Material Inventory Movement Advance tracking System (MIMATS)

Store Oracle Barcode Tracking Implementation

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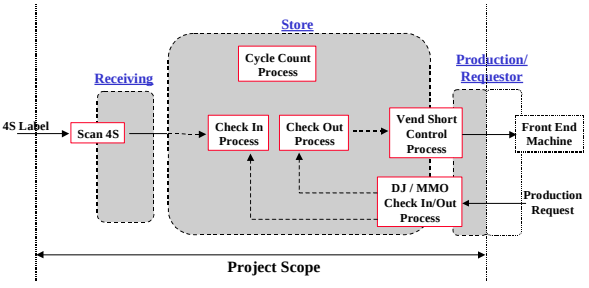
Abstract

Oracle Manufacturing was roll out in Penang sometime in July 1998. The roll out has help manufacture to improve some of the high level process in term of database transaction. However, there are still areas that can be improved at the lower level process where the physical movement is actually take place. The challenge here is how to streamline the lower level process and further enhance the integration between the low level physical movement and the high level electronic transaction. This paper discusses how the streamline was implemented in material movement tracking in store. It also illustrates the bridge and integration between the two processes. The paper also pulls out one of the old process (From receiving bay to store) and illustrates mapping and streamlines are done with the new process. With the help of barcode, RF network device and good network infrastructure integrating the low-level process are made simple. This paper also illustrates how these components are setup and use in MIMATS implementation.

Introduction

Material Inventory Movement Advance Tracking System or MIMATS is a system that implements in storeroom to streamline store inventory movement process. This system allowed close integration between low-level process where most physical movement take place, and the high level process where dollar and cents transactions take place. The system have allowed real time tracking and allowed on line request. The real time tracking and on line request have streamline and optimize the old process by removing some of the redundant process and distribute data entry to the suitable area that is receiving, store and production as compare to all data entry take part in store transaction operator.



Project Scope Cover From Receiving Dock To Production WIP

Figure 1

Scope

The scope of coverage for MIMATS is from receiving bay to storeroom and from storeroom to production part issuance. This is shown in figure-1. The major focus here is in storeroom. However, the extension of the coverage to receiving and production have benefic all area that involve.

Overall View

Figure 2 shows a brief overall view of MIMATS. *At receiving bay*, after sorting out the cartons, 4s label is scan to perform data entry to Oracle Mfg. database. Once the data entry are scan in correctly, a receipt traveler with a barcode receipt number printed on it are generate out from the printer. The receipt traveler will then attach with the batch of cartons to send into storeroom. At store, when picking operator pick up the cartons, they will verify those cartons with the receipt traveler and locate the exact storage location using the storage ID. Once the cartons are move into the storage place, operator will scan the barcode on the receipt traveler and the storage ID that is located in the storage area to confirm cartons receipt in storage area.

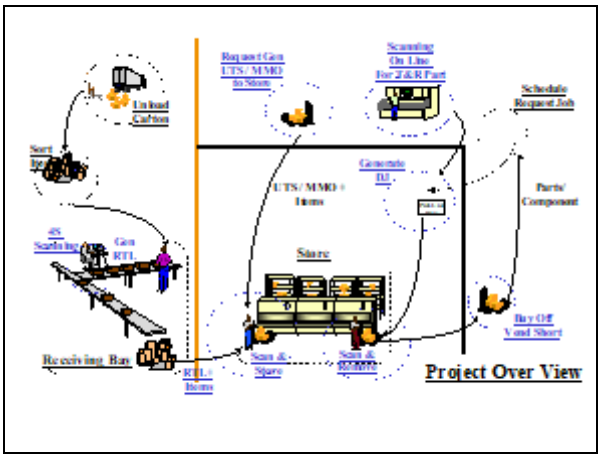


Figure 2

For issuing part out from store, there are basically three options. 1st is through job request, 2nd is through sub-inventory transfer 3rd is through line direct request.

