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Case Study

ADVANCEMENTS IN OVERHEAD REMOTE CONTROLS INCREASE SAFETY AND EFFICIENCY

BY DAN MIHALCAK (reprinted from CraneWorks Magazine)

Portable remote controls have been part of overhead crane operation for more than a decade. Efficiency, productivity, and, above all, safety, account for their growing use. With all that these control systems could perform, it seemed that very little remained technologically to improve.

We've learned since the early 1990s, however, that technology does not respect limits. This is especially true for remote controls. Some technological improvements were deemed beyond the realm of possibility only five years ago but not any more. Recently, manufacturers have sought to create advanced, safe, and thorough systems that provide instantaneous feedback for operators.

Functional Needs

What was behind this necessity to push the development envelope? It arose from the needs of companies that saw portable radio remote controls (PRRCs) as an answer to safety and efficiency issues. Consider the experience of Nova Steel, a service center in Louisville, Ky. Until a few years ago, the company relied on cab operators for its Zenar over head crane. It eventually switched to three PRRC units. In what is essentially a "pitch and catch operation," a PRRC operator is situated at each end of the 300 yard long loading and unloading coil operation. The controllers' quick response coupled with the diagnostic feed back keeps each operator aware of every step of the process and has enhanced safety and efficiency. The controllers also enable a tighter coil placement, resulting in more available space.

Digital Data

Upgrades in technology, particularly with PRRCs, are visible in digital data instrumentation feedback, which confirm to the operator that various conditions exist and commands have been executed. This digital feedback can be in the form of text messaging, LED lights, or alarms, depending on the type of controller and available options. For example, operators are made aware immediately of a fault or out of limit condition. This is especially useful when operations involve the use of weigh scales. In addition, PRRC feedback assists the operator with alignment

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(e.g., operators can be assured they are moving or placing the load at a specified point). Indications on the handheld controller also can warn operators about conditions, such as low brake pressure.

Feedback has been enhanced to the point that it can tell the PRRC operator how long crane equipment is running; whether its run time has gone beyond specific limits; and, in the case of certain magnets, whether temperature has been exceeded and the magnets are overheating. The data feedback is instantaneous, and the operator can respond in time by shutting down the operation before a potential catastrophic drop occurs.

Count the Joysticks

Improvements also have appeared in the controller's design. For example, the housing of most controllers generally contains two joysticks. Recently, however, Cattron-Theimeg introduced an overhead crane controller with three joysticks, which can handle multiple bridge, trolley, and hoist motions. The unit is a combination of single and dual axis joysticks. It uses advanced encoder circuit boards and micro controllers. In the event the operator falls or drops the controller, tilt switches can send different functions, such as alarms or immediate equipment stops.

Bob Aiken, Vice President Technical Planning & Support for Cattron-Theimeg, said having three joysticks improves functionality of the remote control. "We wanted to give the operator the function of switching from tandem operations to independent ones without requiring a selector switch," he said.

Many companies might be dealing with five motor cranes a bridge, two trolleys, and two hoists. With a single axis joystick, the operator would have to use the selector switch when changing trolley and hoist combinations.

"Maybe the operator, who is on the ground, wants to roll something over, so you've got one trolley hoist going up and another down," Aiken said. "The operator, because of the dual axis, can do this without having to add the selector function in the same way the crane operator did when he was in the cab overhead."

Aiken explained the benefits by comparing the three joystick controller to a manual shift car with brake and clutch pedals. "What if you needed a selector switch to go from one pedal to the other?" Aiken asks. "Obviously, that wouldn't be very functional. That's why we added the third joystick to give the operator one less step to be concerned about."

Remote Control vs. Pendant

Remote control usage is widely gaining preference over pendants for several reasons. Those who have worked in tethered pendant applications know that range of movement is restricted relative to the load because of the pendant cord, which was not always easy to maneuver during load placement. With a wired pendant, an operator could find himself uncomfortably close to the load. As any risk manager would point out, this setup does not provide optimum conditions for safety. The advancements in today's PRRCs, however, enable operators to position themselves away from potential danger.

Another improvement of PRRCs is the elimination of awkward steps, such as those tethered pendant operators may take to gain a safe walkway and/or unobstructed vision. PRRC operators can position themselves away from all obstructions on the plant floor. This enables the operator to send the load via the most direct path, while maintaining a complete view of the crane, the load, and any potential obstacles.

Remote controllers also have the flexibility of programming changes should the design of the shop floor or the crane operational assignment completely change.

Internal Diagnostics

Internal diagnostics the trouble-shooting capabilities of today's portable remote systems may be the biggest advancement in PRRC technology. These systems have gone far beyond a simple red light display, which originally advised the operator that something wasn't right in a particular function. At that point, determination of the problem was left to the operator, who then had to troubleshoot.

Consider some of the information now available from a display. At the Lockheed Martin aircraft assembly plant in Marietta, Ga., one operator using a PRRC can conduct diagnostic assessments of multiple cranes. Two separate microprocessors can provide simultaneous and independent data-signal processing, with specific information immediately fed back to the operator, while data logging keeps a record of activity. Some PRRCs even have a safety override function that only disables the faulty portion of the controller.

Less Can Be More

Technological enhancements are not limited to top-shelf PRRCs. Many of these improvements have been sufficiently cost effective to be offered in moderately priced systems. "You've got OEMs trying to maintain their profit margins but concerned about the costs of purchasing top-quality equipment," said Don Rottman, Cattron-Theimeg sales supervisor. Digital PRRC alternatives for overhead cranes and reversing motor machinery are available to meet these needs, such as Cattron-Theimeg's non-customized PRRC designed for three-motor, three-speed cranes. The CS (crane specific) system includes millisecond response from a PRRC command as well as self diagnostic capabilities and a receiver/decoder that can handle heavy industrial usage.

What's Next

Manufacturers are tight lipped about the next advances in PRRC technology for overhead cranes. Engineers are working on ways to put more information at overhead crane operators' fingertips with the most compact controllers and receiver/decoders. Some of these enhancements have been made in remote control systems used by the railroad and mining industries and could very well carry over into crane applications. What is clear is that safety, efficiency, and productivity will always be overriding considerations in the development of more capabilities for PRRCs

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