Applied Mechanics and Materials Vols. 644-650 (2014) pp 6200-6203
Online available since 2014/Sep/22 at www.scientific.net

doi:10.4028/www.scientific.net/AMM.644-650.6200

Submitted: 18.07.2014
Accepted: 20.07.2014

Analysis and Design of Logistics Warehousing Management Information System Based on RFID

Dawei Xu[1, a], Liping Yang[2, b], Shan Ren[3, c]

[1] School of Electronic and Information Engineering, Changchun University, Changchun, 130022, China

[2] College of Computer Science and Technology, Changchun University, Changchun, China

[3]General Department Office of Admission Committee of Jilin Province Changchun, China

[a]email: 24003908@qq.com, [b]email: 648824133@qq.com, [c]email: renshan5885@sina.com

Keywords: RFID; Logistics; Warehousing Management; Information System

Abstract. Tracking difficulty generally exists in the traditional warehouse management mode in the business process, the turnover, low efficiency, logistics management information processing is not seasonable and means backward, thus affecting the competitiveness of enterprises, based on the analysis of traditional logistics warehousing management deficiencies, the great advantage of application of RFID technology in logistics field to solve the above problem. The logistics management information system based on RFID is analyzed, based on the traditional logistics business processes analysis, given the information and process structure of logistics business processes, and established a framework method storage business system based on RFID technology.

Introduction

Warehouse management is the material to the warehouse and warehouse is the management, storage mechanism in order to make full use of its resources, to provide efficient storage service of plan, organization, control and coordination process, it is one of the most important basic link, essential for modern logistics[1].

The traditional warehouse management pattern that is widespread human cost is high, the business process, goods, capital and goods tracking difficult turnover low efficiency, logistics management information and backward and other shortcomings, has not been able to ensure correct stock, inventory control and delivery, thus causing pipe increased cost, service quality is guaranteed, thereby affect the competitiveness of enterprises[2]. Traditional logistics warehouse management system can achieve information goods "static" management, and unable to realize the real-time tracking and monitoring the whole process of logistics [3]. RFID [4]technology is a non-contact, large capacity, fast, high fault tolerance, anti-interference and corrosion resistant, safe and reliable information identification and so on; it has been applied in logistics warehouse management.

System Requirements Analysis

Existing in the traditional logistics management based on the problems, this paper puts forward a logistics warehouse management system based on RFID, according to the analysis on the actual warehouse management process, the system should satisfy the following requirements:

(1) The demand of storage management is essential to the storage management of goods to meet the enterprises to improve the response capability and efficiency goals.

(2) The storage management needs to realize the storage, automatic storage, inventory, picking and other aspects of the requirements, standardize business processes. To improve the accuracy of query speed up goods, goods out of storage speed, thereby increasing the stock center throughput. Smooth business process is the guarantee of high response capability and efficiency of warehouse management, warehousing management need to adapt to so management process and organization structure of scientific management with optimization, non redundant, parallel operation.

(3) The storage management requirements can reduce the management workload, improve work efficiency.

(4) Visual warehouse management has become an important aspect in the supply chain management. Inventory management visualization can make the inventory management personnel and even in each node of the supply chain and timely, accurately grasp the position, status, activities of articles and other information, to achieve the timely decision-making inventory collection and supply the information automation, to achieve paperless operations and to improve the level and quality of warehouse management and inventory management.

System Key Business Processes

The core of warehouse management system based on RFID technology is: every piece of goods is additional electronic label, set the RFID in the warehouse the entrance channel at the reader. The goods in the reader, the reader can get goods information through electronic label on the goods. In the middle of the rack and outbound channel is also arranged a number of RFID handheld terminal or wireless data terminal, to track the goods in the storehouse of information and library information, warehouse management system information management of goods from the warehouse to automatic recognition, location, transportation, access, such as a library of all work processes.

A. Warehousing Business Process

Warehouse storage business process management system shown in Figure 1.

