

Increase Productivity, Improve Picking Accuracy And Reduce Costs With Warehouse Navigation

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Scope

Best practices in a warehouse using “semi-automated” systems

- To include new and current technologies utilizing operators onboard lift trucks
- Not to include fully automated options such as Automated Storage and Retrieval Systems (AS/RS – Unit Load, Mini Load), Automated Guided Vehicles (AGV)



Why A Navigation System?

S.P.A.C.E. Principles – defining best practices for a warehouse

- **S**pace Utilization
- **P**roductivity
- **A**ccuracy
- **C**ost Reduction
- **E**fficiencies



Space Utilization – manage the cube

Does the navigation system have the flexibility to allow for load variation, and/or for dynamic storage within any storage medium?

- This can be defined by: product size, number of SKUs, inventory levels per SKU, seasonal adjustments, warehouse limitations, among others.



Productivity – move more in less time

Can the navigation system allocate the use of the lift truck fleet most effectively to handle inbound and outbound product throughout the system?

- This can be accomplished by:
 - selecting the lift truck closest to the pick location;
 - allowing the lift truck to travel in the most effective manner to the pick slot while elevating;
 - automatically handling pallet loads in/out of the racking;
 - eliminating the need for bar code scanning;
 - communicating in “real time”



Accuracy – eliminate common mistakes

Can the navigation system effectively integrate with the WMS to ensure accurate receipt, put away, picking and shipping of product?

- This can be managed by: the system driving either fixed or random put away, and then communicating to the WMS; automatic location data transfer from the navigation system to the WMS eliminating bar code scanning or manual data entry errors; accurate X, Y and Z positioning; aisle verification at time of entry



Cost Reduction – fleet, labor, pick errors

Does the navigation system effectively reduce material handling costs?

- This can be achieved by: throughput or productivity gains which will reduce the fleet requirements by moving more product in less time; reduction of maintenance costs; lower labor costs; higher accuracy thereby eliminating costs associated with returns, re-stocking, additional picks and shipping; reduced facility energy costs



Efficiencies – enhanced profits

Does the navigation system effectively serve to convert logistics from a cost of operation to a competitive advantage?

- This can be achieved by: incorporating the benefits of best space utilization, productivity gains, increasing accuracies, and overall cost reductions
- A complete system will provide for higher levels of achievement in all areas, allowing for a greater ROI in a shorter period of time, and establishing that competitive advantage
- The more demanding the application, the greater the benefit

Current Options

- Wi-Fi
- Indoor GPS
- 2-D Bar Code Tracking Systems
- RFID Transponders – floor embedded control system



Current Options

Wi-Fi

- Consists of ceiling mounted transmitter-receivers and truck mounted componentry
- Can track truck location and data relative to the performance of the lift truck (for example: travel hours, lift hours, overall utilization)
- Location tracking accurate to within several feet: good for fleet allocation within various areas of a warehouse
- Better used for data transfer purposes than for truck positioning information

Current Options

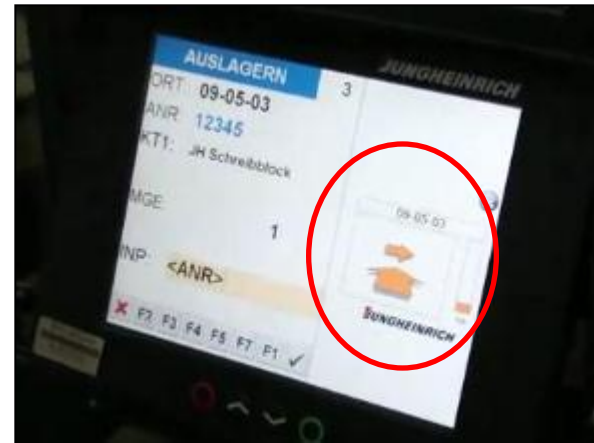
Indoor GPS

- Can utilize network of ground based transmitters that communicate to the lift trucks
- Currently tracks location only
- Better tracking accuracy than satellite based GPS systems
- Capable of being utilized indoors or outdoors
- Further integration required for collection of lift truck performance data

Current Options

2-D Bar Code Tracking Systems

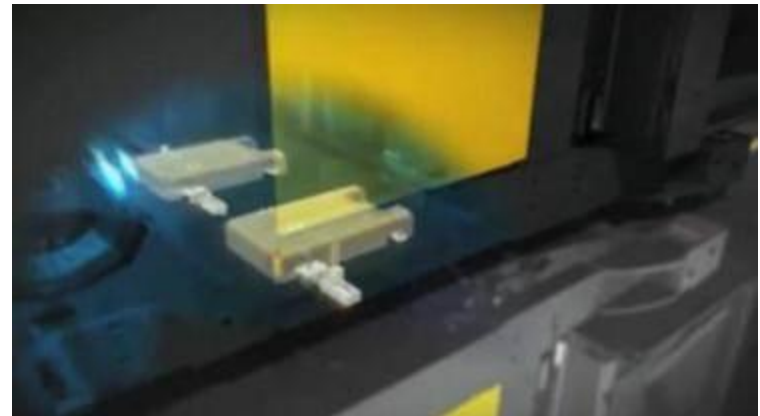
- Uses truck mounted camera and ceiling mounted tiles to determine truck position within warehouse
- Accurate to within inches
- Advanced truck/system integration can provide travel path information to forklift operator
- Primary use is for “Wide Aisle Navigation”



Current Options

RFID Transponder Systems

- Uses floor embedded “pills” to communicate with onboard truck mounted RFID readers to precisely determine truck location, and automatically adjust truck performance to match location requirements
- Travel speed, travel direction, lift height, auxiliary and ancillary truck functions, all can be controlled



Current Options

RFID Transponder Systems

- Use of transponders results in highest levels of positioning accuracy
- Highest accuracy provides for automated stacking/retrieving of full pallets and for incorporation of “pick-to-light” technology
- Truck to WMS communications can eliminate need for scanning or operator data entry



Current Options

RFID Transponder Systems

- Truck positioning information provides for determination of most efficient travel path with automated delivery to next pick location
- Entry into incorrect aisle can be prevented
- All pick and deposit information delivered to WMS via wireless RF terminals



Summary

- Navigation systems have advanced past the point of using wireless technology to better manage a fleet
- Today's technology provides for full integration of the lift truck fleet into the WMS to allow for the greatest efficiency in product movement
- Greater positioning accuracy allows for reductions in travel, verification, error correction, and throughput times
- Creates competitive advantages

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