SmartFocus on Traceable Safety Improvements

A SmartBrief Update

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BOOSTING SAFETY WITH 3D LASER SCANNING

Safety is a key business concern for most industries, especially in the construction and oil and gas sectors. Protecting workers is a core tenet of corporate social responsibility and companies also need to guard against profitability hits from lawsuits, lost work time and increased insurance premiums.

Improving personnel safety is paramount and any opportunity to share and advance best practices should be seized, according to Stephen Sandherr, CEO of the Associated General Contractors of America. "No wisdom or insight should be proprietary when it comes to the safety of construction workers," he said when announcing a safety study commissioned by the organization in 2017.

One often-overlooked tool to improve site safety and reduce the risk of accidents is 3D laser scanning. Oil and gas production and construction are dangerous businesses. Valued for their accuracy and cost-control capabilities, laser-scanning solutions are also useful tools for reducing risk to employees, avoiding fines and improving industry safety.

LESS RISKY ACCESS TO DANGEROUS AREAS

"Safety is a major factor for petrochemical work," says Kerry Johnson, senior piping designer — engineering, Sinclair Wyoming Refining Company. "Imagine for a minute being able to measure a tall pressure vessel with all its components from the ground without having to climb all over it."

Laser scanning technology boosts safety because it involves less scaffolding and fewer ladders, and reduces the need to climb or squeeze into

confined and hazardous spaces. "The scanner has a 350-meter range, which allows data capture at distance," notes Irene Radcliffe, an oil and gas industry veteran and a FARO® sales engineer. "This data can be used to measure without having to be as close to the area as you would using traditional methods such as a tape measure."

Keeping workers on the ground dramatically cuts the risk of falls, which are the leading cause of workplace death and injury in construction, as well as in oil and gas production. Workers in construction lost 78 days of work from falls ; oil and gas workers lost 66 days. In 2017, 887 workers lost their lives in falls, according to the Bureau of Labor Statistics. Keeping employees out of tight spaces further reduces risk. Data show that deaths related to confined spaces accounted for 166 workplace fatalities in 2017.

3D laser scanning further lowers risk by limiting workers' exposure to toxic environments and dangerous weather because you need fewer employees to gather data and the process is completed much faster.

"Toxic gas and exhaust, extreme cold and extreme heat are among hazardous conditions workers face on a daily basis," Radcliffe says. "Being able to both visualize and measure accurately without actually putting people in a potentially hazardous situation is a huge benefit to stakeholders."

And because the measures are more accurate, employees don't have to make as many return trips to the site to check their work. Eleven percent of work-related motor vehicle deaths occur in the construction industry, according to the Centers for Disease Control and Prevention. Semi-, tractor-trailer and tanker trucks made up the highest percentage of work-related highway deaths (38%), followed by pickup trucks (14%). Reducing truck rolls also keeps workers on the ground safer. In 2017, the construction and extraction sector had 71 pedestrian work-related fatalities, the most of any industry.

BETTER AND SAFER TRAINING

Another underutilized application of 3D laser scanning is safety training. Scans can be imported to simulations to produce more effective, hands-on

SAFETY BY THE NUMBERS

The cost of safety issues goes beyond lost productivity, legal action and increased insurance premiums. Fines for violations can mount up quickly, putting your profitability and sustainability at risk. Here's a quick look at the financial impact of safety fines:

- The construction and extraction occupational group and the transportation and material moving occupational group made up 47% of worker fatalities in 2017, the most recent year available.
- OSHA penalties are $13,260 per violation for serious, other-than-serious and posting requirement violations; and per day for failure to abate violations. The penalty for willful or repeated violations is $132,598.
- Of the top 10 OSHA fines, oil and gas companies paid more than $125 million in initial penalties from 2008 — 2018
- The average initial penalty was $16,813 for 552 accidents in the oil and gas industry from 2008 — 2018.
- The majority of the top 25 OSHA enforcement cases of all time involve oil and gas or construction companies.

instruction on safe operations and maintenance. Taking new operators or crews to sites virtually to familiarize them with locations increases awareness of hazardous sections and other nuances. It also produces more memorable instruction.

This highly realistic methodology allows companies to standardize and expand training opportunities, and deliver them in safer environments. Simulations can be run in classrooms or remotely at regularly scheduled times and on demand, neutralizing cancellations or complications from climate conditions on site. It also enables employees to be safely unsupervised as they learn, further reducing training costs and safety risk.

Mark Franklin, account manager and design and reality capture lead for Kleinfelder, has used 3D laser scanning data to create virtual reality replicas of plants and worksites. A gaming company animates the data to create an immersive work environment that lets trainees learn safe operation and evacuation procedures without risk.

"Once the facility has been laser-scanned, personnel can use a VR (virtual reality) headset to familiarize themselves with the plant, including access routes, evacuation routes and muster areas," Radcliffe adds. "Being able to practice these drills in a safe indoor environment means that people are less likely to be disoriented during a real emergency, and be able to find their way out as directed."

With site safety a major priority at the industry and company level, investment in any technology to mitigate risk and improve worker wellbeing is justified.

"With the digital twin fast becoming a necessity in the engineering and construction world, laser scanning has become one of the standard tools in the engineering toolkit," Radcliffe notes. "Beyond the benefits 3D scanning yields in cost savings, productivity, quality compliance, regulatory verification accuracy, the safety factor is a tangible added value. When you combine the risk mitigation potential with these other upsides, laser scanning technology makes companies more accountable and more competitive." ■

Check out our infographic on how 3D laser imaging improves safety in the oil and gas extraction and production industry ▶▶

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Our commitment to safety includes our own hardware. FARO® Technologies earned the Laser Institute of America's Award for Achievement in Laser Safety Education in Specialized Manufacturing & Services. The accolade recognized FARO®, the company's continuous improvement and laser safety education programs.

ABOUT FARO

FARO creates portable 3D laser scanning hardware and software solutions designed to accurately capture, process and deliver pre-existing and as-built conditions to be integrated with BIM solutions for improved decisions throughout the project lifecycle.

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