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Proposal of Storage Process Optimization in Manufacturing Enterprise

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Abstract

Article focuses on the issue of storage optimization and efficiency improvement through the control and overview of material flow in the chosen company. In the first chapter is processed introduction overview of case study. Second chapter is focused on defining the problem of current storage management. The third chapter exactly defined goals and application of solved issue which should by achieved using the proposed innovations in chapter five. In the forth chapter is current state of production storage process in the enterprise. Summary of the issue is last chapter called conclusion.

Keywords: Storage process optimization; computer aided data collecting; storage transparency; warehouse management

1. Introduction

The purpose of optimizing and streamlining the storage process is to gain benefits for customers. The contribution to business clients is rooted in high quality product in combination with a competitive price. Furthermore, customers have the advantage when the partner is reliable and flexible.[1,2] Reliability is mainly reflected in the ability to deliver the orders and flexibility is reflected in the ability to respond quickly to changing needs of customers. In short explanation it means have a transparent overview of storages content to make a fast decision and answer for customer satisfaction. Processes and activities in the enterprise, which show signs of inefficiency, are necessary to be

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analyzed and then it is essential to find and apply the appropriate method or methods of optimization. Thus, optimization of manufacturing processes is currently one of the most common tasks.[3,4]

2. Problem statement

The storage management of enterprise which is oriented to customer, MTO (Make to Order) is very important. It is necessary to have a complete overview and control over it in the most possibly way.[5, 6]This article describes and compares current storage process of raw products with proposed optimized storage process.

3. Goal and application

Mainly goal of this article is to identify and analyze waste in production storage process. Propose a variant of storage process with computer aided technologies and with this advantage make a transparent high-tech warehousing.

4. Current state of storage process

Current state of warehouse management is based on a paper communication and paper data collecting. After the data collection based on paper forms, they are recorded in ERP software [7]. This way of data recording and collecting is tedious, outdated and prone to fail. In current state the warehouse management consists of five main storage circuits and two sub headed stores, with continuity on each other. They are described in the following Table 1.

Table 1. Storage numbering and continuity of stores.

Numbering of stores	Description	Continuity
100	Raw material	500, 200
200	Final goods	-
300	Purchase raw products	500, 200
400	Reclamation	200
500	Production	200, 510, 520
510	Production – Repair	500, 520
520	Production - throw-outs	-

Description of material flow is following: the imported materials are stored in stores 100 and 300. It depends what kind of material. Thermoset is stored on store 100 and the other material like additional package, cartons, are stored on store 300. From store 100 and 300 goes the material to store 500 which is a production store. On this store are created raw products. Good raw products are stay on store 500 and they go to packing. From packing are moved final goods to store 200 and they are ready for expedition. Raw products which have faults like cracks, misruns, are moved to store 520.

Raw products which need to be repaired are stored from production store 500 to store 510. After repairing they can by good and moved to packing and to store 200. Even from repairing can by fault raw products, and they are moved to store 520.

5. Innovation of storage process

Innovation lies in the creation of an additional warehouse for raw products called Buffer with number 550 (Table 2). In this store will be stored a 100% product quality of raw products. With this additional store is gaining better outlook instantaneous availability of sources. Booking of raw products to store 550, will be carried out with a booking terminal.

Table 2. Proposed storage numbering and continuity of stores.

Numbering of stores	Description	Continuity
100	Raw material	200, 500
200	Final goods	-
300	Purchase raw products	200, 500
400	Reclamation	200
500	Production	200, 510, 520, 550
510	Production – Repair	520, 550
520	Production - Fault	-
550	Raw products/ half products	500
FE	Real time production	550
VP	Real time packing	200

Store marked as FE and VE are virtual stores, on which is booked real time production (FE) and packing (VE). Booking process from production to Buffer is shown in Fig. 1.

With the barcode scanner we scan the booking annex which comes from the production with raw products. After scanning we need to enter amount of good, pieces for repairing and fault pieces. After entering all necessary data the booking continue by pressing the "Booking" button.

