DC VELOCITY
SEPTEMBER 2006

strategic insight | Lift Truck Fleet Management

forklifts get smart

By John R. Johnson

They're not just for heavy lifting anymore. The next generation of forklifts will be RFID-enabled smart trucks that not only collect data but crunch it as well.

For all its metallic paint and high-tech gadgetry, the "Forklift of the Future" will never match the style and flash of, say, the Nissan Urge concept car. But then, almost anything would look stodgy next to the Urge, with its sleek, motorcycle-inspired styling and built-in Xbox 360 gaming system. (Yes, gaming system—when the car's driving controls are deactivated, a monitor folds down from the rearview mirror, and the steering wheel and pedals become game controls.)

Yet there's much more to the Forklift of the Future than meets the eye. The truck—like the Urge, a concept vehicle intended to showcase design innovations—features built-in RFID and mobile computing capabilities. And though it's not wired to let operators play Madden or Chromehounds during shift breaks, the forklift does promise to lighten their workload. For one thing, it allows drivers to read and encode RFID tags without ever leaving the vehicle. For another, it can direct them right to the storage aisles where they need to deliver or retrieve items.

What's truly unusual about the Forklift of the Future, however, is that RFID has been designed into it from the ground up—not added as an afterthought. Its designers—engineers from auto ID specialist Intermec and forklift attachment maker Cascade—went into the project with the goal of integrating RFID technology into the unit's infrastructure, replacing the cumbersome and inefficient bolt-on approach to data collection. "When you throw out your preconceived ideas of what forklifts do today and think about how RFID capabilities could be built into the very structure of a complete forklift equipment system, you begin to realize the efficiencies this type of mobile data-collection system can deliver," says Brad Vandehey, a product manager at Cascade.

That this particular mobile system can deliver is real-time location data and RFID tracking capabilities throughout the DC. Intermec and Cascade integrated the forklift's RFID reader with real-time asset locator technology from Cisco and management software from RedPrairie to create a system that reads RFID tags, collects and wirelessly transmits tracking data, and provides operators with directions for delivering or retrieving items. It also allows managers to keep precise records on their forklifts: who is using them, how fast they drive them, when they bump into something, how often they're idle, and what their maintenance needs are.

Right now, the Forklift of the Future is only a prototype, not a production model. Unveiled at Intermec's Global Partner Conference in February and later exhibited at RFID World in Dallas and RFID World Asia, it is now making the rounds of industry trade shows. But that's not to suggest that trucks like this won't ever be produced.

Intermec and its partners are currently talking to manufacturers about bringing something like this to market.

Early warning systems

Like Intermec and its partners, engineers at companies across the country are looking at ways to use RFID technology to transform what has traditionally been one of the most mundane pieces of equipment in the DC into a cutting-edge tool.

As the Forklift of the Future indicates, one area of focus is using RFID to help managers keep better tabs on their lift-truck fleets. Intermec and its partners, for example, are exploring ways to combine RFID technology with the "telemetric" technology that lets truckers remotely monitor their fleet vehicles, tracking each truck's average fuel mileage, run times at various speeds and hard brake conditions, for example.

"There are a ton of things that auto manufacturers capture about a vehicle by using telemetrics, and we're picking up on the fact that some of the forklift manufacturers are starting to do some work in this area," says Bob Eckles, director of industrial marketing at Intermec and a key player in the development of the Forklift of the Future. "There are a number of different things you may want to record about a forklift to give you information about the operational status of the unit. You could monitor shock vibration or hydraulic pressures, and if you deal with a fleet of forklifts, that could provide timely information to help avoid breakdowns."

Indeed, designers of the Forklift of the Future have already taken a step in that direction. The truck is outfitted with Cisco's Wireless Location Appliance, which works in conjunction with RedPrairie's Mobile Resource Management software to provide location tracking via an 802.11 wireless network. Working together, the two systems can provide the X, Y coordinates of an RFID-enabled forklift's location, report movements, monitor dwell time and collect other data useful for security, employee performance auditing, maintenance and asset management applications.

