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RFID Helps Halt Collisions Between People and Robots

Topics/Verticals: Sensors, Operations, Asset Tracking, Manufacturing

Automation-machinery provider CAMotion is offering Q-Track's RFID-based CANLOS solution, with its collision-avoidance technology, to head off accidents.

By Claire Swedberg

May 25, 2012—In today's manufacturing environment, humans often work side by side with large robotic equipment. Many factories thus count on automated protection systems to ensure that robotic cranes and other automated heavy machinery never collide with a person—even if that individual's behavior is unexpected (such as if he or she leans down to tie a shoe, then suddenly stands).

CAMotion, a provider of robotic automation machinery, is offering Q-Track's RFID-based Collision Avoidance Non-Line of Sight (CANLOS) system to its customers. The solution, intended to provide redundancy to CAMotion's existing laser-based perimeter-safety system, employs RFID receivers (readers) on cranes, as well as RFID tags worn by workers, to detect an imminent collision and stop a crane before that can occur.

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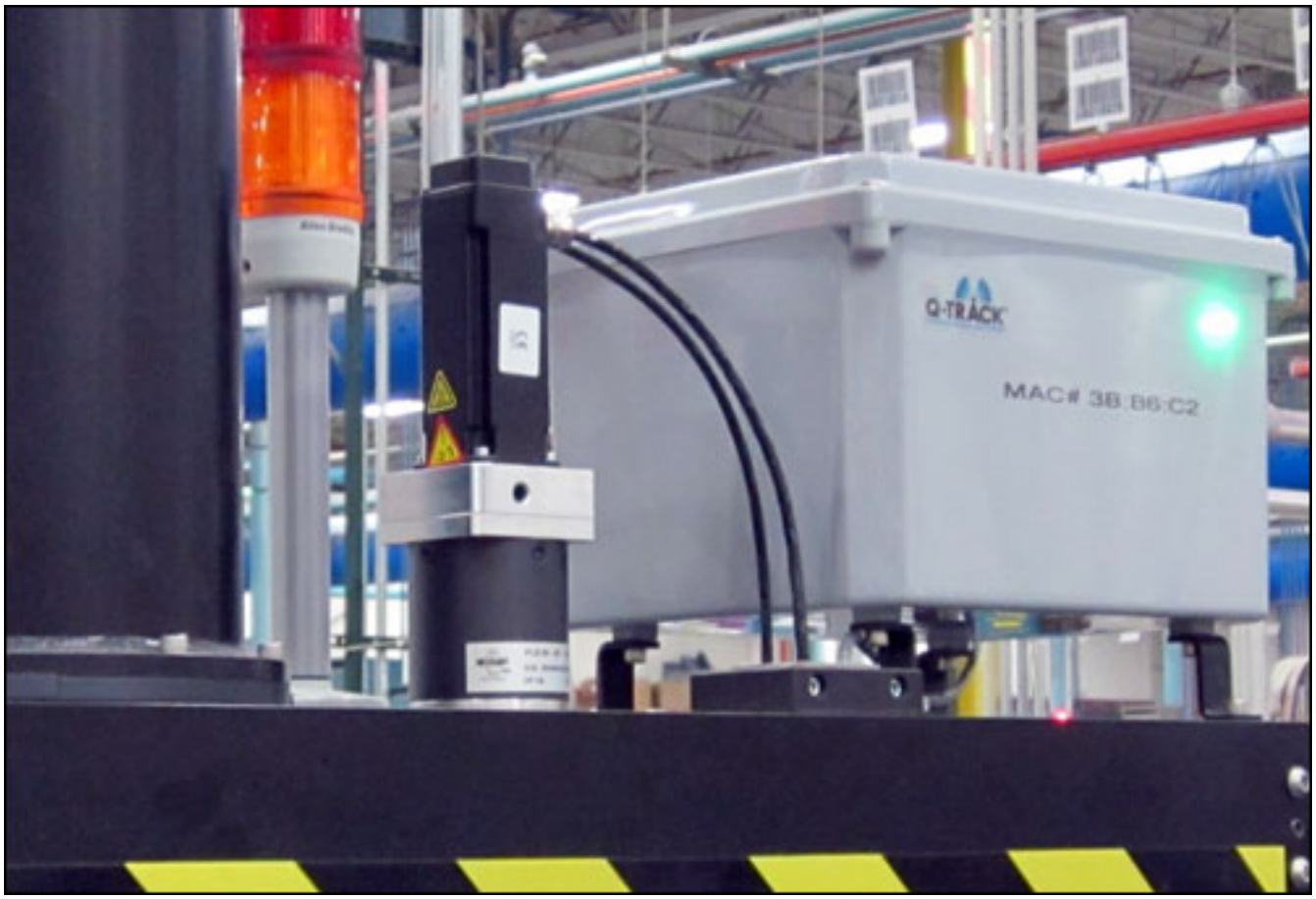

