# Safety First: Leveraging Technology to Help Improve Jobsite Safety

## New ways technology can create safer worksites

By David Gaw, Founder, CEO – Sensera Systems

The alarming fact that 21% of workplace fatalities occur in construction, is often cited as a clear indicator that dramatic safety improvements are needed on jobsites. In addition to the tragic loss of life, there are multitudes of serious injury, lost work days and delays.

**THE CHALLENGE**

The cost and impact of jobsite safety incidents and worker injury span a number of different aspects of construction. Insurance premiums are affected by a firm's accident occurrence rates. Projects can be delayed by investigations and the implementation of corrective action plans, as well as replacing or supplementing injured workers. Safety incident patterns, or even negligence on a single incident, can open a general contractor (GC) to additional legal exposure and even costly litigation. Future worker's compensation payments may be affected by claim rates. Fines for non-compliance with specific regulations can also be incurred. Other more indirect costs include worker productivity and satisfaction and retention. In today's tight labor environment these costs can be significant.

Conversely, there are also opportunities to recapture significant savings by improving jobsite safety and reducing risk. Decreased, or lower than average accident rates can result in reduced insurance premiums, or at least fewer increases!

While these costs accrue primarily to the GC, they can trickle up to the project owners and developers. Each of these dimensions of cost have their own ROI in terms of mitigation opportunities; however, the overall business case is quite straightforward — improving safety will reduce costs and advance schedules.

## POTENTIAL TECHNOLOGY SOLUTIONS

Technology-based solutions can help improve safety and reduce risk in several general ways:
- Enables More Effective Training
- Facilitates Compliance Monitoring of Safety Protocols and Procedures
- Provides for Documentation of Incidents and Near-Misses
- Makes Automation of Data Capture for as-built, Analysis Possible

One of the core values that technology-based solutions can bring to the area of risk and safety management, is the ability to begin to "measure". Peter Drucker famously noted that "If you can't measure it, you can't improve it" — sometimes paraphrased as "you cannot manage what you cannot measure." This insight certainly applies to managing risk.

The ultimate goal would be to have an efficient, automated system that can (1) quantify the risk and identify key risk areas for a given project and (2) monitor performance of the build, providing a quantified measure of actual risk vs. projected risk based on practices carried out. This would "close the loop" and allow for changes in safety procedures that can be directly measured against objectives or baselines. Unfortunately, this is not a simple goal to achieve, but key actions in this direction can move us closer, reducing risk and increasing safety each step of the way.

### Types of Technologies

There are several categories of technologies that can, and in many cases already are, impacting safety and risk on the jobsite:
- Software for Training and Compliance Management
- Atmospheric Sensors – To Detect Air/Work Area Quality
- Visual Auditing – Cameras & Video Analytics
- Drones
- Wearables
- Tracking Tags and Real-time Location Systems
- AI/Analytics

**Technology Applications and Use Cases in Construction**

Each of these technologies can be applied individually, or in combination, to tackle different aspects of risk mitigation and safety improvement. Let's look at a few of the use cases for construction:

■ **Knowledge and Training**
At the core of any worker safety program is a strong base of knowledge and training on a variety of areas that can impact jobsite safety. These include project or site-specific things like known or anticipated hazards and procedures, and general safety protocols such as hazard identification, reporting policies/ requirements, worker rights, company safety philosophies, etc.



**Software applications** for training can improve instruction effectiveness, reduce costs, and improve the frequency of education material review. These tools support traditional methods such as toolbox talks.

■ **Compliance and Worker Certification Documentation**
**Software applications** can also be effective in streamlining processes for compliance documentation, such as worker licenses and certifications. Having a single system to record this information can save time and improve compliance management.

■ **Real-time Compliance Monitoring**
Even with the best training and regular briefings, it's critical to assess actual compliance with guidelines and protocols. Are workers staying on designated paths and avoiding restricted areas? Is personal protective equipment (PPE) being worn at all times?