Issuing part through job request. When scheduler request to run a job, parts is automatically request by Oracle Mfg. system, MIMATS will then base on this request to generate the picking list in store. Picking operator will then base on the picking list, to pick up the required parts. As she pick up the part, she will scan the pick-list tracking barcode, storage ID that is in storage location and the qty that she pick up. MIMATS will then update this picking item as picked, and log the transaction in a custom database. When production picks up the parts, there is a buyoff process where the pick-list number is scanner to confirm all item are delivered to the production. Once the pick-list is buyoff, MIMATS will then transact these transactions info to Oracle Mfg. database for update. For any item that is not picked, system will generate SMIR pick-list so that store will use that as further pick-list and also as follow up reference.

Sub-inventory transfer. Parts can also be request manually using on line sub-inventory transfer program. While requestor request parts from store, MIMATS will show the qty stock available in store, requestor can only request parts if it is available in store. Upon completed the request, pick-list will be generated out from store directly, the requestor name will be appear in the pick-list for store's reference. Once the pick list came out from store, pick operator will take it as another pick-list and process it as picking reference mention above.

Direct line request. Production operator can also request tape and real part on line from production line using RF scanner as the parts run low. The process of scanning are as follow, operator will first login with their username and password, follow by the production line name. She than take up the real from the tape and real machine, scan the barcode from the real, MIMATS system will automatic assign the real size for them, if addition quantity are required, requestor just need to scan again to double up the request quantity. Once they got all the part they needed, an OK barcode are scan to confirm the request. Pick-list will then generate a pick-list in store and similar picking process is executed by store picking operator.

For returning part back into store, requestor will run a sub-inventory transfer program. MIMATS will verify if any available parts in the sub-inventory where item is suppose to transfer from. Once the requests are completed, a tracking list will be generated. Requestor will have to pick up the tracking list, attach together with the item as they send in the item into store. When store receive the item, they will verify it according to the tracking list before they accept the item. Once they accept the return item,

item will be push down to the storage place. Before the item is store into the storage area, picking operator will have to scan the tracking list barcode and follow by the storage ID to confirm item is store in store. Once scanning are done correctly, MIMATS will login the transaction in a custom table and update the transaction info to Oracle Mfg. database.

Besides streamlining the checking in and checking out item process from store, MIMATS also reduces signature cycle time. In order to do away with long approval cycle time, *daily reports are generated* on all issuance to persons involved through e-mail.

Auto paging is another feature build into MIMATS. As the urgent item arrive in receiving bay, system will page the responsible personal on the arriver part so that they can take any corrective action. This has greatly improved the delivery time from receiving bay to production floor for any urgent shipment.

Streamline Process from Receiving Bay to Store

In order to discuss how the streamline is done for MIMATS, here we will use the process streamlining from receiving bay to store as an example.

At receiving bay in the old process, data entries to Oracle Mfg. are done using 4s barcode label or manual data key in. A receipt traveler will be printed out once the data entries are done successfully. The receipt traveler will then attach with the item and send in to store. At store, picking operator will pick up the item and store in the storage location. While storing the item to the storage location, picking operator will log in the storage info into a stock card (bin card). This ended the receiving process at receiving bay.

At that point, receipt travelers are printed out without barcode. All the tracking is then base on human-eyes and the data-log in bin card. There are no zoom down storage location on the travelers, searching for the storage location are base on experience.

In order to improve the old process mention above, barcode are added to the receipt travelers. This barcode are use in the storage location to track the movement where the physical item is store in the actual storage area. The same barcode is also uses in replacing the data-log of the bin card. Scanning the receipt traveler barcode will help in this, because with the receipt number that scanned into the system, system can obtain most of the detail information for the item. By scanning in the receipt traveler and storage ID, transaction now confirm by the data-log in the custom database table. Storage location is accurately defined in the receipt traveler and no experience is required. Figure 3 shows the summary of the new process.