CAMotion is mounting Q-Track RFID receivers on some of the robotic cranes it sells to customers.

CAMotion's laser-based solution provides what it calls complete accuracy in protecting people from the machines in their vicinity, as long as those individuals comply with expected behaviors. However, for situations in which the laser system fails to detect a person's presence—such as when someone crouches down or steps behind a box or crate—CAMotion now offers CANLOS to ensure that the system will shut down even during such unexpected events. Using RFID technology, Q-Track provides a non-line-of-sight solution, so that if someone fools the laser's line of sight but still remains within the crane's vicinity, CAMotion's safety software will detect this.

The CANLOS system employs what Q-Track dubs Near Field Electromagnetic Ranging (NFER) technology. NFER tags, unlike typical active RFID or Wi-Fi solutions, transmit at low frequencies (1 MHz), says Stephen Werner, Q-Track's CEO, with long wavelengths that typically measure approximately 300 meters (984 feet). This makes the transmission easier to read in what are considered "hostile" RF environments, such as those containing a great deal of metal. The company's

tags are battery-powered, and employ a proprietary air-interface protocol to communicate with a receiver.

CAMotion's "dynamic safety system" technology runs on the crane's Siemens programmable logic controller (PLC), in conjunction with CAMcode motion-control software on an embedded PC. In the event that the solution detects a person within the laser system's field of vision, it instructs the crane's PLC to deactivate the crane until someone manually restarts it, or until the system senses that the area is clear.

CAMotion is providing the CANLOS system—as redundancy to its laser-based collision-avoidance technology—to a magazine printing firm that utilizes automated cranes to move large stacks of paper, known as logs. The CANLOS system has been installed at 15 locations throughout the United States, according to Alex Furth, CAMotion's CEO, with six additional sites slated to go live during the next few months.

A Q-Track QT600 RFID transponder, worn on a belt clip, beacons a unique ID number at predetermined intervals—typically, 10 times per second. The RFID receiver is installed on the crane's gripper (the claw that picks up an item), which measures about 45 inches in length and 9 inches in width. The crane itself usually moves at the speed of a typical fast walk. When the gripper comes within about 8 feet of an individual's transponder, the receiver determines that a collision is possible. The CAMotion software, loaded on the machine's onboard computer, then instructs the crane to halt, which takes approximately 1.5 seconds to occur once the transmission has been received.

The system can be adjusted based on the amount of time required to stop the crane, Werner says, according to the vehicle's speed and the weight it carries. For example, a crane carrying steel may take longer to stop than one holding a lighter load.