*Cameras providing real-time site video can make it very easy to see who is, and who is not, following best practices.*

Capturing visual documentation and conducting real-time video monitoring using **jobsite cameras** are powerful methods for assessing many aspects of compliance. **Jobsite cameras** can provide real-time video feeds, as well as recorded images and video to allow managers to quickly assess compliance minute-by-minute and day-by-day. Cameras make it very easy to see who is, and who is not following best practices.

**Wearables** that are combined with **location systems** are another technology that can provide real-time compliance monitoring. By monitoring worker location in real-time, the system can push alerts when a worker enters a restricted or hazardous area. **Wearables**

can also provide slip/trip/fall incident alerting and provide real-time notifications to enable rapid response.

■ **Documenting Incidents and Near-misses**

**Jobsite cameras** and visual auditing are a great way to document incidents and near-misses. Today's systems allow continuous 24/7 recording to capture high-resolution video of any onsite occurrences. Properly documenting incidents can affect risk and safety management in a number of ways. First, it can reduce exposure by having a comprehensive and visually backed capture of the facts, circumstances and timelines. Secondly, aggregating and analyzing incident data can provide baseline and project risk performance metrics. Finally, documenting both incidents and close-calls enable the assessment of root-cause, the updating of policies and procedures where necessary, and the strengthening of training exercises with real-world scenarios.

■ **Evacuation and Notification**

**Wearables** and other **Networked Notification Systems** can provide the ability to send evacuation or other notifications to the entire jobsite or portions of the jobsite. This can greatly speed evacuations and alert workers of critical safety events.

■ **Management of Workflow and Site Movement**
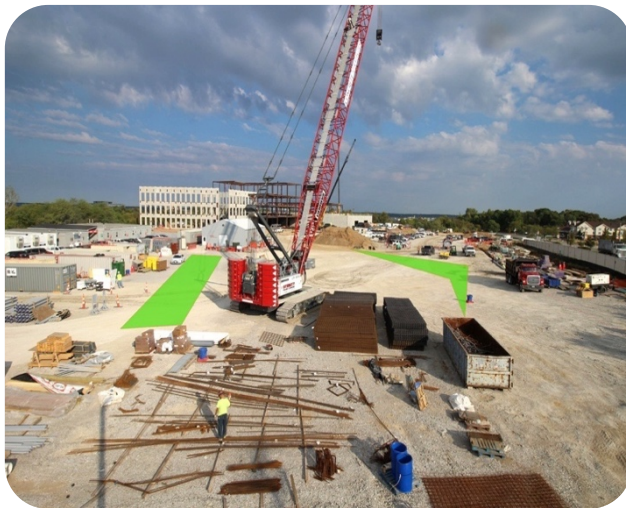


Worker movement across the jobsite in relation to materials, equipment and other build activities can have a strong impact on-site safety. **Jobsite cameras** allow managers to instantly see where workers, equipment and materials are in transit and identify potential safety issues or risk. **Real-time location systems** can track worker and equipment locations in real-time, showing histories of locations and alerting on entry and exit of specified zones. Alerts and historical movement data can be used by project managers to optimize workflow to improve safety.

■ **Automated Detection of PPE**

Compliance with PPE requirements is an important part of site safety. **Jobsite cameras** combined with **AI and video analytics** can provide automatic detection of workers not wearing required PPE. This type of information can be used in real-time to take immediate corrective action, and over time, to develop metrics at the project or company level to drive risk models with predictive measures.

■ **Automated Worker Location**

Knowing how many workers are on-site and where they are located provides overall situational awareness to the safety team. **Real-time location systems** are pivotal in

providing detailed worker headcount and location information in the event of an evacuation, accident or other hazard.

■ **Dangerous Inspection Tasks**

Dangerous inspection tasks required during a build can be a big source of risk. **Drone photography** can be used to reduce the need for workers to access highly elevated locations, thus improving the safety of that operation.

