

## Visual Aid Technologies to Increase Crane Safety and Productivity

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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With thousands of mobile and overhead cranes active across the world, steel companies are looking for ways to remain competitive while maintaining high standards of safety and improving the bottom line. Leveraging the latest technology in situational awareness platforms is one way that companies can remain competitive while improving quality and safety.

Situational awareness platforms may be a combination of sensors and/or camera systems that are designed to increase the safety and efficiency of a crane operator, resulting in savings of time, money and a reduction in accidents.

### What Is Situational Awareness?

Crane operators often take the lead in maintaining the tempo of a steel mill. Their ability to make immediate and accurate decisions has a direct impact on the entire mill. Providing the operator with enough information to help him or her relocate equipment, move materials and support the mill is critical to smooth operations. One way of improving the ability to make better and more informed decisions is to increase the crane operator's awareness of the work environment around them.

In today's market, the competitive advantage at a steel mill can be gained by leveraging the latest in situational awareness platforms. Often a term reserved solely for the military, situational awareness is defined as the perception of environmental elements with respect to time and/or space. To further elaborate, the ability to see what is around the decision-maker enables him or her to make better informed decisions. When personnel are properly

trained and equipment is correctly installed, situational awareness platforms can increase the decision-making capabilities of management and operators, resulting in more efficient and safer operations for everyone.

Effective situational awareness platforms start with the basics by providing the operator with enough information to enable him or her to make better decisions without being a distraction. Simply put, a display mounted in the crane operator's cab can show a live video feed from a wireless camera placed on the trolley of an overhead crane. Another option is to mount cameras around a mobile crane to allow the operator to quickly see around the equipment prior to relocating or moving the crane. The combination of strategically placed wireless cameras and video display mounted in the operator's cab is an example of a situational awareness platform.

### Leading in the Blind

Blind lifts are some of the most dangerous and nerve-racking maneuvers for any crane operator. Traditional blind lifts are often very slow and require time-consuming moves. Having to rely solely on the eyes of the rigger to relay information to the crane operator with radio communication can cause a great deal of stress to the operator. This is especially true if the operator and rigger have not worked together in the past or have not built a good rapport with one another. They must have the ability to work together as a team and rely on each other's judgment.

A wireless camera that is easy to deploy, is rechargeable and can

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provide a battery life long enough for an entire shift can significantly increase the efficiency of the entire steel mill.

For example, when working a blind lift in which a hot-rolled steel supply cargo vessel was emptied, Netarus found that with a camera mounted on the vessel, the crane operator could be up to 40% more efficient in a blind lift than without a camera. This significant increase is attributed to an increase in the operator's situational awareness, which enables him or her to make better and more informed decisions regarding the load. Working in cooperation with a rigger, the crane operator increases his or her situational awareness, and the result is more efficient operations between the two.

Further, situational awareness platforms positioned directly at the construction site benefit the entire operation. When the crane operator is given increased visual ability, there is the obvious benefit of fewer accidents. Fewer accidents can reduce costly claims and the loss of personnel due to injuries.

In addition, because the crane operator is more efficient, the entire steel mill gains in efficiency, which results in increased productivity from having to work less to accomplish the same goal.

Placing wireless cameras on the boom of a mobile crane, or on the trolley of an overhead crane, can significantly increase the ability of the rigger and crane operator to effectively understand what is happening in and around the mill. Having a video feed for hard-to-see areas means the crane operator is effectively placing his or her eyes exactly on the load or equipment for which they are responsible. This is especially true behind large stacks of rolled or slabs of steel. If the lifting team is able to work faster without compromising safety, the benefit can be seen in reduced direct and indirect operational costs.

## Unintended Consequences

There are some unintended benefits from using cameras at a steel mill to improve situational awareness. If they're used to increase the situational awareness of the crane operator, the rigger or banksman may interpret this as management watching them. An unintended benefit of this perception by the rigger is an increase in productivity whether or not management is actually viewing the camera feed. This productivity increase can be associated with the Hawthorne effect, where the basic premise of which is that workers tend to work harder because they believe they're being monitored individually.

As a counter to the positive psychological benefits of cameras at a mill, there can be a negative consequence as well. Some team members may interpret cameras as an invasion of privacy, whether they are

entitled to that privacy or not on the job site. If not well educated on the positive aspects of the situational awareness platform, team members will be left to their own thoughts, which can create anxiety and, even worse, the possibility of unintentional or intentional sabotage of the camera or other mill equipment.

As with any new tool, proper education should be provided to ensure that everyone understands how the situational awareness platform is there to benefit all. Further, any wired or wireless equipment at a steel mill needs to be properly implemented and maintained. Proper training, setup and the ruggedness of components all need to be considered before attempting to install or use any situational awareness platform. However, a properly installed and configured platform at any steel mill can significantly reduce time, money loss and accidents, and a fully trained and educated team supporting the crane operator can go a long way toward accomplishing these goals.

## Reduce and Better Understand Accidents

It goes without saying that the most important job function of any mill supervisor is the safety of his or her team. Providing the crane operator with the proper situational awareness platform can be instrumental to the safety of the team that operates around him or her. A wireless camera system can allow the rigger and crane operator to decide when and where they need the additional line of sight.

In addition, this video can be sent wirelessly over the internet to management for monitoring progress within the mill. It could also be recorded to a digital video recorder (DVR) and used for analysis of the efficiency of the mill, or to conduct post-incident or accident analysis.

The ability to relocate the crane operator's eyes to anywhere within the steel mill improves the confidence of both him/her and the rigger(s), resulting in better decisions by the team during any lift. A confident crane operator is critical in preventing accidents, and he or she instills similar confidence in the team that works below and around them. Therefore, the benefits of a situational awareness platform can be immediately tangible and substantial for the safety and well-being of the operator and every team member of the steel mill. ♦