Tower Inventory System (TIS) Product Brief

Product Overview

The Tower Inventory System (TIS-Patent Pending) is a dynamic Passive RFID inventory scanning system that provides faster cycle counts and improved accuracy at a fraction of the usual industry investment typically expended on cycle counts. The TIS also allows for flexibility of inventory reconciliation audits and simple software integration into current Supply Chain Management databases.

Abstract

The fidelity (accuracy) of a warehouse database is a direct link to the quality and efficiency of the warehouse. It is important for warehouse owners to measure the fidelity of the warehouse database through cycle counts in order to understand where improvements can be made. Traditional spot checks (monthly/annual) give warehouse personnel an estimate of the database fidelity, however these are only estimates and do not necessary reflect the entire health of the data contained throughout the database.

The TIS has been designed to reduce the costs associated with cycle counts through the use of Passive Radio Frequency Identification (pRFID). Reducing the costs associated with cycle counts allows warehouse personnel to conduct more frequent low cost cycle counts. Having the ability to conduct more frequent low cost cycle counts allows warehouse personnel to identify and correct database errors when they occur and to implement business process changes that improve efficiencies of warehouse operations.

Additionally, warehouse owners also care about other areas where cost avoidance can be achieved, some of these areas are:

1. Fewer lost items
2. Better location accuracy of stored items

3. Less time looking for misplaced items
4. Better database = fewer spares required to be stored in a warehouse
5. Items tagged with pRFID can have an inventory reconciliation completed against a database almost instantaneously with a computer, resulting in lower labor costs.

Problem Definition

Annual cycle counts (traditional inventories) are conducted to understand the data integrity of the warehouse database, however this process is also prone to error. For example, when paper cycle count sheets are issued to warehouse personnel, the warehouse personnel are informed that each item on their cycle count sheet has one of the three possible scenarios:

1. Items are on the shelf (Found)
2. Items are not on the shelf (Missing)
3. Items not listed on the location are found (extra).

Since each of these three scenarios listed above require human intervention, there are three possibilities for error for each item on the cycle count sheet. Some of these instances for human error are as follows:

1. Found - warehouse person checks wrong row on cycle count sheet as being found.
2. Missing - warehouse person does not accurately conduct a cycle count for the location.
3. Extra - warehouse person misreads part number or writes it down wrong causing the person conducting reconciliation to conduct research on wrong information. Person conducting reconciliation types wrong information into database, effectively creating an item that does not exist.

During the cycle count process, it is probable that the warehouse personnel conducting cycle counts will have an accuracy rate of 95% to 98%. If a warehouse had 10,000 items, the cycle count would have induced between 200 and 500 errors to the database.

In addition to cycle count errors, warehouse errors occur when wrong items are shipped and received. These errors are cumulative (add up between cycle counts) and contribute to the overall accuracy of the database.

High Level Solution

The best way to increase the accuracy (identify and correct database errors) of the aforementioned cycle count, is to conduct another cycle count, however traditional cycle counts are expensive, time consuming and as we discussed, prone to human error.

Placing RFID tags on items allows the warehouse persons to physically attach the record from the database to an item. If there is an error in the database, then the error will be visible to the warehouse person when looking for the item. For example, if an item was received into the warehouse with a wrong part number, a tag was printed out and placed onto the item.... when that wrong part number was searched for in the warehouse, the warehouse person would find the tag, and have the opportunity to catch the error when double checking the tag to the item. If the item did not have a pRFID tag attached, there would be no association between the tag and the item on the shelf. This would result in an 'extra' item being found and added to the database and the wrong item would now become 'missing'.

Humans do not efficiently reconcile the results of a cycle count and should use computers as computers can more quickly and accurately compare the cycle count results to the database. In order for computers to compare this data, we must get data in a digital format (not hand written pages).

Radio Frequency Identification (RFID) is a unique number that is communicated between a computer and a tag. The exchange of data between a computer and a tag is very fast and a single RFID reader and 4 antennas can process (count and reconcile) approximately 25 tags per second.

The Tower Inventory System (TIS) patent pending, places four 6' RFID panels vertically so that a single user can conduct a full cycle count in a fraction of the time (up to 100 tags per second)

as compared to traditional cycle counts. The TIS is self-contained and uses a marine deep cycle battery, battery charger, inverter and PC to power and communicate with 4 RFID readers and 16 RFID antennas.

The TIS drastically lowers the labor associated with cycle counts and allows organizations the ability to perform more frequent cycle counts (daily/weekly) without disrupting day to day activities. These more frequent cycle counts will allow warehouse personnel the ability to identify and correct the errors described above and maintain the accuracy of the database at a high level.

Figure 1 TIS Front

Figure 2 TIS Rear