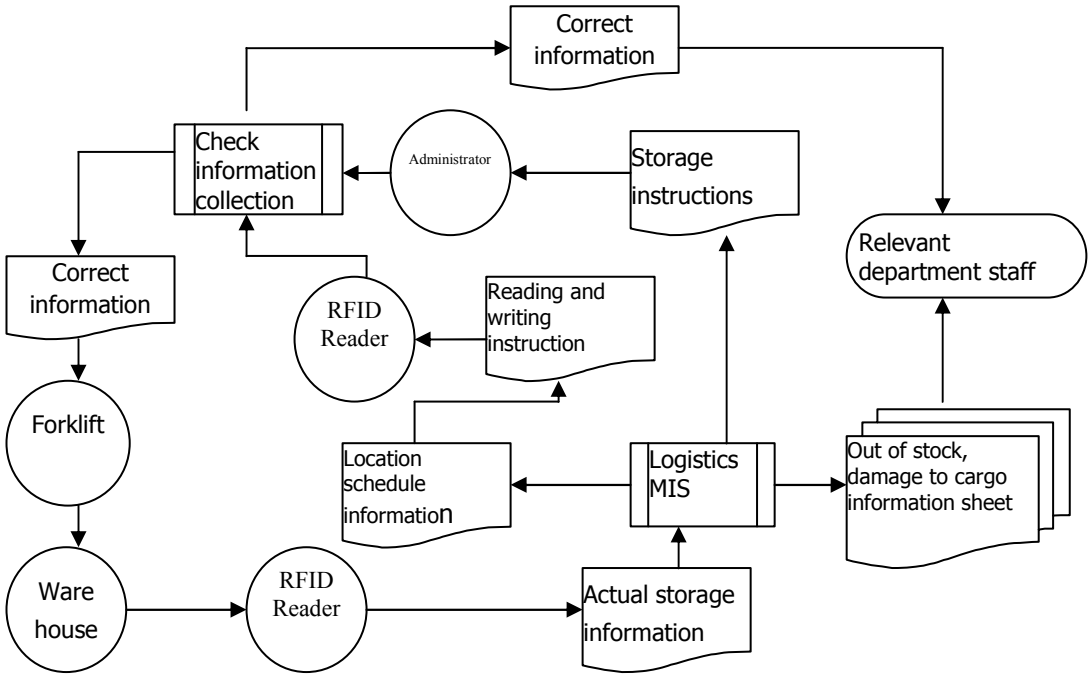

Fig.1. System storage business processes

(1) The storage administrator for the warehousing operation instruction through the warehouse management information system, to understand the business details (such as storage time, delivery vehicle brands, inventory etc.) relevant information.

(2) System according to the incoming goods warehouse, goods, and then in the area and the distribution of reservoir according to the selected storage, ready to receive cargo, personnel time, place of receipt and handling equipment for pre storage.

(3) The goods to the quarantine area, fixed RFID reader reads the tag information in the warehouse door, the system will the actual storage information and pre storage information, according to certain logical judgment verification tag information and input of the items of information are consistent. If the error occurs, the system output message, and solved by the related department staff; if there is no error, system will be the best way to automatically allocate storage, inventory, and the specific location of downloaded to the wireless data terminal to notify the forklift driver.

(4) The forklift driver transport allows storage of goods to the designated location; with a hand-held reader library to read and write label information, check the position of the goods sent to the correct location.

(5) The warehouse handling business ends by handheld RFID reader to upload data to the database complete the logistics management information system information update. Electronic tag data also need to update is written to the operating time, it can realize the object tracking.

B. Inventory Business Process

Warehousing and inventory management systems business process shown in Figure 2.

