

CASE STUDY OF A SUPPLIER WAREHOUSING PROCESS RATIONALIZATION

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Abstract: Accomplishment of customer orders from the viewpoints of required lead time and quality is important factor in successful operation of a multinational company. Logistics plays key role in meeting customer requirements and also it has great influence on operation costs. Rationalization efforts often mean the reduction of inbound and outbound stocks and the minimization of the material handling activities in a production factory accordingly customers require more and more complex services from their logistics suppliers.

Bay Zoltan Foundation for Applied Research was requested for development of logistic capacity intensification system at FOXCONN Hungary. The main aim of the contract was the reduction of the service time at the supply chain operating between FOXCONN's and their significant consumer: NOKIA's plant in Komárom.

Keywords: warehouse process development, tracking and tracing using barcodes, picking system development

1. Introduction

There are deterministic dependencies between the effectiveness of a production system and effectiveness of its logistic subsystem. Facilities try to allocate minimal storage areas beside their production lines (which is enough) only for the necessary amount of raw materials and components of a short time production. Minimizing the interoperation stock means suitably prepared groups of components which supplied right to their installation site at the lines in short time intervals. Close co-operation with the component supplier is crucial for ensuring the production continuity in the case of application this production method. The supply order form has to be processed, the necessary components have to be picked to inhomogeneous units and they have to be discharged and shipped along the lead time by the side of the supplier. The shorter the lead time is the quicker more accurate transparent and simple the warehouse processes have to be. The boosting rate between the former and expected system in the FOXCONN's case was approximately 5 times.

PC aided and automatic identification, tracing and tracking warehouse system had to be worked out for meeting the higher requirements. This system applies simplified and easy to use warehouse rules for allowing workers to speed up their functions and to increase their efficiency. By using intensified picking process storekeepers produce more amounts of inhomogeneous component units along shorter times.

2. Warehouse processes

New processes were worked out regarding to the outbound warehouse of the supplier in which there are three different warehouse divisions of storage places with mainly low shelves. One of them serves as long term storage of large homogeneous component units (pallets), the second one is the temporary storage of fragmented pallets (boxes) and the third one is the picking area where component trays can be stored and inhomogeneous load units are formed.

2.1. Multi level loading units

Components are contained by multi level packages at the long term storage. Building up of these containers is shown at Figure 1.

- Tray contains the smallest product groups which are handled separately through the supply system. There is only one component type inside of a tray. Every tray has unique id number (represented by barcodes) which refers to the product type quantity contained in.
- There are several tray inside a box which is identified by a box code. This code refers to the product type quantity too.
- Uniform boxes form homogeneous load unit (pallet) which has id labels with complete SSCC standard information.

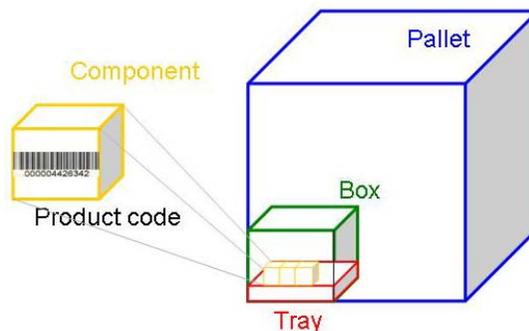


Figure 1. Product identification levels of the containers at the long term storage

Long term storage contains only homogeneous type of pallets.

2.2. Storage places

Pallets have to be relocated to a temporary storage place if the homogeneous load unit is opened and some boxes are removed from it. The temporary storage located on the lower shelves of the warehouse as picking of the smaller product containers (boxes) is done without mechanical loader machine. Boxes with different product types are allowed in the same temporary storage place as every box are marked therefore picking can be carried out without missing the correct component type.

The storage method means that only one pallet is assigned to a storage place in the long term warehouse while there can be several load units (mainly boxes) assigned to the temporary storage places.

