Yard Management
A Case for RTLS

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Yards – The Weakest Link?

A Yard is the critical interchange point between manufacturing, distribution, and transportation. Failures in yard operations can have a costly ripple effect across the systems they support. Problems such as line shutdowns, theft, late deliveries, high demurrage costs, trailer shortages, and spoiled cargo are just a few of the problems that can result from yard failures. Most businesses address these problems through manual methods such as performing routine yard checks, logging information about arriving and departing trailers at the gate, and recording each trailer move within the yard. The purpose of these manual processes is to answer four basic questions:

- What equipment is currently in my yard?
- Where is the equipment within my yard?
- What is the status of the equipment?
- What is the status of each dock door and yard slot?

Because yard operations are fluid, having up-to-the-minute location and status information about yard equipment and parking slots is essential to ensure smooth operations. This is easier said than done. Manual processes lend themselves to data entry errors and tend to be untimely. To compensate for unreliable information, companies typically keep a buffer stock of yard equipment on hand to prevent equipment shortages. This, in turn, leads to greater yard congestion, higher equipment expense, reduced equipment utilization, and higher labor expenses associated with managing more equipment. It's a vicious cycle.

The emergence of yard management software has had a direct and positive effect on reducing the severity of common yard problems, but even the most advanced software solutions are subject to error if they rely solely on manual data input. In order to fully realize the potential benefits of yard management software, basic data collection methods need to be re-examined. This white paper discusses the benefits of combining automated location and status information with an appropriate level of manual data input to achieve continuous and efficient operations within yards and the systems they support.

RTLS – A Natural Fit With Yard Operations

Real-Time Locating Systems (RTLS) have emerged over the past six years as an alternative and cost-effective method for tracking the location and status of assets within local areas, such as yards and remote storage and delivery sites. RTLS systems differ from other types of automatic identification technologies in that tagged assets are not required to be scanned or pass within close proximity of a reader in order to be detected. In contrast, RTLS tags transmit their ID's and status information at frequent intervals via a low power radio signal to a central processor, which computes the location of up to thousands of tagged assets within yards and remote sites. The result is a completely automated inventory of all tagged yard equipment…all the time.

Leveraging RTLS Within Yards

This section describes the advantages of leveraging RTLS within specific yard processes that exist across most industries.

The Gate

Most yards have one or more gates that control the flow of traffic in and out of the yard. Information about arriving and departing equipment is usually logged in a computer system or on paper. Recorded information differs from company to company and could vary depending on the type of trailer, appointment status, and other factors.

Most companies use a combination of contract and private fleet trailers for inbound and outbound operations. Inbound transportation operations are often serviced by contract carriers, while private fleet trailers service outbound transportation operations. Some companies outsource outbound operations to dedicated carriers. Separate gate processes may exist for inbound and outbound deliveries. Drivers returning from outbound deliveries, for example, are usually granted fast access to the yard, while drivers making inbound deliveries are subject to a longer check-in process.

RTLS can be used to track both contract and dedicated/fleet trailers. By permanently attaching RTLS tags to *dedicated* trailers, these trailers can access and leave the yard with little or no manual intervention. Lanes instrumented with low cost magnetic devices cause an RTLS tag to transmit its ID, along with the lane ID, to overhead readers in the yard. A central processor immediately receives the signal and passes it to the yard software, which updates the yard inventory and historical logs to reflect the arriving or departing trailer. The tractor can be tagged and managed in a similar manner, allowing the yard software to validate tractor/trailer combinations before releasing shipments from the yard (see figure 1).

