**Safety Performance**
- Number of reportable incidents
- Number of audit findings
- Lost-time injuries
- Repeat offenders/offenses

**Safety Culture**
- Number of senior leadership safety visits
- Number of safety meetings and attendance rates
- Number of safety tours and observations

In addition, you may wish to track the following KPIs and metrics:
- Measures of responsiveness—how many days it takes to close an incident
- Staff qualifications, including total number of safety hours of training, credential modeling, etc.

By putting these together, you can model and determine the leading indicators impacting workplace safety at your organization. An immediate indicator that your organization can use to gain a snapshot of your organization’s overall performance is the safety climate. According to Government of Queensland, “Safety climate is the perceived value placed on safety in an organization at a particular point in time.” It is the starting point for your overall safety culture strategy. In order to develop a measure of safety climate in your workplace, you have to look at metrics that make sense for your sector and organizational priorities.

Safety culture can be hard to measure, but it is more stable than safety climate over time. This is in part due to the growing volume and speed of data being generated within the enterprise. The goal is to measure safety climate change that predicts safety culture change in the workplace. It generally focuses on three areas:

- Management commitment
- Employee engagement
- Safety management systems.

**Management Commitment**

We look at these as leading indicators that can be measured towards prevention of incidents in the workplace. Culture comes from the top down and would be reflected in metrics that account for management commitment. In general, a best practice is to dedicate 60% of the KPIs to this function. Management commitment can include: financial investment, tools such as wearables, amount

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**Figure 1.**

*Source: Safety Data Survey, Conity Inc, June 2018.*

*How would you like to use data and/or analytics to improve your safety performance in the future?* Please rank in order of importance to you with 1 being most important and 7 being the least important.
of team members committed to EHS, as well as their time allotted to it.

Some data points to consider are:
- Requested vs. actual budget
- Safety budget per unit produced
- Preventive spend
- Funding for tools to carry the safety program
- Marketing support for safety programs
- Capital projects to address high-risk safety issues
- Man-hours spent on safety prevention
- Current vs. ideal staffing
- Personnel SME training hours.

Employee Engagement

Employee engagement measures the effectiveness of the other two components. It can include items such as training competency, numbers of observations/suggestions, and voluntary participation in safety and related programs and committees. Employee engagements should weight at least 30% of the KPIs.

Some data points to consider are:
- Ratio of man-hours trained to worked hours
- Pass rate of training competency evaluations (on-the-job preferred)
- Training effectiveness results of training feedback surveys
- Number of observations
- Number of suggestions
- Employee man-hours spent on safety committees
- Breakdown of man-hours spent in safety committees
- Percent of employees that consider that they are in-charge of their safety
- Percent of employee suggestions adopted by management
- OSCAR survey.

Safety Management Systems

Safety management systems are an important component but can be challenging to measure. It’s important that you are able to find objective ways to measure the effectiveness of your programs, like CAPA/action tracking, root cause analyses, JSA/JHA programs for high-risk tasks as defined by operations and safety.

Some metrics to consider are:
- Inspections scores
- Audit scores
- Open actions
- Percent of action completion
- RCA & breakdown
- Percent of JSA/JHA completed/reviewed for high-risk activities
- Percent of safety procedures reviewed
- Percent of procedures available vs. procedures needed
- Ratio of preventive actions vs. corrective actions
- Completion of monthly regulatory reviews.

This component should weight to 10% of the KPIs. This weighting is due to the assumption we make that being “in compliance” is a need and should not affect safety culture dramatically.

WHERE CAN YOU MINE THE BEST DATA?

When it comes to leveraging your data, the most important and impactful source can be from your root cause analysis reports. As an EHS professional, being able to differentiate the root cause from the various intermediate issues that may arise during its analysis is critical. The root cause analysis will allow you to leverage the information captured, which can then be implemented into a top-down accountability structure that assigns and measures information, including goals and targets. At this point, the EHS manager can also go a level deeper to look into the processes required to make these changes.

Be prepared to ask and find answers to the tough questions. Key questions you’ll need to find answers to include:
- What are the main drivers of incidents in our organization?
- What can we do to change?
- How does changing the weighting of certain variables impact the organization’s performance?

