Research and Establishment of the Integrated Project of Barcode Acquisition Technology and ERP System in the Regenerated Textile Chemical Fiber Industry

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Abstract

Through the research of the demand of the ERP information system of Ningbo Dafa Chemical Fiber Co., Ltd which is the leading enterprise in the regenerated textile chemical fiber industry, in this article, we put forward the solution project of the integrated logistics information system based on barcode acquisition technology and ERP system, discussed the logistics information processing flow and implementation method according with the characters of the industry, and mainly studied the implementations of barcode data acquisition method and technological project.

Keywords: Regenerated textile, Barcode acquisition, ERP, System integration

1. Introduction

Ningbo Dafa Chemical Fiber Co., Ltd belongs to the industry of regenerated chemical fiber, and it takes the reclaimed waste beverage bottle as the raw materials to produce the high-class and differential multiple functional polyester staple fiber through the waste material disposal processes such as separation, cleanout and selection and the technical processes such as melting, filter, draught and curling. Because the supply of waste plastics is sufficient and unstable, and the contents of moisture and impurity (PVC, bottle-neck and scrip) are different, which will induce the color, viscidity and melting point uneven and present dynamic change, so the variety of the waste plastics is especially numerous. At present, the automatic level of logistics management in the domestic regenerated chemical fiber industry is very low, and the industrial characters limit the extension and application of the information system in enterprises. To seek benefits from managenet, the company first established the standards about raw materials and finished products in the industry and introduced the Kingdee ERP management software.

To exert the function of ERP system to the largest extents and solve the bottleneck brought by the difficult data acquisition of raw materials to the cooperate management and decision-making, the company introduced the barcode system and the data acquisition model, which could solve and realize the seamless link with ERP system and produce various relative report forms, avoid the repetitive input of data, enhance the veracity and input efficiency of information, and achieve the benefit maximization of the system.

The integrated barcode information management system adopts the intranet technology, client/server (C/S) technology, database technology and ERP technology which adapt the production of Dafa Company, and takes the container batch number and packaging bag of raw materials as the main management objective, and the system can realize the functions such as the barcode conversion and print of product information, the acquisition and transmission of product data and the conversion of data, and offer the guarantee for the veracity of the data source of the ERP system. In the actual application of production practice, the system has obtained sufficient affirmation by locale operators.

2. Waste plastic processing barcode information management system

2.1 Different characters of the waste plastic processing barcode system with other barcode management systems

(1) The system can closely combine the production characters and product characters of waster plastic processing and realize the follow and management of gross slice, net slice and scrap materials. Especially aiming at the complex waste plastic classification and processing, the system establishes one soft of product organization management form, i.e. the

reasonable batch-combination and batch-division, which forms mutual and perfect solution method and develop the reasonable and feasible function module.

(2) Based on the intranet network, the system adopts three-layer C/S structure to realize the network service and sharing of product information, which can offer reliable data platform for the finance and logistics management system.

(3) According to the requirements of different clients, the system establishes its own product database and client database, which can enhance the usage efficiency of the system.

(4) The system realizes the seamless integration with ERP system by the form of second development of ERP system, which can largely reduce the operation time of data conversion.

(5) The system also realize the automatic processing function of printing forms, optimizing query and picking up data and other daily affairs, which can offer conveniences for users' daily operations.

2.2 Operation flow and total frame of the system

In the process of waste plastic processing, the barcode information management system is related with material information such as batch, size and type through ERP system, and then the collector (electric balance) acquires the weight information of every bag of waste plastic through the port of COM and transfer the information to the barcode system, and the system will print the acquired information and deliver cargos from storage or receive receipt. The data of various weights acquired in the material processing process through the electric balance can be used to analyze the flux of materials. According to the acquired data by the balance, the system will dynamic judge the start and end of once weight process, and store the weight, begin and end time, and the operator information into the database for the later query. The system implements the process according to multiple runs and multiple technical processes, and each run has its own name, and the system should record the name of the run when weighting the cargo, then the run name can be inquired later. And the run and the run name can be conveniently added and edited under the permission of limitation. Finally, the barcode system will automatically produce corresponding receiving receipt document and transfer it into the ERP system, and the concrete operation flow is seen in Figure 1.

