ThyssenKrupp to Use EPC UHF Tags to Track Steel

Having completed a pilot that tracked 1,000 slabs shipped to Germany, the company plans to deploy an RFID system at its new factory in Brazil.

By Rhea Wessel

May 14, 2007—ThyssenKrupp Steel, one of the world's biggest steel companies, has completed a pilot in which it RFID-tagged 1,000 steel slabs and tracked them along their journey from their point of origin in Brazil to German factories, where they were processed.

The pilot ended successfully in January and was the basis for a decision by the Duisburg, Germany, company to tag and track 100,000 steel slabs sent to Germany each year once it opens its new plant in Sepetiba, Brazil, in 2009. In the future, the volume of tagged slabs—which range up to 12 meters in length based on customer requirements—could reach 250,000 when the application is extended to North America.

As part of its expansion, ThyssenKrupp Steel is building the Brazilian factory, which will produce 5 million metric tons of steel per year. The company ran the pilot because it needs an automated way to identify 100,000 slabs per year as they moved through ports. The company sought quick identification so it could use its cranes at maximum capacities, says Gerhard Thiel, ThyssenKrupp's manager in charge of the project. The pilot tracked slabs that were bought from a Brazilian producer.

ThyssenKrupp Steel, its RFID integrator, Accenture, and RFID tag maker SATO used specially designed SATO FlagTag RFID labels to allow for reading despite the metallic environment. A FlagTag label has a crease so that the embedded RFID transponder does not lay flat against the object to which the paper label is attached.

Instead, the transponder is at a 90-degree angle to the object, extending like a flag perpendicular to the object. With the tag not touching the object—particularly a metallic object—its readability is improved, according to SATO. For the ThyssenKrupp project, Accenture and SATO modified the RFID label's flag size, paper and glue and modified the printer's folding mechanism so that it could fold the labels without the need to perforate them. The lack of perforations increases the flag's flexibility so that it bounces back to a 90-degree angle even if it has been laid flat for a considerable time during transport.

"We don't know of another case where a company is successfully tagging steel slabs in production," says Loic Feinbier, Accenture's RFID expert on the project.

The tags were attached with adhesive to the middle of the side of each slab at a seaport in Brazil. They contained UPM Raflatac EPC Class 1 Gen 2 RFID inlays, which operate at 860 to 950 MHz, so that they will work in all countries where ThyssenKrupp Steel does business. Tags are encoded with a 10-digit unique ID (part of the EPC number) linked in ThyssenKrupp Steel's IT system to information on the slab's steel grade,

dimensions, customer and destination.

At present, such information is tracked manually, and slabs are marked with a 10-digit number sprayed with heat-resistant aluminum ink. The partners chose EPC inlays because of their global availability and competitive pricing. They also wanted to keep the option of possibly using EPCglobal's software-based EPCIS standard for systems used to store and share tag-related data.

"Today slabs are only used internally for production of coils and other end products, but in the future they may also be traded with other steel companies or even end customers," Feinbier says. "Therefore, the exchange of information via EPCIS might be a future scenario."

Once the application is up and running, slabs will be identified about seven times during their journey from Brazil to the German processing plants. In the pilot project, the steelmaker interrogated the slabs when they were tagged at the Brazilian seaport and when they were unloaded off the ocean vessels at the European seaport. A third interrogation came when the slabs were cleared from river barges at ThyssenKrupp Steel's Rhine River harbor in Duisburg-Walsum, Germany.

Up until this point, handheld readers made by Psion Teklogix were in use. But in Duisburg-Walsum, ThyssenKrupp Steel tested several RFID readers mounted on a crane used to hoist the slabs off of the ship and onto barges and railcars. The readers, made by Alien Technology, interrogated slabs while they were suspended about 3 meters aboveground. The system then tells the crane operator where to place the slab. Once the system is fully implemented, fixed crane readers will be used at each point and handhelds will be used as backups in case a tag is damaged and a new one needs to be applied and encoded.

Because of high fees for landing and docking ships at European harbors and a limited number of cranes to unload the ships, the company must limit the time it takes workers to unload to a maximum of three minutes per slab. By quickly identifying the slabs, RFID helped speed the process of determining which slabs go on which barges and railcars. Part of the steel was taken to ThyssenKrupp Steel's hot rolling mill in Bochum, and other slabs go up the Rhine to the plant in Duisburg-Walsum.

The last interrogation happened with fixed RFID readers along the production line before the slab was sent into the reheating furnace to be rolled into a coil. The partners may also identify further interrogation points at other destination sites.

Before the pilot began in October, tags were tested to make sure they would be readable after going through harsh conditions during transit, such as being washed with seawater and exposed to temperature changes, snow, ice, bumps and knocks. Bar-code labels were ruled out as a method of tracking the slabs since ice, dirt or salt buildup could hinder the ability to scan the bar code to identify the slab, and time was short for moving the slabs around.

"The lack of time means that manual tracking of the slabs simply isn't possible," Thiel says.

Feinbier explains: "There are further reasons why bar codes were ruled out: strong sunlight could lighten the black-white contrast necessary for bar codes to be read, and we wanted to identify moving objects. There are no auto-focusing bar-code readers that can reliably read over distances of several meters under these conditions."

RELATED_ARTICLES Read rates in the pilot were "highly satisfactory, although not 100 percent." The company was so pleased with the results that it decided in March to move ahead with the project and announce the pilot to the public. Currently, ThyssenKrupp Steel is integrating the RFID application with its IT systems, Thiel says.

"This entire project is not about optimizing an existing process, as there is no steel plant in Brazil to date," Feinbier says. "It's all about creating the new processes in the best possible way." ThyssenKrupp Steel declines to say how much it is investing in the project.

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