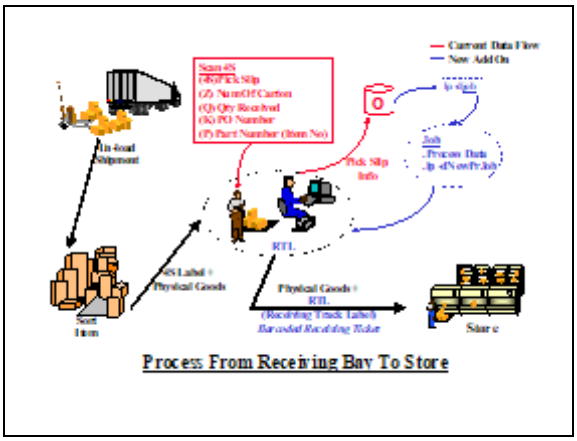


Figure 3

MIMATS Technical Element

Barcode / Barcode ID

Barcode can server to simplify keying process. It can also use as a tracking media if the barcode content is design properly. Two majors barcode ID are use in MIMATS, Item tracking/pick-list barcode ID, and storage barcode ID.

Item tracking barcode ID is use to track the item that is sends into store. ***Item pick-list barcode ID*** is use to track on the picking item that is request to be issue out from store. Both ID are use to perform data entry during inventory transaction. In order to perform a unique transaction, 3 data entry are required, type of transaction, pick-list number and item. A direct solution to this is to print out 3 barcode contain these information. MIMATS however combine these 3 informations into one barcode to minimize the number of scanning required. The barcode ID format is as followed:

Tdddd+iiii

Where T is the prefix that tells what transaction type, dddd is the tracking ID / pick-list number and iiii is the item/parts number. The + sign is to separate the field between tracking ID /pick-list number and item number.

Storage ID is use to locate a storage location regretless if the storage place is a room, rack or carrier cell. It is design in such; human and system can easily decode it. With this good design, automate carrier cell or other storage machines in future are made easy. The storage ID has a format as followed:

AAMmmLllSss

Where AA is the area, Mmm is the Media type and media number (mm), Lll is the level and level number (ll) S is Slot and slot/section number (ss).

Example:

CAC02L23S04

Where

CAC02 = Carrel Cell Area, Carrel Cell 02
L23 = Level 23
S04 = Section / Slot 04

Oracle Mfg. Database and Custom Database

In order to track the detail physical movement in store, custom table/database are created. This custom table is then use to update and synchronize with Oracle Mfg. database through view and open interface provides by Oracle. This coupling is as shown in figure 4.

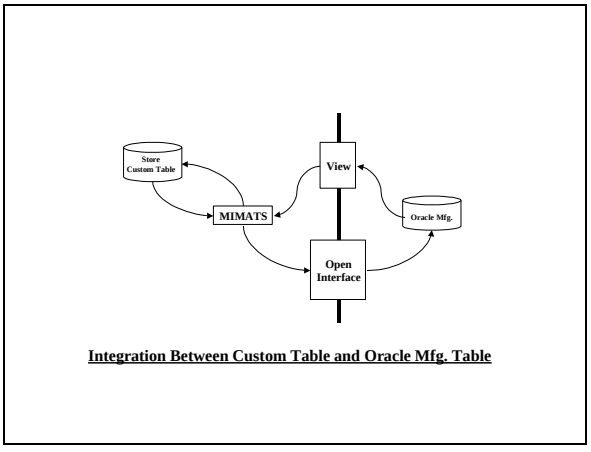


Figure 4

Multi-platform

Most of the application programs are written to running on the UNIX server where it allowed user to run it from any OS client (Dos/ Windows/ NT/ Mac/ HP-UX/ RF Scanner) using telnet session. The multi-platform architecture is as show in figure 5.

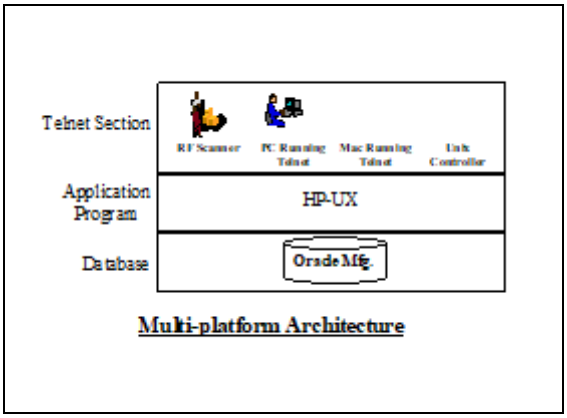


Figure 5

RF Scanner

RF scanner is use in this project due to its mobility. Information query can be obtained online by scanning the barcode. Scanning also perform data entry for the database transaction.