The decision-making and reporting processes can be driven around practical targets for outcomes that are readily shared in multiple digital mediums (e-mail, dashboards, smart devices). These outcomes can impact your operations—from small things like scheduling maintenance schedules to large operational changes.

BRINGING IT ALL TOGETHER

A way to provide a mid-way to measure safety climate is to create a scorecard, which is a compilation of various user-defined metrics which together help evaluate the health of the main components of your company’s safety objectives.

When it comes to considering your baseline safety culture score (or metrics), it is important to consider the following:
- Test measure validity
- Data quality
- Don’t introduce change
- Test validity
- Record in DB.

You can start by defining a target for each measure and then use this to create a score. The culture score should be based on the measures selected is “100%” and climate measures how close you are from that ideal state. You can put these together in a management dashboard found within your EHSQ application. We can also say that once it’s implemented and operational, the safety professional is able to introduce one change at a time with a goal to affect culture by a particular amount. You would then be able to measure your success using climate/culture scores.

Since safety culture and safety performance have a critical impact on your operations, it’s time to start today. In terms of next steps, begin with data that is available to you. As much as possible, ensure the data is clean by applying relevant data hygiene practices.

Define a safety culture index that allows you to first create a base-line score and then introduce changes to provide the impact to the program. From there, review and adjust to understand priorities and changes.

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For a company the size of retail giant Walmart, ensuring the safety of more than 90,000 workers employed in more than 150 distribution centers is no small undertaking. Warehouses and loading docks are notorious for workplace incidents (which of course are notoriously expensive); so, Walmart set itself the goal of reducing OSHA recordable incidents. That meant the retailer would need to improve its workers’ awareness of safety practices. Walmart needed to create a safety culture, but with a workforce that encompasses all age groups and generations, that would take some doing. In fact, it would take a new breed of safety technology.

Walmart opted for a microlearning solution, one that lets each employee access the company’s safety training on their own terms. Gamification doesn’t really adequately describe the microlearning process; certainly, workplace safety isn’t meant to be a game. Yet, the attraction to microlearning technology is that it engages a worker in a way that immediately gets their attention and keeps it—in Walmart’s case, for roughly five minutes at a time, through a series of entertainingly produced safety scenarios and questions.

The results have been impressive: a 91% participation rate; an increase in knowledge levels on safety by as much as 15%; and a reduction in recordable incident rates at eight Walmart distribution centers of 54%.

Walmart’s experience with microlearning is a scenario that’s becoming increasingly common throughout numerous industries. Thanks to the widespread popularity of laptops, tablets and smartphones, microlearning has emerged as one of the fastest-growing technologies used by companies to enhance the safety of their workforce and workplace. 

EHS Today recently conducted a study on behalf of safety technology provider Cority called “EHS Embraces the Technology Revolution,” which found that more than half (54%) of safety leaders surveyed already are using microlearning to train their employees.
you saving money on specialized equipment and don’t have to bring in third parties, you now have easy and direct access—enabling you to take more samples, get better data and make better decisions. Newer technologies like wearables, fatigue monitors and smart PPE are also poised to have a big impact on workplace safety."

Other than safety management systems, mobile devices are considered relevant to safety operations by 64% of safety professionals, according to the safety tech study. Only safety management systems (at 85%) scored higher on a list of 18 safety technologies (Figure 1). Also, 56% of respondents already are using mobile safety devices in their workplace, and another 25% intend to do so within two years, which again puts it just behind safety management systems for current or near-term use (Figure 2).

In other words, rather than calling it a "killer app," it might be more accurate to call mobile safety devices a "savior app."

CONTROLLING RISK AND PREVENTING INCIDENTS

The real potential of safety technology is in its transformative impact, in how it can provide information to workers to help them control risk and prevent incidents. It offers immediate access to key information that helps a worker view the risk assessment for the job, safety data sheet, work instructions and other key information...

