Aker Yards Uses RFID to Ramp Up Worker Safety

At its shipyard in Turku, Finland, the company installs interrogators alongside gangplanks so administrators can determine who is on board a vessel and in danger in the event of a fire or other risk.

By Rhea Wessel

Nov. 7, 2007—More than 5,000 people work in and around the world's largest cruise ships as they are assembled at the Aker Yards shipyard in Turku, Finland. Therefore, the shipyard operator needed to be able to track which workers were on board a ship at any given time in case of a fire or other problem.

The 5,000 people working on a vessel can hail from 40 different nations, and some 2,500 may be subcontractors. The fact that workers are employed by dozens of companies and speak a variety of languages made it especially difficult for Aker to track personnel and provide for their safety.

The company sought a solution for its tracking needs for nearly a decade. It considered guards, but they were too costly. It also looked into employing a standard key fob application using passive RFID, but decided against that because workers coming on and off ships often carry large loads, and key fobs would likely get damaged or be difficult to use for a person with full hands.

The tracking system needed to be wireless and able to inform administrators how long a worker had been aboard a vessel, said Antti Virkkunen, CEO of Vilant Systems, on Wednesday at RFID Journal LIVE! Europe 2007 in Amsterdam. "The main idea was to have a tool you can use in a fire emergency on a ship," Virkkunen told attendees.

Vilant Systems designed and implemented the RFID system, using Motorola interrogators to track workers wearing RFID-tagged helmets as they move on and off a ship. The company mounted readers alongside each of the ship's gangplanks, with one interrogator used on footbridges measuring 1 meter (3.3 feet) across, and two on those spanning 3 meters (9.9) feet across.

The readers contain internal heaters and small drainage pipes that can be used to siphon off water from rain and melting snow. The devices comply with EPCglobal Gen 2 standards and function at temperatures ranging from -40 to 50 degrees Celsius. The only cable attached to the each interrogator is an electrical plug; internal batteries allow the reader to function for about 30 minutes after the plug is pulled. In the event of a fire, firefighters customarily cut off electricity to the ship immediately. The readers communicate with the back-end system via a wireless LAN connection.

With RFID interrogator antennas positioned at opposite ends of each footbridge, the system can determine if a person is embarking or disembarking by calculating the time difference between reads from the two antennas.

The first tags utilized in the project were EPC Gen 2 ShortDipole tags from UPM Raflatac. Vilant later

switched to UPM's DogBone tags because they offer slightly better read ranges. In the beginning stages of the application, workers wore helmets with RFID tags placed on the back and covered in plastic. However, employees often bumped their heads or sat on their helmets, damaging the tags, so they were eventually placed inside the helmets instead.

When Aker Yards was installing the system, unions raised concerns regarding employee privacy. Therefore, the company agreed that the RFID system would be used only by firefighters and security workers.

The system can also be utilized for further security applications: If a worker remains on board for 12 hours, for instance, it may be a sign that individual has been injured, and that guards should begin a search. What's more, guards can use a handheld reader to scan a worker's helmet and pull up a picture of that employee to confirm that the correct person is gaining access to the ship. Because of these additional security benefits, union representatives began to value the system—and sometimes even complained if it took too long for Aker Yards to set up the readers when a new ship docked.

RELATED_ARTICLES According to Virkkunen, the main challenges involved finding the proper tags for the project and getting directional reads. "A person needs to be 'visible' for 10 meters," he told conference attendees. The Motorola interrogators deployed take multiple reads as a person walks by, allowing operators to choose from four or five data points to calculate whether that individual is moving on or off the ship.

In the future, Aker Yards plans to expand its use of the system—which cost about €150,000 ($220,000) for the Turku deployment—to its two other Finnish shipyards, located in Rauma and Helsinki.

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