When the system is designed, we adopt the three-layer C/S structure (seen in Figure 2), and the first layer is the user interface layer which includes data input window, data query window, data management window and form print window. The second layer is the application service layer which mainly disposes the processes such as limitation management and data processing. The third layer is the database server management layer which includes one part of storage process development and operation management (Agent) used in the data processing. The three-layer C/S structure makes the operation interface of the client port more friendly, and only simple operation can complete the management work of various data. Main data processing works are completed in the database server, and their design maintenance and updating work only need to be implemented in the database server. Because of the diversity of users (including pondering personnel, depository conservator, statistician, information center and company leaders), the system offers the multiple-user function which can implement corresponding limitation distribution aiming at different users and different management levels, and interview different operation logic models according to different limitations.

3. Design of system function

The total objective of the operation platform of the waste plastic processing product barcode information management system based on ERP system is to adopt advanced, mature, safe and reliable barcode technology to realize the acquisition of product information, and automatically combine the batches and warehouse cargos into the ERP system to implement data processing, and the system can largely enhance the warehousing entry speed of ERP system, and fulfill the special demand of enterprise logistic management. According the actual situation of waste plastic processing, the system can be divided into the basic data module, the information acquisition module, the module that statistician prints warehousing bill, the data management module and the system administrator module.

3.1 Module of base data

In the waste processing process, according the demand of raw material management, the module can introduce the size, type, product status, stock date and other information about waste plastics into the ERP, and print corresponding barcode according to the requirement of storage management.

3.2 Module of information acquisition

The information acquisition module is to acquire and automatically store the information in the stage of material processing and product production, and it is the core of the whole information acquirement system. The collector transmits the acquired information into the compute to identify and automatically record the data information through the port of COM, and judge the data according to different rules and store the information into the product database. The system implements the acquisition through the data of 8 electric balances which are divided into five work stations and 1 central management station. The system firstly sets up the port parameters and electric balance. If the type of the electric balance has existed in the system, the data in the system database can be directly transferred, which omits the

approach of setting. If the system has not the type of the electric balance, it will establish the new format which inputs the manufacturer and the type of electric balance to obtain the required data.

3.3 Module of warehousing bill print

After the electric balance weights the product, the warehouseman prints the warehousing entry bill, and the statistician completes corresponding data statistics according to the warehousing entry bill.

3.4 Module of data management

The module introduces the warehousing document batch into the ERP system through the function of data introduction, which can realize the data sharing with the ERP system and effectively enhance the using efficiency of data. In addition, the module also possesses many usual functions such as data output, data query and data processing.

3.5 Module of system function and module of employee limitation management

The module mainly implements the maintenance of the system such as modifying the users' passwords and deleting the log of the database. The personnel limitation management includes the management and operation about personnel's basic information. Through distributing different user limitation, the module can make operator to implement proper interview and operation to the various function modules in the barcode information management system only by proper mode and limitation, which can ensure the data security of the whole system.

4. Selection and design of database

The database design is the technology based on the database and its application system, and it is the important part of the development and construction of the barcode information system. Considering the ERP system which has been implemented at present in enterprises, and the characters such as the seamless integration of the barcode system with ERP system and scientific management operation flow, the database adopts the SQL Server2000 to implement development and design.

According to the method of standard design, considering the whole development process of database and its application system, the design of database is divided into six stages including demand analysis stage, concept structure design stage, logic structure design stage, physical structure design stage, database implementation stage and database running and maintenance stage. The relationship database model can be utilized to establish the corresponding relations among various tables of the database, design the table reasonably, and define the data type in the table.