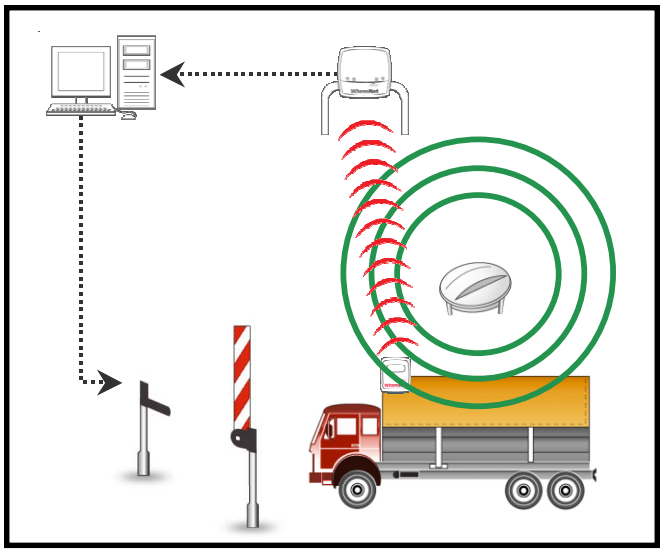

Figure 1. Automatic Gate Control

Temporary tag mounts are designed for contract trailers. Gate personnel attach an RTLS tag to the trailer when it arrives at the yard and remove it when the trailer leaves the yard. After a temporary tag has been removed from a trailer, it may be used again to track a different trailer. Whether a trailer is equipped with a permanent or temporary RTLS tag, its location and status are continuously monitored while the trailer is on site, effectively eliminating the need for manual yard checks.

The Dock

All of the operations that occur in the yard are designed to support shipping and receiving operations within a distribution, warehouse, or manufacturing facility. The dock facilitates the transfer of product and dunnage between the facility and the transportation system; therefore, it is imperative that dock operations are tightly integrated with the yard to ensure smooth and efficient transfer of goods. Questions that supervisors ask about the yard to manage their docks include:

- Which orders have arrived at the yard and have not been processed yet?
- Do I have enough trailers of the right type for shipping operations?
- What is the status of each trailer at the dock and how long have they been there?
- Am I effectively utilizing my dock resources?
- Are there any drop trailers in the yard that I can pull to an available door?

Dock systems and supervisors use information about the yard to schedule labor at the docks. Inaccurate or untimely yard data can result in inefficient use of labor at the docks, potentially costing a company millions of dollars a year in overtime expenses.

RTLS enables accurate and timely information about the yard, effectively maximizing labor productivity. Because RTLS tags continuously broadcast their signals as they move about the yard, the yard software knows the exact location of tagged equipment all the time. In addition, RTLS tags can interface with various sensors and pass status data to a yard system for analysis. If the temperature of a trailer loaded with perishable goods is out of range, the yard software can send an alert to a loss prevention manager before the cargo spoils (see figure 2). Thus, real-time location information, combined with real-time status information, is a powerful tool for effective yard management.

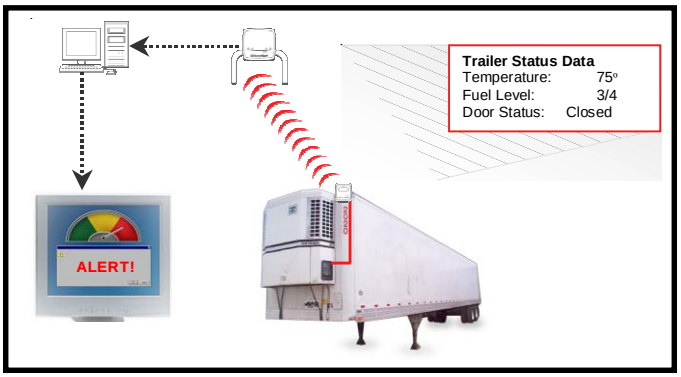

Figure 2. Remote Status Monitoring

The Switchers

Yard switchers accept requests from receiving and shipping operations to move trailers to and from dock doors. Moving the right trailers to and from the right dock doors in a timely manner is important; therefore, an accurate yard inventory is imperative. Without an accurate yard inventory, switchers must sometimes search among hundreds of trailers to find the one they are looking for. With any luck, the trailer is located close to its expected location, but drivers often park trailers in yard locations other than their assigned spots. In addition, because switchers are human, it's not uncommon for them to accidentally move the wrong trailer, or move the right trailer to the wrong spot.