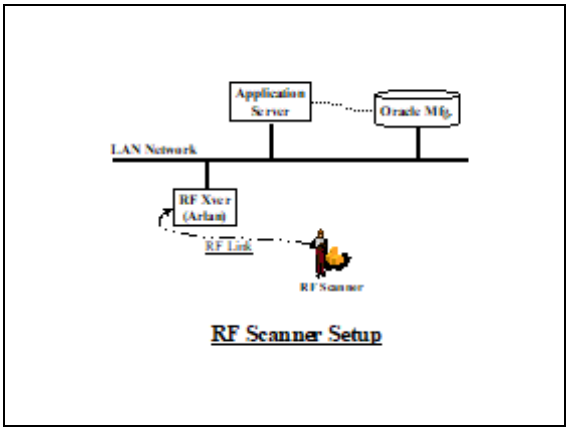


Figure 6

Figure 6 is quick over view on the RF scanner setup. The RF scanner basically is link to a transceiver that is connected to a network point in order to access the application program, which runs on the application server through telnet session.

Auto Paging

Auto paging is use here to page the scheduler and picking operator where critical and urgent parts arrive in the receiving bay.

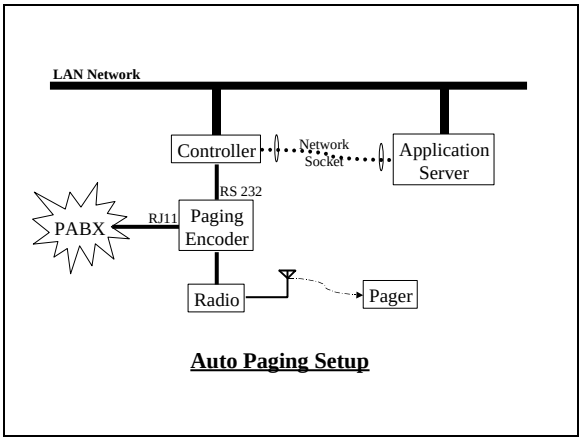


Figure 7

Figure 7 shows the paging setup for the auto paging. The paging system is connected to a controller (server) through serial port (RS 232). The controller also connected to the LAN, in order to allow other application server access the paging service through network socket.

Implementation Result

Implementation of MIMATS has showed a very rewarding result. Cycle time for requesting process have show lots of improvement. Due to the fast cycle time in requesting process, store has avoided a lot of item returning back to store due to unnecessary request. By removing bin card tracking and full time data entry transaction operator, store are able to avoid additional 25% increase in head count for its operation to handle the additional volume increase in inventory flow due to volume increase in factory. [5]

The material inventory movement process in store was very paper tracking intensive at the low-level process before implementation of MIMATS (Material Inventory Movement Advance Tracking System). Material movements are mainly track by stock card (bin card). Material moving into and out the storeroom is request using various forms (Receipt traveler, MMO, DJ, UTS and etc.). Although Oracle Mfg. have help in high level transaction process, tedious data entry process still need to be perform in order to make the book keeping between the stock card and database transaction are tally. Audit process is not much easy, because it involve tracking between database, bin card and logbook. MIMATS have help store to remove most of the tedious paper tracking process. It also helps to link out both low-level process and high-level process. With the fundamental infrastructure MIMATS put in, future automation will be possible.

Future Enhancement

MIMATS has lay out the fundamental infrastructure for store in future for automation. Since the physical movement can now be monitor and track by the custom table. Automation in driving storage machine like carrel cell and other parts picking machine like sky-craft are possible.

Automate part request from front-end machine is another area that can be work on. With the new window base RF scanner, future application may be developed in Web base.

The similar concept use in MIMATS can be applied to material movement in production line. Extension of the concept to shipping area is also possible. There are actually a lot of areas the concept of MIMATS can be applied.

Conclusion

The key off success here is to make use off information available. Optimize in local customization. Make use of leading edge device and technology available to link physical movement with virtual data movement.

Implementation of MIMATS has lay out the fundamental infrastructure for future store automation. Improvements in store efficiency have showed the successfulness of the streamlining by MIMATS. Cost avoiding of US$65K per year is the result from this project implementation. [5]

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