Improving the Materials Tracking Capabilities of Your ERP System

A White Paper by Dr. Peter Green

Introduction

All ERP systems are accounting systems at heart. As such, they track the quantity of each Item Master part number in stock. Many ERP systems improve on this by tracking the quantity at each location and some will even keep a list of quantities by lot number at a location.

From an accounting viewpoint this is more than adequate but often falls short of the requirements for tracking materials in an industrial distribution warehouse, manufacturing plant, or industrial supply chain. The primary reason for this is that ERP systems are tracking the quantity of materials at a location rather than tracking the location of containers of material and/or individual serialized items, which is the method used by Amazon, UPS, and FedEx and is now the GS1 standard for tracking materials in the Global Supply Chain.

In this white paper, we first give a brief overview of container-based tracking and the look at the problems caused by tracking items by location rather than tracking containers and serialized items. Then we look at how we can integrate container-based tracking into existing (or new) ERP and accounting systems.

Container Based Tracking
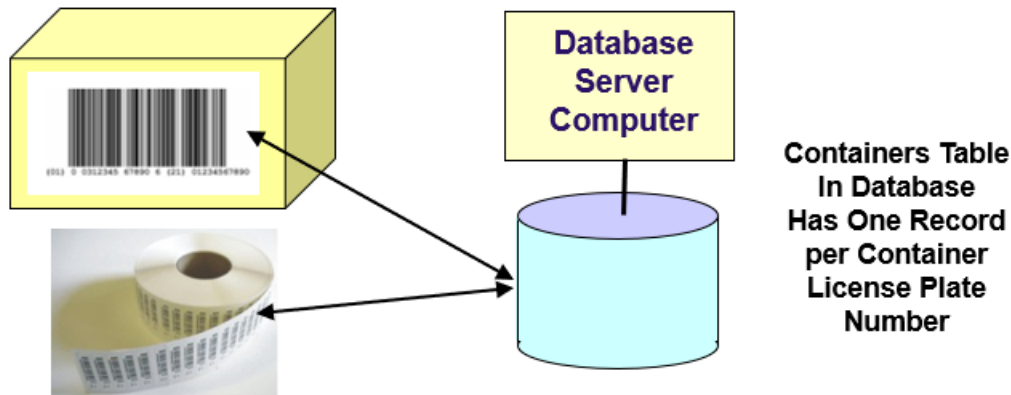
In container-based tracking (sometimes known as license-plate-number (LPN) tracking) a unique tracking barcode (and/or RFID tag) is attached to each container or serialized item and then all the data about the contents of the container or serialized item is stored in the containers table in the tracking system database.

The tracking barcode is simply a sequence of letters and numbers that is unique within its domain of application. This barcode can be as complex as the GS1 barcode, shown at top, which is used for tracking in the global supply chain. Alternately, within a warehouse or manufacturing plant, the tracking barcodes can be sequentially numbered labels peeled from a roll of preprinted barcodes.

Some of the data tracked within each containers table record includes:

- Item Master Part Number
- Quantity in Container
- Vendor/Supplier
- Lot Number
- Serial Number
- Location in each plant or warehouse
- Expiration date
- QC Status, passed, failed, needs inspecting
- Cost data
- Parent Container – for tracking nested containers, such as on pallets
- User Defined Parameters such as Size and Color

This enables very detailed tracking of the location and status of each container of materials or serialized item.

Problems with ERP Systems

ERP systems are designed for data entry by office personnel. Also, the same software is designed for use by thousands of organizations without customization. This is exactly what you want for an accounting system but not for industrial materials tracking. As a result, the data entry screens end up with many data entry boxes, from which the user can select to enter their data.

This makes these screens totally unsuitable for use by material handlers and other production workers, both from a time taken and skill viewpoint. As a result, most material movement is recorded using paper forms, which are then given to someone in the office, to subsequently enter into the ERP system.

