A culture of safety: How Suffolk is using its RiskX observation system and Smartvid.io to reduce its Recordable Incident Rate

Construction is a particularly dangerous industry, accounting for over one in five of all on-the-job deaths in the United States for 2017.[1] That same year, the construction industry saw almost 80,000 incidents that led to an employee missing at least one day of work. In more than 26,000 cases, the injured employee was unable to work for a month or more.[2]

The human costs of workplace injuries are enormous — even one death is too many — but the financial impact of on-the-job injuries is also substantial, especially in construction. For example, the average workplace fatality costs society $1.42 million, but that figure accounts only for direct costs, and in the construction industry, indirect costs from worker injury can be 17 times higher than the direct costs.[3] Given all of these statistics, it's no wonder the construction industry is heavily focused on improving safety and creating a safety culture within their organizations.

STRENGTHENING SUFFOLK'S SAFETY CULTURE THROUGH OBSERVATION AND TECHNOLOGY

Suffolk has long had a strong safety culture. In 2017, the national contractor decided to further strengthen it with the design and implementation of RiskX, a proprietary observation-based system designed by Nick Carbone, Manager of Data Science, and Kyle Kutach, Vice President of Suffolk Business Systems. RiskX combines company-wide safety observations with technology to allow workers to manually report safety issues they identify on project sites using a smartphone or tablet. It was a bold effort. After all, Suffolk is a $4 billion private contractor with more than 2,400 employees with offices in Massachusetts, New York, Florida, Texas and California.

> *"Construction is about risk management, so data is fundamental."*
> **– Alex Hall, EVP of Suffolk Business Systems**

1. OSHA. "Commonly Used Statistics." https://www.osha.gov/oshstats/commonstats.html. 2. U.S. Bureau of Labor Statistics. "Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, 2017." https://www.bls.gov/iif/oshwc/osh/os/summ1_00_2017.htm. 3.Morrison, Kyle. "The ROI of safety." Safety+Health. 23 May 2014. https://www.safetyandhealthmagazine.com/articles/10414-the-roi-of-safety.

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"Construction is about risk management, so data is fundamental," said Alex Hall, EVP of Suffolk Business Systems. "With support from our data team, we created RiskX on a mobile app development platform because we wanted an end-to-end management system, supported by technology and observation, that would allow us to collect data in real time that could inform the decisions we make regarding safety. These decisions could include anything from identifying trade partners that are at the highest risk at a given moment or the types of hazards most prevalent on certain jobs."

Suffolk's RiskX initiative incorporates measures that academic research has shown to be effective in improving safety and reducing incidents. Workers who know their safety practices are being observed by others significantly improve their adherence to safety policy without a decrease in productivity.[4] Additionally, investments in safety are far more effective if they take place within a strong safety culture.[5]

Suffolk's rollout of its proprietary RiskX solution was enormous, involving 2,400 users across 500 projects in 11 different regions. The goal was to get every Suffolk employee on a work site engaged in making and reporting safety observations.

"We were trying to take the focus away from the old-school, check-the-box system and toward real engagement with trade partners," said Mike Moore, General Superintendent, West Region for Suffolk. "We didn't want to just be

Figure 1: Alex Hall, EVP of Environmental Health and Safety at Suffolk, explains how Suffolk manages safety through its RiskX program

pointing out errors, because we wanted to put the focus back on rewarding good behaviors. It's been well documented that incentive programs cause others to seek that kind of reward. It's not just about identifying problems."

From engineers to executives, every Suffolk employee is required to submit observations using the RiskX tool — positive or negative — any time they are present at a project site. Soon, Suffolk had thousands of site safety observations pouring in weekly. The results speak for themselves. After implementing the Risk X program, Suffolk collected more than 65,000 observations. By analyzing this data and acting on the insights they gained, Suffolk was able to lower its recordable incident rate by 28% and lost time incident rates by 35% (Figure 2).

Figure 3. By analyzing this data and acting on the insights they gained, Suffolk was able to see:

65,000
Observations

28%
Reduction in incidents

35%
Reduction in lost time

4. Alvero, Alicia & Rost, Kristen & Austin, John. "The safety observer effect: The effects of conducting safety observations. Journal of Safety Research." February 2009. https://www.researchgate.net/publication/23251089_The_safety_observer_effect_The_effects_of_conducting_safety_observations. 5. Feng, Yingbin. "Effect of safety investments on safety performance of building projects." Safety Science. November 2013. https://www.sciencedirect.com/science/article/pii/S092575351300091X?via%3Dihub#ab010.
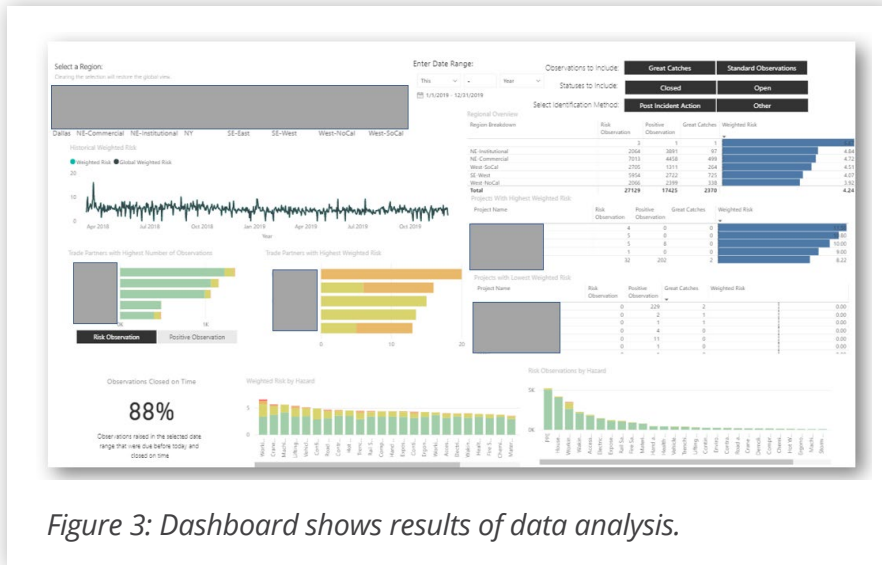
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Figure 3: Dashboard shows results of data analysis.