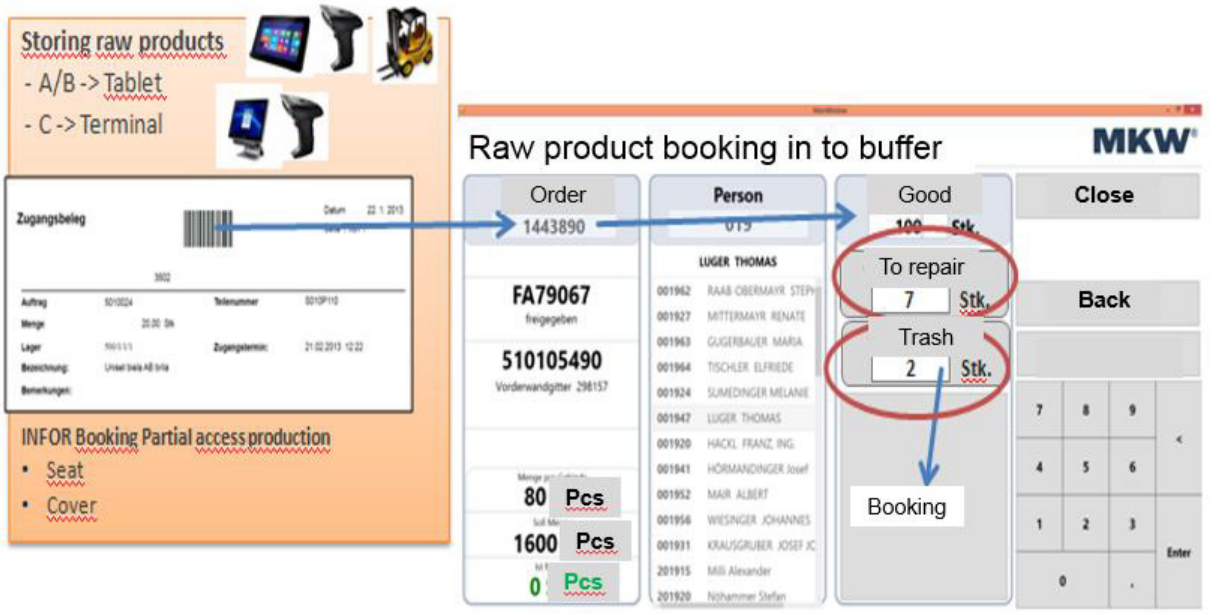

Fig. 1. Process of raw products booking to Buffer.

Another booking process occurs in the store with finished goods (Fig. 2). All steps are the same as in Buffer terminal booking, but we do not enter bad or fault pieces.

There is need to enter only the amount of packed pieces on the pallet. The finished goods terminal is a fix mounted terminal in the store. It is connected to Ethernet network with a LAN cable. Terminal controlling is via touch screen.

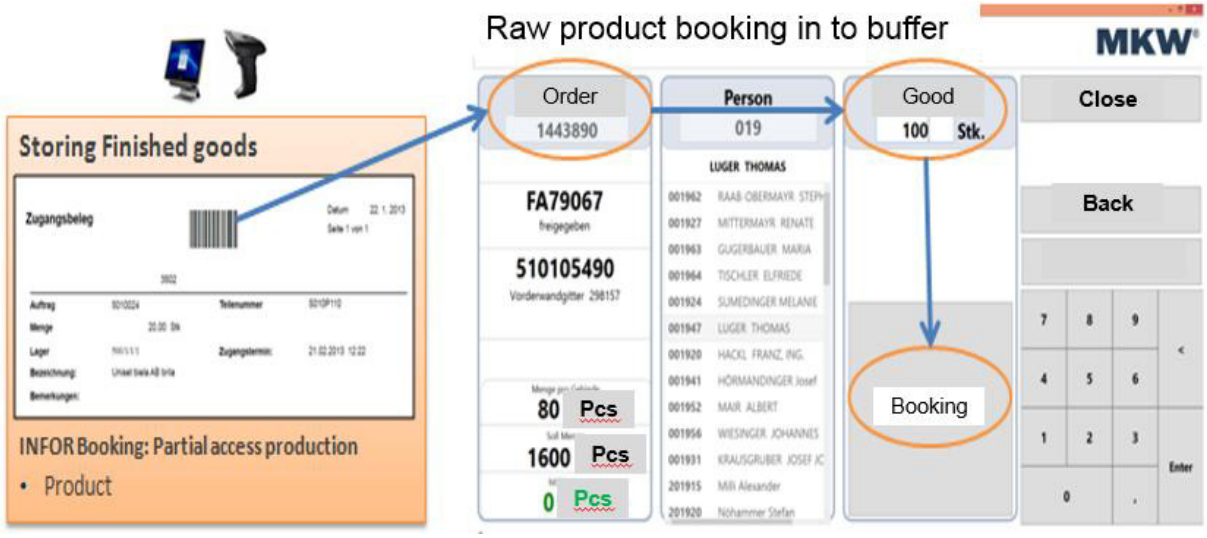

Fig. 2. Process of Finished goods booking to finished goods store.

6. Planed future innovations

In the proposed innovation of storage process is the Buffer terminal is fixed at one place. In future steps are counting with a mobile terminal witch will by mounted on fork lift. The Buffer client software will run on a tablet with connected barcode scanner. The tablet will communicate via wireless technology with the database of ERP software.

Also is counted with additional service in client software, which will handle with positioning of pallets in Buffer. It will work like a GPS (Global Positioning System) version for store. With this utility it will by very easy to have a perfect overview not only what is in Buffer stored, but also where it is stored.

Future innovations will not only concern with storage processes, but also with production. The same type of terminals but with other client software and user interface. This terminals will take care for feedback reporting of produced products on customer order.

7. Conclusion

This article deals with the optimization and efficiency improvement of warehousing through control of material flow in the Slovak Company MKW Presov. The company is a subsidiary of the Austrian company MKW Kunstofftechnik and is a leading and successful manufacturer of toilet seats. MKW Presov supplies customers with the goods in Central and Eastern Europe. It is possible to enable further growth by implementing the necessary project for the reorganization of production with significant investments in ERP system, material tracking and in automated buffer.[7, 8] The problem identification on the basis of the analysis of the company will present us with the potential storage process systems that would lead the company to the fulfillment of three basic tasks, namely: to respond flexibly to individual market requirements, to minimize stock supplies and to improve the reliability of delivery abilities. At the buffer point are crossing three production planning systems, CONWIP, MRP and inventory reporting process.[9] For better transparency and overview control over the disponibility of storages are used ERP system Infor with connected computer aided data collecting points, for example booking terminals.

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