SIMULATION OF WAREHOUSE RECORDING PROCESSES

Tolaniddin Ramziddinovich Nurmukhamedov  
Doctor of technical sciences, professor of the Department  
"Information systems and technologies in transport", Tashkent State Transport University  
niylaniddin @ mail.ru

Temur Shukratovich Tashmetov  
Assistant of the department "Information systems and technologies in transport", Tashkent State Transport University  
tima260491@gmail.com.

Annotation

The article analyzes the functioning of a wagon depot warehouse, investigates the operations of inventory accounting of inventory items, and substantiates the choice of a means for modeling. A model of an information system for warehouse accounting in UML notation is proposed, while building a model of the subject area, the actors of the system are singled out. The unique names of the actors of the designed automated information system for accounting operations of the warehouse are noted. A use case diagram is provided to provide a general idea of warehouse accounting operations.

Article history:
Received 6 Oct 2022
Revised form 5 Nov 2022
Accepted 31 Dec 2022

Keywords: analysis, wagon depot, railway transport, mobile units, automation, system, element, goods, repair, chart, equipment, transportation, warehouse accounting.

Introduction

Automation of accounting operations of the car depot warehouse increases the efficiency of production processes performed with moving units, allows you to quickly manage the repair and servicing works (RSW) and is an urgent task. The need to automate the accounting operations of the car depot and its structural divisions is aimed at facilitating the work of managerial personnel, curbing the growth of maintenance personnel caused by the development of production; the complication of industrial relations; increase in the volume of management functions. The railcar depot in the process of functioning is forced to constantly improve its activities, which requires the development of new technologies and methods of conducting RSW with moving units, the introduction of new, more efficient methods of managing and organizing its activities. Wagon depot - system - a set of all its structural units, united in a certain order, each of which performs only its own function, which is important for the rest of the system. Based on this, it becomes necessary to have adequate information about the work performed by each structural unit, in...
connection with which a model is created. In this paper, we are talking about the development of an information model for performing accounting operations at the warehouses of the car depot.

**Main part**

The model of accounting operations of the warehouse, information exchange between structural divisions allows for a comprehensive analysis, to look from all points of view, to see what is possible, not seen by all warehouse workers, including the manager. Having a model of the enterprise, all its business processes, focused on a specific goal, we can open the possibility of its improvement. Analysis of the enterprise as a model is a convenient way to form the achievement of a specific goal. Accordingly, the object of study is the warehouse of the wagon depot. Investigating operations on warehouse accounting of spare parts, components, inventory items (hereinafter referred to as inventory) it is required to solve a number of tasks: study and description of the subject area; fulfill the task statement; justify the choice of means for modeling; develop measures to improve the business process; perform modeling of the business process of accounting for inventories at warehouse.

The car depot warehouse accepts consignments of goods and materials from suppliers and releases them to shop workers in small batches. It is necessary to keep a quantitative and cost accounting of incoming and outgoing goods and materials, to form incoming and outgoing invoices. At the same time, the main tasks of warehouse accounting are:

- ensuring the safety and control of the movement and proper use of all goods and materials;
- compliance with established norms of stocks and expenses;
- timely identification of unused goods and materials to be sold in the prescribed manner;
- obtaining accurate information about the balance of goods and materials in warehouses.

The warehouse staff consists of: warehouse manager; storekeepers. The main functions performed by warehouse employees are:

- at the request of management, warehouse employees perform certain or certain types of warehouse activities under the direct control of the warehouse manager;
- the warehouse manager provides the depot units with the full information necessary for the implementation of the RSW;
- the formation of stocks of goods and materials in the warehouse is carried out on the basis of recommendations and in agreement with the warehouse manager.

The introduction of an automated information system for accounting operations in the warehouse will relieve the activity of the warehouse manager in the following areas: the receipt of goods and the formation of operational, quarterly, annual reports, improve productivity and working conditions. For this purpose, we have proposed a model of an information system for warehouse accounting in UML notation.