Better operations through RFID

The possibilities for using RFID to improve operations seem almost endless. For starters, there's the promise of RFID-enabled inventory tracking. Companies are beginning to realize that the forklift can become a powerful supsupply chain information tool, quite possibly the center of networking operations within the distribution center. The Forklift of the Future, for example, incorporates software that not only processes the data collected via RFID reads, but can also share it with other applications, including warehouse management, yard management, labor planning and asset management systems.

Another advantage of RFID-enabled "smart" trucks is that they allow forklift operators to dispense with the laborious check-in process at the start of each shift. Instead of manually reviewing a laminated checklist tied to the truck, the driver simply uses a keypad to punch in answers to a series of questions: Is the battery fully charged? Is there any debris on the truck? Is the seatbelt in working order? Aside from saving time, the system would automatically create an electronic record in case it might someday be needed for an OSHA inspection.

Not only that, it would instantly alert technicians if a problem developed with a particular truck. "If there is a piece of equipment that you are unable to drive because it's not safe, it could be days before a mechanic hears about it if you are using a paper-based system," says Pete Rector, senior vice president of strategic initiatives for third-party logistics service provider Genco.

RFID technology may even help DC managers take performance management to the next level. For example, it could be used to verify assumptions about how long a particular task should take—for example, 10 minutes to pick up a pallet and move it to the dock door. RFID allows supervisors to validate their metrics by monitoring the routes drivers take throughout the DC as

well as the truck's idle time.

"The goal is to see if that 10-minute standard that you use to drive your entire distribution center operation is accurate," says Ken Ehrman, chief operating officer at I.D. Systems, a company that provides wireless fleet management systems. **(I.D. Systems recently signed deals with forklift manufacturers Yale ands Hyster to include its RFID software system on their machines.)** "While you might think that 10 minutes means you are operating at 100 percent efficiency, it may turn out that the job actually only takes six minutes," he says. "Our system helps you see the routes drivers are taking, as well as the idle time, in order to verify your metrics. There are opportunities to squeeze more productivity out of operators by looking at information like travel time with a load and without a load, and motion time on a vehicle. All these data points can add a whole new layer of visibility and a way to measure productivity of vehicle operators."

No tag left unread

Beyond that, the RFID forklift technology currently in development promises to cut down on errors and thus, improve accuracy. I.D. Systems, in conjunction with Yale and Hyster, is working on an advanced sensing application that prompts an RFID reader to turn itself on (or off) based on the presence of a load on the truck's forks or predetermined actions by the vehicle, like lifting its forks.

That monitoring capability is expected to lessen the likelihood of reading errors. "The system will be able to identify a situation where an RFID read didn't take place, and the display on the forklift will alert the operator that he picked up a pallet without getting a read," says Ehrman. "The problem can be fixed in real time, not later on when the supervisor realizes you only achieved a 70-percent read rate. We can program the machine to recognize that without a load, there is no reason to energize the reader. Being able to prompt the operator to help assure effective data-collection capability is extremely important to our customers."

In addition, wireless fleet management systems promise to reduce vehicle downtime by helping companies keep closer tabs on spare parts. RFID tags affixed to key parts and components would provide instant visibility as to their whereabouts. Technicians would no longer have to waste time tracking down the parts they need, which would expedite service calls.

"Many companies end up brokering parts amongst different facilities, so having the ability to know where you sent a part and when is critical," explains Eckles. "They probably won't track nuts and bolts, but companies put a lot of money into spare parts and if they are in a campus-type location, knowing where parts are by using RFID can get a truck up and running much faster."

Progress has its price

Of course, these RFID-enabled fleet management systems don't come cheap. Industry experts say it will cost somewhere around $1,000 to outfit a lift truck with RFID technology, and another $25 per truck for monthly software fees. **Krista Rose, director of Yale Fleet Management, says her company is working with I.D. Systems to come up with a more costeffective solution.** One possibility is a tiered system with graduated fees based on the level of service, so that a customer who only wants hour meter readings pays less than the customer who wants more sophisticated data-collection capabilities.

Another challenge concerns the age and the different types of lift truck units within a company's fleet.

"While RFID technology may work well on brand new units, it can be difficult to put that technology on a truck that is eight years old," says Rose. "If customers use this tool to track their fleet, then they want it on all the units, not just the new ones. Finding a tool that can be placed on all those units in a cost-effective manner without using eight hours of labor to get something hooked up can be a challenge."