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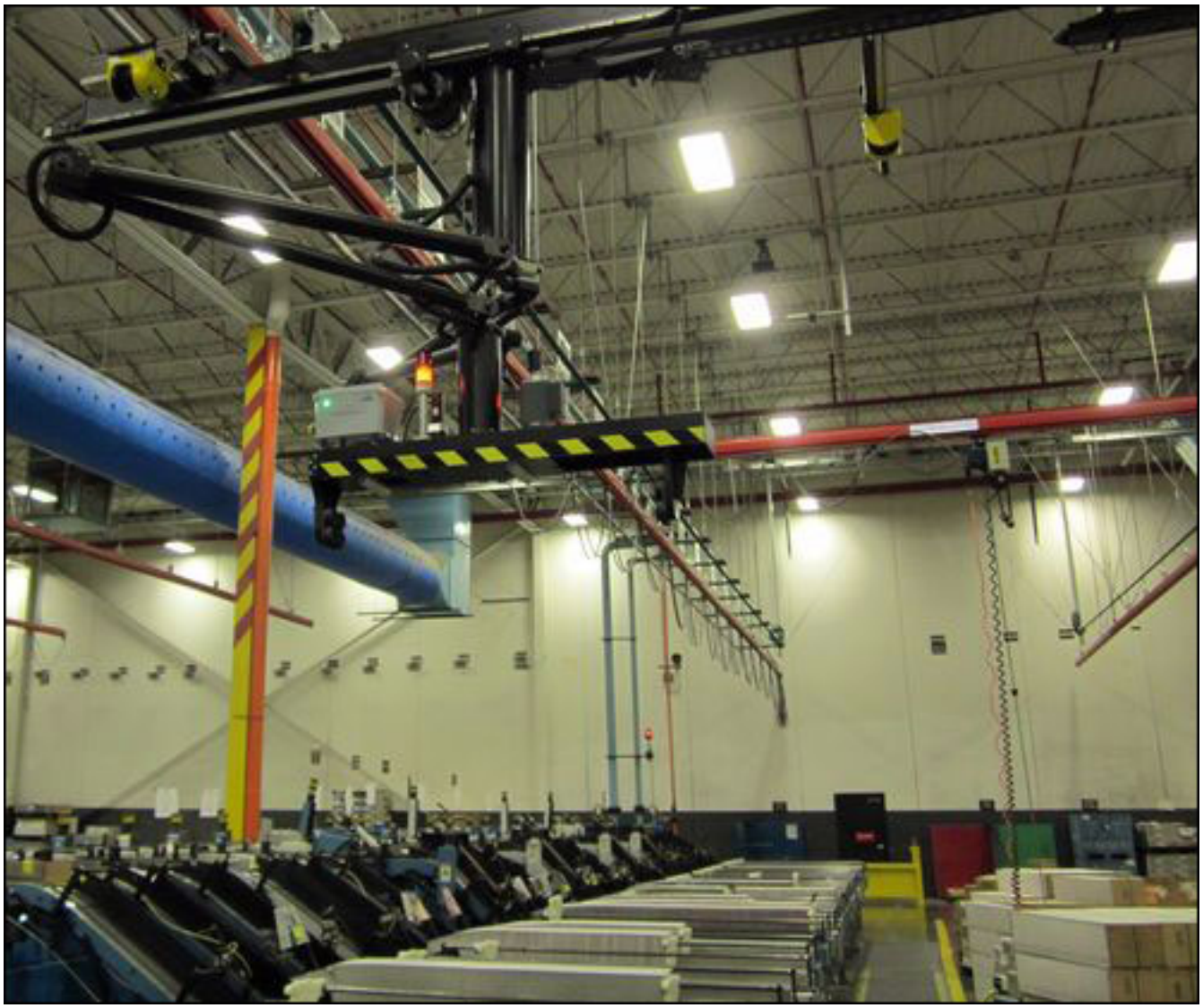

Q-Track's RFID-based CANLOS system has been installed at a magazine printing company that uses automated cranes to move stacks of paper.

CAMotion began marketing its crane-automation systems four years ago, Furth says, and has offered Q-Track's RFID-based CANLOS solution for about a year and a half. In each case, RFID is used as redundancy to the primary laser-based safety system when users want an additional layer of safety beyond the existing technology.

Q-Track offers solutions for a variety of applications, from tracking miners to elder safety solutions, as well as firefighter-location systems. In addition, the firm is currently developing a correctional officer

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distress alarm (CODA) system for use by correctional facilities. At the 2012 Tactical Conference, held earlier this month in Verona, N.Y., the company demonstrated its NFER real-time location system (RTLS) in an application designed to track police officers during training applications occurring indoors, underground or anywhere that GPS service is unavailable.

Q-Track's technology has also been used to train workers in the nuclear industry, by providing RFID transponders with dosimeter sensors to detect radiation and forward that data via RFID to a back-end system (see Nuclear Plant Operator Uses RFID to Promote Safety). In 2009, Southern Co. deployed the system at a training site for future employees of the electric utility company's Plant Vogtle nuclear facility, located in Waynesboro, Ga. More recently, American Electric Power's D.C. Cook nuclear power plant in Michigan began utilizing Q-Track's Q-Dose and Q-Dose XL solutions to enhance its training efforts.