documentation). Nearly two years ago, Suffolk recognized that Smartvid.io had developed image recognition capability for safety hazards, and the two companies had worked together to conduct R&D on whether data from image recognition tags could be used to predict incidents a week before they happened (https://www.smartvid.io/suffolk-predictive-analytics-case-study). Positive results from that project resulted in the decision to partner with Smartvid.io to add predictive capabilities to enhance its RiskX solution.

RiskX was a resounding success for Suffolk, but the company wanted to enhance its solution even further. To accomplish that, Suffolk needed a technology partner that had advanced capabilities to roll up all that observational data into an analytics platform that could assess risk, identify trends and inform safety policy (Figure 3). The aspiration was to use AI to conduct image analyses and power predictive analytics so that the company could move towards predicting incidents, and thereby take preventive action. After a careful selection process, Suffolk chose Smartvid.io.

Smartvid.io and Suffolk had already partnered on other Smartvid.io product lines previously (field

Smartvid.io's Safety Observations and Predictive Analytics solutions - Suffolk Safety Culture and Solutions Combined with Smartvid.io Technology

Smartvid.io's platform makes it easy for any employee to make safety observations. It's not just limited to safety personnel. And while Suffolk requires that photos be submitted along with each observation, Smartvid.io can handle observations without photographic documentation. The solution is also easy to deploy. Suffolk was able to fully roll out Smartvid.io to more than 1,000 users in just two weeks.

PREDICTIVE-BASED SAFETY

In a Predictive-Based Safety program, safety observation data is analyzed by AI to provide risk ranking of projects along with a list of actions that will change behavior and reduce incidents. This data can take many forms.

Observational reports from people onsite form the bedrock of any Predictive-Based Safety program. But to ensure a steady flow of high-quality data, it's critical to use modern technologies such as tablets and smartphones to make it simple and efficient for people to submit reports. AI-based analysis of job site photos and video can help fill in the gaps because it can automatically spot risks that might have gone undetected by humans. And finally, traditional project data such as schedules and costs can also play a role. Previously, much of this data has been trapped in discrete data silos, but, thanks to modern technologies, it can now be pulled into a single platform for analysis.

As a result, teams don't just have visibility into current safety risks, but can also identify the measures required to mitigate those risks by eliminating hazards and changing behavior to prevent incidents.

Suffolk uses Procore for its construction management platform, and Smartvid.io integrates effortlessly with the software. As a result, information such as projects, users and trade partners are automatically pulled from Procore into Smartvid.io. Whenever a project is created in Procore, that same project is created in Smartvid.io via API (application programming interface). What's more, Suffolk was also able to pull in all its prior observations and photos, so that they, too, could be analyzed. Nothing was lost.

If employees see good safety practices, they can report a "great catch" to flag items worthy of recognition. And when they observe safety risks, the report asks that they rate both frequency and severity of the risk on a scale of one to five, with five being most severe. These two ratings are then multiplied together by the system to create a severity risk score of one to 25. These risk scores are used for workflow, triggering alerts if the score is severe enough.

Once observational data is submitted, it flows into reporting, which can take place within Smartvid.io, Procore and any other major construction management platform. It can also output to standard data visualization platforms like Microsoft Power BI, which can be tailored to suit individual management preferences of different companies.

Data could also flow into Smartvid.io Predictive Analytics solution. This AI-powered analytics software trains on historical project data and incident reports, with a model built specifically for each customer's unique mix of projects and data. It gives a dynamic view of projects at highest risk, and helps contractors understand what actions to take to mitigate that risk.

"RiskX combined with our strong safety culture and technology from Smartvid.io gives us consistent, predictable performance with continuous improvement," Hall said. "It's exciting to be one of the first in the construction industry to combine culture, technology and predictive analytics to address such an important industry challenge while potentially saving lives," Hall said.

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Suffolk is a national building construction firm based in Boston, MA with a clear vision to "transform the construction industry by building smart."

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Smartvid.io enables Predictive-Based Safety, helping companies identify projects at highest risk for an incident and act upon them to prevent incidents from occurring.