When building a domain model in UML, we select the Actors of the system. An actor is a role that a user or another system performs when interacting with the system being designed, and each actor has its own unique name.

The actors of the designed model are:

- warehouse manager;
- accountant;
- warehouse staff.

The use case diagram is used to get the most general idea of the functionality of the system. It gives an idea of how the Actor (the active subject of the system) interacts with other subjects, or external systems.
The general diagram of use cases is shown in figure 1.

![Use Case Diagram](image)

**Figure 1. General Use Case Diagram**

Description of the general diagram.

1. Consumption of goods.

   The warehouse manager checks the availability of goods in the warehouse. In the presence of goods and materials in the warehouse, the warehouse manager prepares goods and materials for release to the worker of the shop.

   The accountant, after receipt of the paid invoice, draws up an invoice and transfers it to the warehouse manager.

   The warehouse manager, on the basis of the invoice received from the workers of the car depot workshops, forms an order.

   A warehouse employee (storekeeper), on the basis of an order, issues goods to a shop worker according to an invoice.

2. Receipt of goods.

   The warehouse manager checks the availability and stock of goods and materials and, based on the results of the check, forms an order.

   The accountant pays the supplier's invoice and draws up an incoming invoice.

   The storekeeper of the warehouse accepts the goods according to the receipt invoice.

Consider use case diagrams for each Actor in the system.

The use case diagram for the Warehouseman Actor is shown in figure 2.
Analysis of fig. 2, description of the diagram of use cases Warehouse manager, allows us to draw the following conclusions.

1. Arrival of goods.

The warehouse manager checks the availability of goods and materials, and if the goods are not available, or there are not enough of them, he (the warehouse manager) draws up a purchase order and transfers the supplier’s invoice to the accountant for payment.

2. Consumption of goods.

The warehouse manager, at the request of a shop worker, forms an order for the required spare part, component, goods and materials. Upon receipt of an outgoing invoice, it generates an order for the warehouse for the issuance of goods.

Consider the role played by the Accountant Actor, the use case diagram of which is shown in figure 3.
Description of the Accountant use case diagram.

1. Receipt of goods.
After receiving an invoice from the Warehouse Manager for payment of goods to the supplier, the Accountant pays the invoice and draws up an incoming invoice upon receipt of the goods from the supplier.

2. Consumption of goods.
The accountant generates an invoice after the issuance of goods and materials to the employees of the depot workshops.

It remains to find out the role that the Storekeeper performs. A diagram of use cases for the Warehouse Keeper Actor is shown in figure 4.

![Diagram of use cases Warehouse keeper](image)

**Figure 4. Diagram of use cases Warehouse keeper**

Description of the use case diagram Warehouse keeper.
The storekeeper of the warehouse accepts or releases goods from the warehouse according to the corresponding invoice (incoming, outgoing). Conducts scheduled inventory.

The system class diagram defines the types of system classes and the relationships between them. Classes represent entities of the subject area (at the stage of analysis) or elements of a software system (at the stage of design and implementation).

The main entity in the system will be the product. As is known from the design task, the goods are stored in a warehouse. But the concepts of a product as a description and a product lying directly in a warehouse differ from each other. A product in a warehouse, in addition to being related to the warehouse by a composition relation (aggregation is not entirely suitable, since in this system a product is a product until it leaves the warehouse), it is also characterized by quantity. Similarly, one should argue when considering the relationship between the Goods and the Order, the Goods and the Invoice. Due to the fact that Order and Invoice are essentially documents and have similar attributes, they were merged using a common Document ancestor class.

**Conclusion**
The development of regulations for the implementation of the process "Warehouse accounting" depot. The description of the subject area is completed, the accounting processes of the depot warehouse are analyzed, the task is set to develop diagrams of use cases by various Actors. Subsequently, it is recommended to carry out activities to develop a regulation model in the IDEF0 notation.
References