This has three major problems:

1. There is no feedback to material handlers as to whether they are making a mistake or not, as they can write anything down on a paper form.

2. Mistakes get made in transcribing the paper forms into computer data entry screens.

3. Writing down the data and then keyboarding it into the ERP system takes a significant amount of labor, typically requiring at least one full-time person.

In a warehouse it is frequently necessary to pull out a pallet to get to a pallet stacked behind it. In this case the material handler has to create a paper form to record the movement of each pallet, which is then entered into the ERP system. To avoid this problem, most ERP systems use large locations, such as whole warehouses, to record where materials are located or simply just record the quantity of materials in stock, wherever they are.

Some ERP systems use attached Warehouse Management Systems (WMS) to track the location of materials in much finer detail, such as to the warehouse shelf or rack. These WMS systems then translate the fine detail of where materials are located to quantity in stock for the ERP system. The WMS system then acts as the system of reference for where the materials are located.

These WMS systems still simply track the quantity of materials at each location, as well as recording the receipt, put-away, picking, packing, and shipping of materials based on purchase orders and sales orders received from the ERP system. They work well for most retail warehousing applications where all parts with a common SKU are kept in one location, from which they can be picked for shipment.

They are not suitable for industrial distribution warehouses in which:

1. The same part may be kept in multiple locations, with each part having a different lot number, serial number and other characteristics that may be important when picking.

2. Dynamic binning is used, where the locations in which parts are stored change over time to make optimum use of warehouse space.

3. Tracking of pallets with a mixture of different parts on them is required.

4. Parts are located in different geographically separated locations and move between them.

5. Kits need to be picked and tracked.

6. Detailed Advanced Shipment Notices (ASNs) need to be sent to customers with contents of each pallet including lot numbers, serial numbers and expiration dates.

7. Detailed traceability data needs to be retained as to what materials were used to make which products and which customers the products were shipped to.

8. Detailed costing as to the actual cost of materials used on each job not based on some assumed FIFO or average inventory cost.

9. Physical lengths of material in stock on each reel, roll, and spool need to be tracked after a number of feet are removed for production or shipment to a customer.

10. Dimensioned material, such as lengths of wood or sheets of steel need to be tracked, including left-overs returned to stock.

How Container based Tracking Solves the Problems with an ERP System

Container based tracking systems, such as BellHawk, collect data using mobile computers with integral barcode scanners, tablets with external barcode scanners, and PCs. Unlike with most WMS systems, there is no special software to be loaded on each device. Simply point the Web Brower URL to the BellHawk website, log in, and collect or view data.

Data is collected in the BellHawk database, which has a containers table at its core, enabling it to capture and process all the data necessary to handle the 10 issues identified in the prior section as not being feasible with a conventional WMS system.

ERP systems can automatically exchange data with BellHawk through a variety of data exchange interfaces, most of which are based on the MilramX intelligent agent technology.
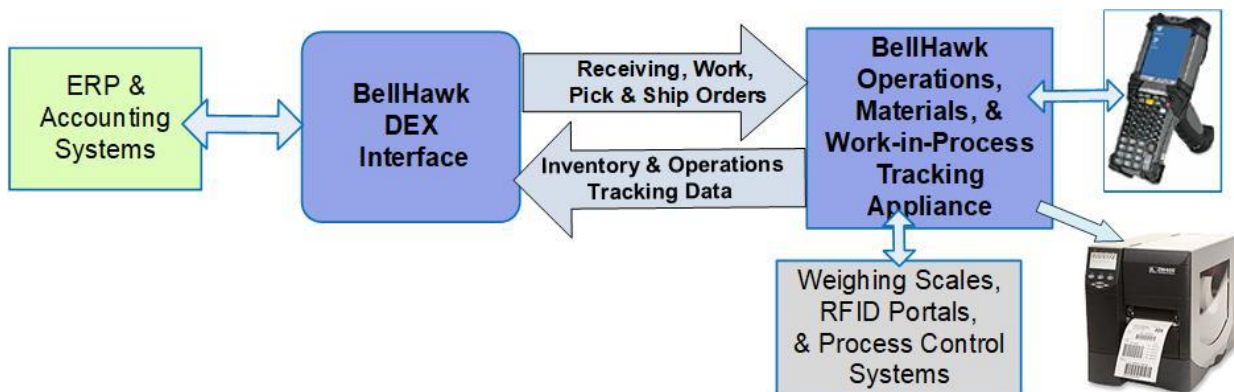
The DEX interface is a store and forward interface designed to run 24x7. An ERP system can export receiving, work, pick, and ship orders to BellHawk to use as the basis of its tracking activities. BellHawk then sends back changes to the inventory it is tracking, as well as cost data for making products.