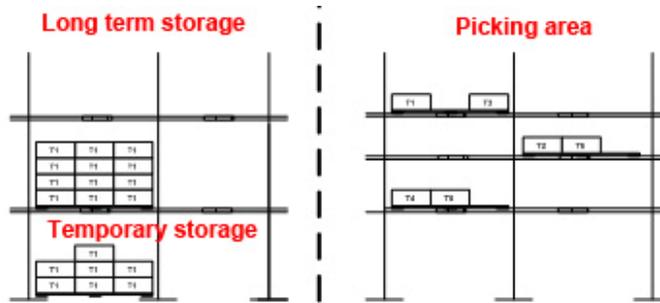


Figure 2. Long term and temporary storage places with different types of homogeneous load units

2.3. Picking processes

In case of allocation of a component group to an actual order the component amounts at the picking area have to be taken into account first for ensuring the FIFO requirements. Component groups have to be fetched from the temporary and long term storages if there are not enough products on the trays at the picking area. If the amount of the ordered components are close to the amount of components which full boxes or pallets contained then FIFO principles are avoided and order is served by using of these full load units. Remainder can be allocated either to the temporary or picking area depending on the applicable container. This procedure ensures more efficient and quick supply service without injuring the traceability of the products.

3. Advanced efficiency of the warehousing processes

Up to date stocking information has to be deployed among storage keepers for allowing them to carry out the necessary picking of the different amounts of ordered components during the narrow time slice of the lead time. Warehousing processes are aided by modern IT background with wireless data acquisition and communication units (handheld computers). They read the product identification labels automatically and forward the gained information online. Barcodes are used for identifying both storage places and component load units. Loading and unloading procedures are both helped by navigation the storage keeper to the appropriate storage places by using the handheld devices accordingly the time consumption of the picking is reduced to the necessary minimum. The product and storage identification barcodes have to be checked in the case of every step of the warehouse processes therefore worker control and accounting is essential.

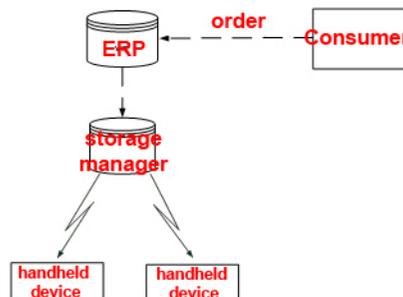


Figure 3. Setup of the warehouse background software

Customer orders are processed by the ERP system first. It determines if the order is achievable (every component types are available in the necessary amount) and gives order number and deadline to it. These data forms the input information of the warehouse manager software which coordinates the unloading and picking processes. It deals with the accounting of the actual stock and the state map of the storage places and the allocation of the picking processes among the available storage keepers. Actualization and data management of the warehouse software is directly done by the checking steps of the material handling processes. These steps keep warehouse databases always up to date with data about the following:

- the actual state and map of the storage places
- the type and amount of the components on a storage place
- the timestamp of the procurement of the load unit

The warehouse manager software:

- allocates warehousing tasks among storage keepers
- makes statistics and accounting information on the warehouse activities
- writes RFID tags for the outbound inhomogeneous load units indicated the following data:
 - o order number
 - o component types and amounts
 - o timestamp of the accomplishment

Customer acceptance of their orders is laid on the base of the RFID tag information. This automatic data interchange ensures avoiding of human mistakes and helps reducing the lead time intervals.

4. Summary

Automatic product identification and trace plays key role in enhancement of the effectiveness of warehouse processes. The application of the modern hardware and development of the software elements are crucial for adequate operation of this system. Scheduling of the different tasks and allocating them to the storage keepers is necessary for equalizing the workload and controlling the workers during the worktime. These organizing methods have advantages on minimizing the necessary lead times too. Automation of the warehousing from both material handling and information management viewpoints has positive impacts on the cooperation possibilities with costumers and helps to reduce the operational cost which is critical in case of most business contacts.