SAFETY AT HAND

Microlearning is just one of many technologies being pilot tested and in some cases fully adopted by companies looking for a way to improve their safety operations, and perhaps other areas of the company as well. Take, for instance, mobile and smartphone apps, which have become almost ubiquitous in the workplace and are now capable of improving worker health and safety. Thanks to technology that’s small enough, comfortable enough and indeed fashionable enough to be worn by employees at all times (even off-the-job), wearable safety devices are now as close as a worker’s fingertips.

Tech giant IBM announced earlier this year a collaborative initiative with several device manufacturers to develop wearables, smart devices and environmental sensors to monitor worker safety in hazardous situations. This includes such things as a shirt equipped with environmental and biometric devices; “smart” hard hats that provide situational awareness capabilities to workers; and activity trackers that can monitor worker heart rates and “man-down” events.

“Mobile devices and applications that enable users to report incidents and safety observations and complete inspections and tasks in the field or on the shop floor are finally gaining traction,” explains Pam Bobbitt, vice president, product marketing at Cority. “Many organizations are also leveraging mobile devices in new ways — using iPads as sensor devices to conduct noise sampling. This is amazing because not only are...

Figure 1. Which safety technologies are considered most relevant to a company’s operations?
“EHS Embraces the Technology Revolution” study (EHS Today/Cority)
the survey indicates, safety leaders need to be able to articulate how any of these new technologies can enhance and improve workplace safety if they hope to get budgetary approval for new initiatives. “What often happens is that companies forget the value and ROI of these new devices and technologies will provide as it takes time and investment,” Bobbitt explains.

A strategy she recommends is to conduct short pilot tests with a small set of employees for a defined, short period of time. Then look at the data from the pilot and evaluate if it provided the value you thought it would. “There may be a clear business case or you may find no business case,” she observes.

However, she adds, the investment is relatively small and it’s far preferable to just sitting on the sidelines while your competitors are gaining a technological edge on safety. 

Predictive analytics, another safety technology, offers a way to use data to provide insights to workplace situations. “Let’s take completing a safety inspection as an example,” Bobbitt explains. “The employee completes the inspection; they can be notified with a message like ‘10 of your fellow employees in other facilities reported an observation noting signs of leaking on this piece of equipment. Click here to access that information.’ The employee doing the inspection now knows to look closer in certain areas and can potentially identify an issue that will prevent an incident such as equipment failure or spill and release. Operations benefits as well because this prevents a potential shutdown of production.”

Looking again at the EHS Today/Cority survey, another safety trend on the horizon are the technologies designed to make a workplace safer by removing human workers entirely: robots, drones, autonomous vehicles and artificial intelligence. Similarly, technologies such as virtual reality, exoskeletons, sensors embedded in PPE and the Internet of Things offer ways to protect the worker while distancing them somewhat—or in some cases, entirely—from hazardous or physically demanding situations.

The biggest barrier to technology adoption for these types of technologies is, not surprisingly, budgetary restrictions. Indeed, as the survey indicates, safety leaders need to be able to articulate how any of these new technologies can enhance and improve workplace safety if they hope to get budgetary approval for new initiatives.

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Dave Blanchard is editor-in-chief and senior content director of EHS Today.
NOW LOADING:
The Next Generation of Safe Drivers

How one California school is using safety technology to teach its students in an innovative truck driving program.

By Stefanie A. Valentic

High school student Javier Diaz was labeled as a failure in an education system where the necessity of a four-year college degree is propagated from early childhood.

On a path to self-destruction, he enrolled in Dave Dein’s truck-driving course at Patterson High School in Patterson, Calif, a decision that would change his life.

“Diaz got so used to being labeled as a failure for so many years in the academic setting. He was growing up to become a really good failure,” says Dein, who is the CDL coordinator/instructor at Patterson. “His dad came to me about halfway through the year and he’s like, ‘I’m here to shake your hand for saving my son.’ I said, ‘what do you mean?’ He says, ‘before my son took your class, he had no self-esteem. He had no value. He had no purpose. For the first time in his life, he feels like he is somebody. He has something to contribute.’ Literally this kid just kind of took his life and did a 180 with it.”

Diaz became the youngest person hired by one of Patterson High School’s industry partners.