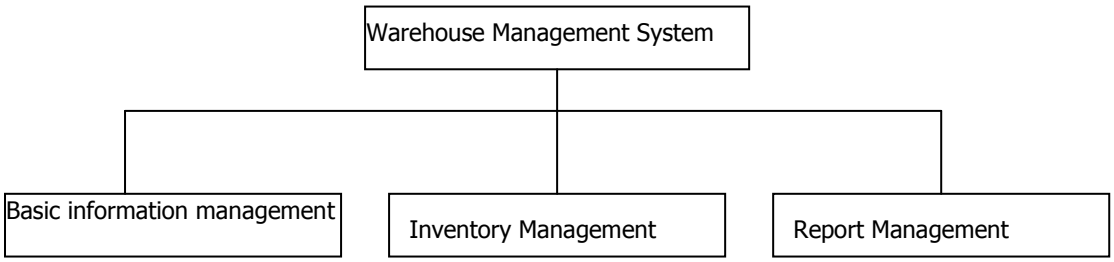

Fig.2. Warehousing system overall structure diagram

(1) According to the logistics management information system inventory plan selection to inventory warehouse, reservoir, and formulate the inventory, generate inventory list.

(2) Pile positioning crane to the need for inventory goods, information system control RFID reader to read data through wireless network. RFID reading and writing device through the wireless network inventory data to the information system, the system of statistical quantity of each location of goods and inventory quantity variance calculation information system.

(3) Inventory management is mainly completed inventory work, also can adjust the inventory. Inventory management, browse, query goods inventory distribution and storage of goods analysis etc..

C. Library Business Process

Based on RFID technology, warehouse management system out of the library business processes as follows:

(1) The storage administrator access storage operation instruction through the warehouse management system, understands the relevant job details (such as the delivery time, delivery vehicle brands, inventory etc.) related information, make delivery plan, and prepare requisition.

(2) A library is downloaded to the forklift vehicle terminal, notify the forklift driver to the specified library location, and then use the handheld reader read / write a tag library, system validation library bit is correct, and remove the making goods from stock position.

(3) Sorting. Remove the goods sent to automatic sorting equipment, automatic identification device is installed in the automatic sorting device reading RFID tags in the goods movement process, identify the items which belongs to a customer order. The RFID information system and control bifurcation sorting conveyor of the items allocated to the packing line corresponding packing and sealing.

(4) From the verification. Goods were transported to the outbound port cargo information, verification device scanning hand, if no error is required to permit operation, and loading operations. When loading, should notice to whether have damage occurs, if you have to report to the relevant units of the business department staff immediately, and processed by the processing opinion.

(5) From the end, the completion of the system information update. Electronic tag data also need to be updated.

System Architecture

A. C/S Structure

Client / server (Client/Server, C/S) [5] structure of the software is divided into client and server 2 layer. The client has a certain data processing and storage capabilities. Through the calculation and data for application in a reasonable allocation of client and server ends, can effectively reduce the

network traffic and server computation. The structure can make full use of the advantages of both ends of the hardware environment, the rational allocation of tasks to the client and server to realize, reduces the system overhead. For a user request, if the client can meet are direct results; otherwise you need to the server to handle. Public data such as calling stored on the server, the server for these data, some customers can handle missing after back to the customer. Therefore, this model can balance work, fully guarantee the data consistency.

B. B/S Structure

B/S (Browser/Server) [6]structure browser and server structure, which is composed of browser, Web server, database server 3 levels. The core part of the structure of the Web server, it is responsible for receiving remote HTTP query request, then according to the query to the database server to obtain relevant data, then the results of HTML and various kinds of page description language, the query request transmitted back to the browser [7].

The same browsers will more the, delete, add data description request to the Web server language, the latter with the database link to complete these work.

The system in the selection of architecture, not only consider the maturity structure of C/S, and taking the advanced B/S structure. Because of a security C/S structure than the B/S structure, C/S structure is used in the storage business internal; B/S structure is mainly used for the interaction of warehouse management system and external information, public information query and publishing.

Conclusion

In this paper, the analysis and design of logistics management information system based on RFID. Firstly, the demand analysis of the logistics management information system based on RFID; secondly, based on the traditional warehousing business process analysis, warehousing business process and system architecture based on RFID technology is presented, with a view to the real RFID in logistics warehouse management applied research has a certain reference value.

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Machine Tool Technology, Mechatronics and Information Engineering
10.4028/www.scientific.net/AMM.644-650

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10.4028/www.scientific.net/AMM.644-650.6200