5. Conclusions

The establishment and implementation of the barcode information management system which can realize the seamless link with ERP system could not only possess important actual meanings for the logistics management of Dafa Company, but largely drive the industry to further classify the waste plastics uniformly and establish feasible industrial standard. The application can also offer new idea in other processing industries which can apply the barcode into the management system to realize the seamless link with ERP system, fulfill the requirement of modern processing manufacturing and management for enterprises, strengthen the market competitive ability of enterprises to adapt the market economy with quick changes, save costs, enhance the efficiency and bring conveniences for the clients when creating large economic benefits.

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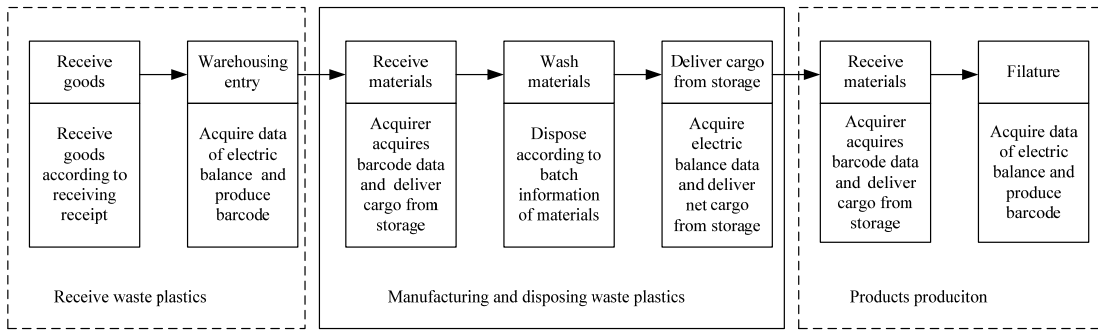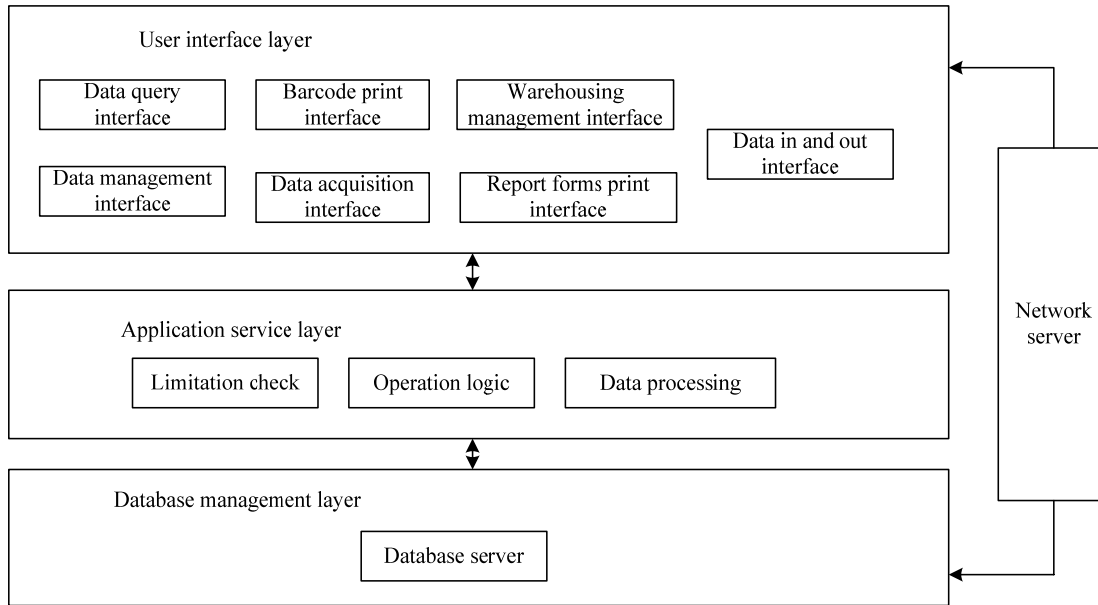
Figure 1. System Operation Flow

Figure 2. Frame of Waste Plastic processing Barcode Information Management System