■ **Avoiding Litigation**

Avoiding litigation is key for any project. While this is typically addressed at the contract level, and of course through best practices in quality and safety, when issues do arise, technology can help contractors avoid costly litigation. Having solid, visual, as-built documentation can help prove that a step or process was completed properly. In addition, having visual documentation with weather information can help resolve disputes quickly and inexpensively. This type of as-built documentation can be provided by today's **jobsite cameras** and **cloud monitoring software**.

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## REQUIREMENTS FOR TECHNOLOGY SOLUTIONS USED FOR SAFETY

Any of these technology-based solutions must satisfy a number of requirements in order to be a viable solution for the jobsite. These requirements include:

- Simple Deployment – any technology solution must be simple to deploy to be practical on a construction project that may only last a year or two.
- Affordable – construction as a business operates on small margins, so even when a technology has a strong ROI for improving safety, it must be cost-effective overall to a project budget.
- Flexible – each construction project is unique. A successful technology solution must fit projects of various types and sizes.
- Integrated – as jobsites become increasingly digital, it is important that each solution integrate with the others to simplify setup, training, and use of the system.
- Cross-project – a successful technology solution for safety must be usable by the entire project team: GCs, subs, trades, owners, and other stakeholders.
- Private and secure – successful solutions must consider the privacy and security of the data that is collected and used by the safety system and honor the data policies of the organization.

**TECHNOLOGY AVAILABLE TODAY AND IN THE FUTURE**

**Sensera Systems** (www.senserasystems.com) a leading provider of jobsite cameras with over 1,000 GC's using the technology, many for visual auditing and safety-related use-cases.
**Smartvid.io** (smartvid.io) provides automated detection of PPE compliance on jobsites with AI and machine learning.
**Triax (**triaxtec.com) is deploying wearables to automatically detect slip and fall incidents.
**Pillar Technologies** (pillar.tech) deploys environmental sensors to measure and manage a safe workplace.
**Procore** (procore.com) software suite includes applications to support jobsite safety compliance and management.

While today's use cases for adopting technology to improve jobsite safety is an impressive start, they are only the beginning of what can and must be done. More widespread awareness and adoption of these kinds of tech solutions are needed across the industry.

Going forward we can expect that vendors will continue to innovate, bring costs down and make solutions simpler to deploy. We are already seeing signs that insurance companies will engage in various ways to encourage the use of these kinds of solutions to mitigate risk. We can also expect that owners and developers will become more aware of the impacts these kinds of solutions can have, and will factor that into their selection of partners.

**TECHNOLOGY ADOPTION BEST PRACTICES**

The key to successfully adopting new technologies and processes is starting small. As a best practice, single out a project or two and select a specific use-case or metric that you want to tackle. Select a technology vendor that will work closely with you and help you get started. Define your objectives for what you want out of the trial and measure your progress. Allow for a learning curve along the way as you gain experience with the technology and understand your objectives may change and expand.

Predicting the future is difficult. Predicting the future of technology is even harder. But betting that technology will play a big role in reducing accidents, increasing productivity and improving quality on the jobsite is a no-brainer.

**About Sensera Systems**
Sensera Systems® is a leading innovator of comprehensive, real-time jobsite monitoring solutions. The company is recognized for pioneering the next-generation of multi-function jobsite

cameras that seamlessly integrate progress monitoring, collaboration, site-security, safety, and documentation functions. Sensera's solar/wireless/LTE/Cloud solutions have earned the trust of over 1,000 general contractor customers, making Sensera the fastest growing solar powered jobsite camera manufacturer in North America.

Sensera's portfolio of advanced jobsite monitoring solutions is powered by Sensera's SiteCloud® platform which provides easy-to-use software for viewing, monitoring, and sharing real-time site data, detecting actionable insights, and simplifying workflow. SiteCloud is tightly integrated with Sensera's complete line of jobsite cameras, SitePOV™ mobile app, and SiteCloud-AERIAL™ drone photography services to provide comprehensive automated site monitoring from a simple web interface. SiteCloud service includes WiFi and 4G/LTE connectivity making it a true end-to-end solution. Integrations with Autodesk® BIM 360, Procore®, and PlanGrid simplify and automate workflow across the enterprise.



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