While BellHawk can use pre-printed tracking barcodes, it can also print barcode labels on demand, with customer specific information, such as is required by the Department of Defense, as shown below.
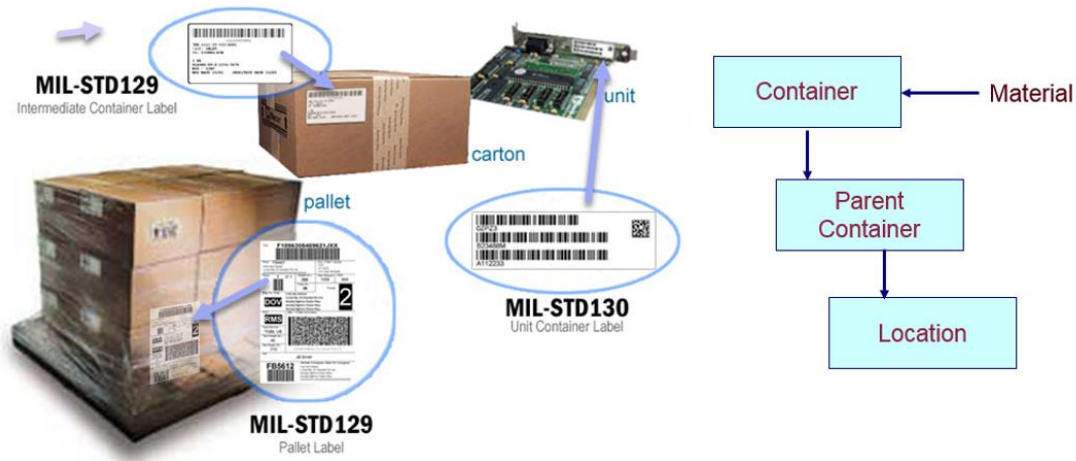
This diagram also shows how BellHawk tracks nested containers of material, with serialized PC cards being located inside cartons with their own tracking barcodes, located on pallets with their own tracking barcodes.

When moving a pallet such as this, all that is necessary is to scan the tracking barcode on the pallet and a location barcode at the destination of the move. BellHawk then simply moves the parent container in the database and everything follows automatically.

In a WMS, you would have to record the withdrawal of each material from stock at the original location of the pallet and their entry into stock at the new location of the pallet.

Similarly, the shipment of the pallet can be recorded with a single scan of the pallet barcode whereas in a WMS attached to an ERP system, you would have to record the shipment of each separate part on the pallet.

In addition, BellHawk can use RFID tags to do location tracking where appropriate and can work in a mixed barcode /RFID scanning environment.

Commentary

Does this mean that you should buy a new ERP system to get these capabilities? The answer is no. Most new ERP systems do not include container tracking capabilities and it is much easier and less costly to interface software like BellHawk to your existing ERP system than to retrain all your people in a new ERP system.

If, for reasons of obsolescence you need to replace your ERP system, then replacing it with a low-cost accounting system plus BellHawk is often much less expensive than buying a new ERP system and gives you container tracking plus a whole host of other capabilities that you will only find in very expensive high-end ERP systems.

For More Information

Please see www.knarrtek.com or contact Sales@Knarrtek.com.