Information system of warehousing logistics enterprise

Yumin Tao, Qingying Zhang
Institute of Logistics Engineering
Wuhan University of Technology
Wuhan, China
237632258@qq.com 373131795@126.com

Jing Liu and Zhengguo Wang
Institute of Logistics Engineering
Wuhan University of Technology
Wuhan, China
kathy8899@126.com zgwang@whut.edu.cn

***Abstract*—The logistics processes of the storage logistics enterprises is analyzed, the warehousing information models, system structures, management modules and their operational processes are studied, to provide enterprises with an automatic business information platform which not only meets internal management needs, but also the demands for the exchange of information between the enterprise supply chain stakeholders.**

Keywords-WMS; logistics warehousing; information system

I. INTRODUCTION

Warehousing plays a vital role in the entire supply chain of an enterprise. If the enterprise cannot guarantee the correct purchase, delivery and effective control of the safety stock, it results in the increase of administrative expenses, and the decrease of the quality and level of service, which affects the competitiveness of the enterprise. To establish an sound information system architecture, and to realize the informatization of storage [1] have become the basic matters of modern enterprise management, which make a lot of contributions to the enterprise information sharing, the increase of the turnover rate of storage, the reduce of inventory and enterprise logistics cost, the realization of the uninterrupted, timely and seamless connection, and operate each aspect of warehousing smoothly and coordinatedly.

II. CURRENT SITUATION AND SIGNIFICANCE OF WAREHOUSING LOGISTICS MANAGEMENT IN CHINA

A. The current situation of storage type logistics in China

In China, the current storage management is basically in the state of artificial or semi-automatic, which brings a low efficiency, while cannot realize information-based, paperless operation absolutely. Traditional simple static storage management is unable to ensure the efficient use of corporate resources. Warehouse and inventory control operations nowadays are very complicated, so a manual recording leads to a time-consuming, laborious and error-prone, and huge loss on business's value.

B. The significance of warehousing logistics informationization

The application of information technology in warehousing and logistics system is definitely meaningful, reflected in the following respects.

1)To reduce logistics costs effectively

In order to achieve the maximum benefit with the smallest cost, the enterprises have to find a way of optimizing the allocation of logistics resources and implementing a reasonable decision-making [2]. This is vital for both enterprise logistics and logistics enterprises. Lots of problems need to be solved by using information technology, e.g. storage configuration, goods packing and containerizatioin, goods allocation in shelves and cargo space, the formulation of the work plan, arrangement of personnel, decision-making of inventory, demand cost prediction, system control etc. Some intelligent means are considered to be useful and significant for the logistics and warehouse system to get the optimization of decision-making and top utilization of the resources.

2)To enhance the competitiveness of logistics enterprises

From a perspective of the competitiveness, enterprises are often very concerned traditionally about some single governance aspects of the activities, but after the formation of the supply chain system, especially after the prosperous development of the third-party logistics enterprises, this competition is no longer limited within a single field, but throughout the entire logistics process. By applying information technology, the competition ability of a logistics business could be improved tremendously. For warehousing, many international logistics activities improved their efficiency through enhancing up the facilities of the automated warehousing years ago. In other words, in the case of underdeveloped information, a lot of logistics technical means depend on the facility capacity. But along with the development and application of information technology, especially after the formation of the supply chain system, information processing, and the ability of governance determines the response capability of the whole supply chain. The logistics competition has shifted from the original concern about the level of logistics facilities to information governance capacity and technical level.

III.WAREHOUSE MANAGEMENT SYSTEMS

A. WMS and its implementation process

WMS, an abbreviation of the warehouse management system, is a management system with many functions such as comprehensive management, inventory management, quality control, and real-time inventory management, which focuses on the effectively control and track the whole

process of warehouse business and logistics management, so as to realize the enterprise storage information management perfectly.

The overall system is divided into: storage management module(SMM), entering management module(EMM), delivery of cargo from storage module and database management module(DCSDMM). The sub management module: storage statistics information management module(SSIMM),warehousing information management module(WIMM),goods cargo space information management module(GCSIMM), inventory management module(IMM),stock alert information management module(SAIMM),special goods store information management module(SGSIMM),warehousing data statistical analysis module(WDSAM),shipping information management module(SIMM),shipment statistics management module(SSMM).Warehouse feedback and analysis system(WFAS)is also an important part of this system. Figure 1 shows the relationship of the modules. The transmission format of the information, such as external information transmission and information exchange format within the system should adopted EDI during receipts and delivery. It helps speed up the rate of the information flow.

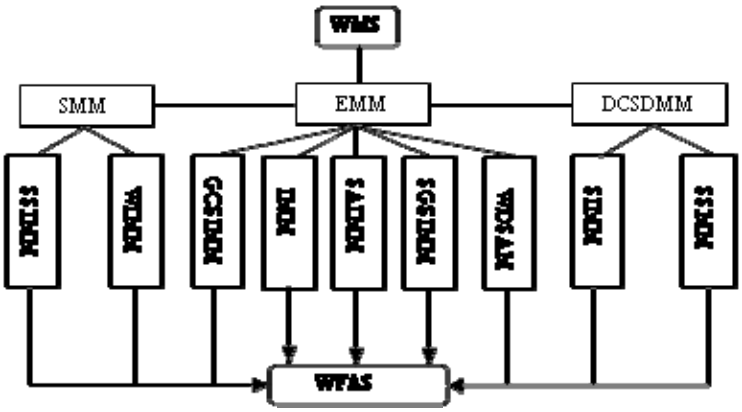

Figure1.WMS and its modules

The system uses Barcode management system. It controls the whole process of implementation of various aspects. Barcode management system manages goods cargo space, batch, and shelf life, distribution and bar code label serial number. It regulates the operations of the entire receipt, delivery and replenishment set of goods. Another function of this system is producing statistical reports according to customer demand. Introducing the barcode into the system can remove the steps of hand-written notes and sent the information to the room and resolve the ills of treasury stale lag. We can track the goods through the barcode system, no matter where does the goods flow to. The combination of barcode technology and information technology helps the enterprise rational and efficient use of warehouse space, providing customers with the best service in a fast, accurate, low-cost way.