As the vocational/technical worker shortage continues to pose a challenge for industries such as trucking, companies are looking to former employees-turned-educators to promote trades and effectively train the next generation of workers.

For Dein, a foray into trucking education is his proactive way of addressing the gap through turning out a new generation of skilled, safe drivers.

HITTING THE ROAD

Despite a high-salary incentive, the shortage of qualified drivers continues to grow.

According to the American Trucking Associations, the number of for-hire positions open surpassed 50,000 in 2017 and has continued to climb since then.
A lack of routine, significant time away from family and disrespect from other vehicle drivers is the reality of being a trucker, according to professionals. However, the pay exceeds the cons for those who drive, with some companies paying up to $90,000 per year.

Former-hauler Dein saw this shortage and the call to address it. The idea, which began as a non-profit to assist ex-convicts, transformed into helping high school students in Patterson.

Patterson High School is in the center of a distribution “mecca,” home to facilities operated by Amazon, CVS, Grainger, Kohls and other large corporations. The implementation of a trucking vocational path was a no-brainer at the school, which also boasts a supply chain and logistics program for warehouse workers.

“I made a call to the superintendent, and I said I know you guys have this great logistics program, but have you thought about doing truck driving?” Dein says. “I gave him some facts, and he’s said let’s do it. So, we spent a year putting together a curriculum, and we launched the program.”

A WHOLISTIC APPROACH

Integrating the truck driving program directly into Patterson High School’s curriculum has allowed Dein to better prepare certified students for a career on the road.

Students attend class one hour per day for an entire year, allowing Dein to dive deep into areas such as distracted driving.

This contrasts with two-week truck driving schools that turn out drivers who are often less aware of the hazards and pitfalls of being behind the wheel for long durations.

“We just don’t look at the skills,” Dein explains. “We look at the industry as a whole. We look at what’s going on in the industry. What are the emerging trends? What are the new technologies? We’re growing up in an era with students or just young people that they’re very connected to their phones. We spend a lot of time and I give them visuals of what happens when you do take your eyes off that road for one or two seconds.”

When Dein developed the curriculum, he knew traditional lectures and PowerPoint presentations weren’t going to reinforce concepts in the classroom.

“Technology is all about being relatable. The generation you are working with now, you just can’t give them a textbook and say read this and take a test on it,” he explains. “They want to feel engaged, they want to feel empowered. The use of technology can be a huge benefit in training and providing those skills for students.”

Dein utilizes Worklete, a mobile-ready technology platform for training workers in transportation, shipping and logistics industries to reduce musculoskeletal injuries. The company developed a specialized version of the software to teach students about specific risks associated with the physical demands of the occupation.

“What we’re doing with Patterson is we’re doing a really cool accelerated program where they go through 18 unique, different courses or pieces of curriculum,” describes John Post, Worklete co-founder and chief product officer.

At the end of the semester, the company’s representatives spend a day at Patterson High School to certify students in the program in core competencies.

“That means that they’re certified to go and give coaching and feedback on working techniques to other folks within these industries,” Post says. “A lot of our customers are these big trucking, warehousing and logistics companies. This not only gives these students a very high quality of training, but it’s also making them really desirable.”

This takes some pressure off of companies, trainers and safety managers when they hire workers who are already familiar with certain concepts.

“They get to coach and give feedback on stuff that people are already learning from us,” he says. “Instead of having to teach everything to every single person first hand, they just get to become reinforce and coaches and give feedback. That’s one really big advantage.”

With industry partners and access to technology such as Worklete, Dein hopes to attract more high school students to vocational careers such as trucking.

Before this happens, however, there needs to be better communication between schools and industry about what types of workers and training is needed. Dein says has been “flooded” with support with the industry since the launch of the program just last year. Other school districts in the area and beyond already have inquired about starting their own initiatives after seeing Patterson’s success in such a short period of time.

“They’re just like whatever you need, we’re here to help,” he says. “So, we started creating partnerships. That’s been a game changer. I think we really need to see more of these proactive type approaches between schools and industry.”

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BACK TO TABLE OF CONTENTS