RTLS provides an accurate inventory of the yard by continuously monitoring the location and status of tagged equipment, allowing switchers to quickly locate trailers that were not parked in their assigned spots (see figure 3). In addition, by tagging both the switch tractor and trailer, yard software can verify that the switcher is pulling the correct trailer according to the move request. RTLS can also verify that the switcher moved the trailer to the intended dock or yard spot.

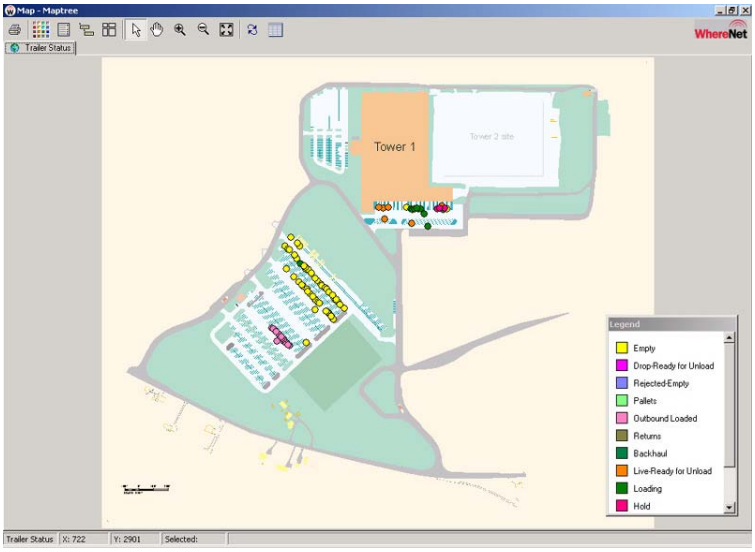

Figure 3. Real-Time Equipment Location

Return on Investment

RTLS systems typically have payback periods of less than a year. ROI categories and savings potential differ from company to company, but in general are comprised of a combination of the categories listed below. RTLS enables yard, transportation, and distribution software to realize their full potential through accurate, timely and reliable data.

Reduced Expenses

- Reduce overtime expenses by improving labor productivity
- Reduce/redirect gate labor by providing fast lanes for dedicated carrier fleets
- Reduce driver labor by enabling route consolidation
- Reduce spoiled cargo and theft occurrences through sensor monitoring
- Reduce/redirect labor associated with yard and dock checks
- Eliminate licensing, maintenance, leasing, and administrative expenses associated with reduced equipment inventory
- Reduce trailer demurrage/detention expense
- Reduce line downtime occurrences
- Reduce expenses associated with tractors pulling wrong trailers from the yard

Reduced Assets

- Eliminate percentage of tractor, trailer, and/or dolly inventory
- Eliminate percentage of switch tractors
- Eliminate percentage of off site leased land for equipment storage
- Eliminate need for yard and/or dock expansions

Increased Revenue

- Enable higher production capacities
- Transfer variable labor to direct labor positions

Soft Benefits

- Improve customer satisfaction through on-time deliveries
- Improve yard safety by reducing congestion, equipment, and search times
- Improve carrier negotiation position through better carrier performance data

Putting It All Together

To ensure the smooth and efficient transfer of goods between manufacturing, distribution, and transportation, yard systems must provide accurate and timely accountability of yard equipment at all times. Yard systems that accomplish this allow the systems that they support to realize their full potential, while minimizing costly problems that result from poor yard accountability. RTLS, combined with a

reasonable level of manual data input, can dramatically improve yard operations in a cost-effective manner, resulting in returns on investment in less than a year.

RTLS enables continuous monitoring of location and status information of equipment in the yard. It accomplishes this through low power radio tags that transmit their ID's, plus optional sensor data about the equipment they are attached to, at frequent intervals. An infrastructure of antennas receives the tag signals and routs them to a central processor where their locations are computed. Location and sensor information is made available to yard software on a real-time basis, which can be used to enhance gate, dock, and switcher operations.

WhereNet is the leading provider of wireless location and communication solutions for managing mobile resources in yards and other supply chain applications.

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