The warehouse management process is inevitably associated with procurements and sales, so the following processes should be put a close attention:

1)Initial information collection

To analyze customer database is the first stage of the system procedures, which establishes a bar code for each product, prints the barcode which includes commodity's name, quantity, specifications, bar code serial number, the date of inbound and outbound, etc [3].

2)Purchase management

When entering the goods to the storage, a printed barcode label is used by a scanner to input relative information into the system, and the inventory data is changed automatically according to the purchase receipt.

3)Warehouse management

In the system of warehouse management, the inventory increases automatically after taking delivery, when sales outbound, inventory system reduces by itself. Anytime except when stock-in or stock-out, the inventory cannot be changed, so parity transfer is unable to affect the entire inventory changes and the administrator could check the inventory of a particular model at any moment.

4)Sales management

When the products get out of the warehouse, administrator uses scanner to get the data of the items on the storehouse column directly, while the total inventory is reduced automatically at the same time.

This is a whole system operation process.

B.Functional modules and applications of WMS

1)Functional modules of WMS

WMS generally has the following several function modules: separate order processing and inventory control management, basic information management, movement of goods, information report, receipt management, picking, inventory and shift library management, print management and background service system [4].

The basic information management: The system not only supports to set the basic information, including name, size, manufacturer, product batch number, production date, valid and box packaging, but encode all goods cargo spaces and

store them in the system database, so that the system can effectively track the location of goods, and it is easy for operators to quickly locate the physical location of the target cargo space in the warehouse.

Shelf management: On the basis of the automatic calculation, shelf management supports manual intervention, provides the slotting deposited and the remaining space. The main job of this part is giving shelf suggestions according to the principle of avoiding storage space wasting. Then the operators can confirm and adjust directly.

Picking management: Picking directive contains location information and the optimal path, according to the layout and the picking order of the cargo space, the system automatically gives the guiding path in RFID terminal interface and other related equipment, to avoid invalid shuttle and commodity finding, and improve the picking amount within unit time[5].

Inventory management: This part supports automatic replenishment, through the automatic replenishment algorithm, not only ensures that the inventory can improve storage space utilization, but reduces the probability of cellular phenomenon. The system is able to make logical segmentations and dynamic settings through the analysis of the deep information, and improve the usage of the space and the accuracy of control.

2)Application of WMS modules

The specific applications of WMS system functional modules are stated below:

Product storage: The public class form is generated by itself, when products enter the warehouse, the differences between normal warehousing and returns storage warehousing are distinguished clearly;

Delivery of cargo from storage: Regardless of the way of getting out of the warehouse, it generates outbound order numbers voluntarily, and distinguishes the differences between a normal outbound and a gift outbound [6].

Inventory management: When product enters and delivers from storage, the system generates each product inventory quantity immediately rather than with manual management.

Special product library: When customers need to discriminate a product from another, the system creates a virtual warehouse to manage the products, each function as the same as normal product library.

Allocation management: According to the transfer in different warehouses, the system produces requisition numbers, and supports allocation of the goods in different warehouses.

Stocktaking management: Stock taking of inventory warehouse is carried out any time when needed, inventory receipts are created, and inventory operation worked quickly;

The stock alarm: When the amount of stock quantity is less than the given quantity, the system alarms to tell the administrator to renewal goods as soon as possible.

IV. SUMMARY

Enterprise logistics warehousing is a central part of the production and consumption, and in a logistics business enterprise of warehouse, storage is the top priority, which is a specific service and able to provide time and space utility and value-added product. It is therefore necessary to strengthen the management of logistics, realize the informationization, and make every process more reasonable and optimal.

ACKNOWLEDGMENT

Supported by“the Fundamental Research Funds for the Central Universities”, 2011-IV-061

REFERENCES

[1] P. Dimitropoulos, J. Soldatos. RFID enabled fully automated warehouse management: adding the business context[J]. Manufacturing Technology and Management,2010,21(3): 269 - 288.

[2] J.K. Jolayemi, F.O. Olorunniwo. A deterministic model for planning production quantities in a multi-plant, multi-warehouse environment with extensible capacities [J].Production Economics,2010,87(7): 99–113.

[3] K. Wang, B. Yang. Warehouse management system based on RFID and data warehouse technology [J].Logistics technology, 2009,32 (12) :51-53.

[4] J.X.Gua, M.Goetschalckxb, L.F.McGinnisb. Research on warehouse design and performance evaluation: A comprehensive review [J]. Operational Research,2010,203(3):539-549.

[5] Ming-chang Lee. A warehouse management system with sequential picking for multi-container deliveries[J]. Computers & Industrial Engineering,2009,58(3):382-392.

[6] G.B. Gao, R. Lau, X.Y. Hu. The research and development of the third-party logistics enterprise management information system research and development [J].China Water Transport (Academic Edition), 2007,7 (8) :197-198.