

Modeling and analysis of storage business processes

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Abstract. Under the conditions of modern market the companies shall pay a special attention to the effectiveness of their business processes. The present work examines the business processes of storage goods processing of gas-concrete blocks producing companies. The modeling of processes like goods reception, goods storage, goods shipping and goods picking was made. The problems of the existing model were analyzed; the key problems of the field were determined; and the key findings on the necessity of these business processes re-engineering were made. The solutions for the warehouse operating quality were suggested.

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Introduction

Business process means the chain of logically related and repeated actions in a result of which the companies' resources for object processing (physically or virtually) aimed to achievement of certain measurable results, or products processing for satisfaction of internal and external consumers are used. The main idea lies in fact that any business process has its internal and external consumer. Basing on this definition we can examine all actions and operations inside organization (company) either as the business process or as its part [1]. In the modern world the companies that wish to stay competitive has to increase the level of their operating efficiency. To increase the operation performance it's not always possible to use the methods which will not lead to fundamental changes in the structure of the company's business processes. Re-engineering of business processes is a fundamental rethinking and radical restructuring of business processes for the purposes to achieve the massive improvements in the modern production indicators such as price, quality and operation speed [2]. To ground the implementation of re-engineering it is required to make a preliminary audit and the next following modeling and analysis of business processes. Let's examine the key variants of building of a new business model of the company:

“Zero-approach” means the development of the business processes model of the company from scratch.

Building of the business model on the basis of modeling of the system of management decisions making with its next following improvement, and building of new business processes on the basis of optimized system of decisions making.

Detailed reflection of current position and the next following building of business processes model [3].

Within the context of the present work we examine the group of gas-concrete blocks production and sale companies. Gas-concrete is a light cellular material that falls into the group of foamed concrete, and is used in a construction business [4]. Hereinafter the gas-concrete will be referred to as the goods. As the operating processes prior the goods delivery to the warehouse is automated and all secondary processes are strictly regulated by manufacturer, they cannot be re-engineered. The key operational process that can be significantly improved in case of re-engineering methods usage is the process of storage goods processing.

Methodology

Within the framework of the present work performance the standard audit of all business processes was made at the warehouse. Basing on the IDEF0 methodology we have built the functional model of storage business processes. We have also made the qualitative analysis of business processes of goods reception, storage and shipping which is described in details in [5].

Main part

The continuous cooperation with the warehouse coordinators is an important stage during the modeling of storage business processes [6]. During the audit five main business processes were determined: goods reception, storage, picking, shipping and inventory accounting. During the inventory accounting process modeling we have found out that this process does not need any re-engineering and for this reason we have examined only four other business processes. The key storage business processes are shown below on Image 1.

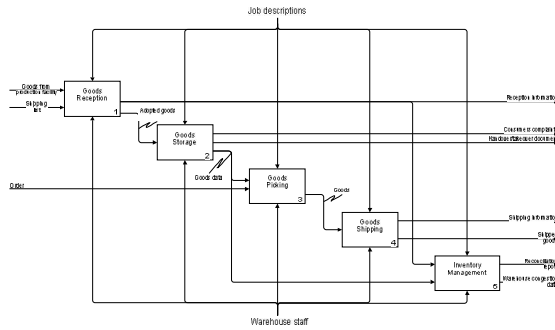


Image 1. Key business processes of warehouse

During the reception the goods are delivered directly from the production together with the shipping list. The information on delivery is input into the database. Then the received goods are delivered for storage where they undergo the quality audit and inspection. If the client orders the certain goods parcel, the goods are packed and then sent for shipping. During the shipping the goods are shipped into the freight and the information on shipping is entered into the database. To make a detailed analysis it is required to decompose all business processes. The business process of goods reception is shown below on Image 2.

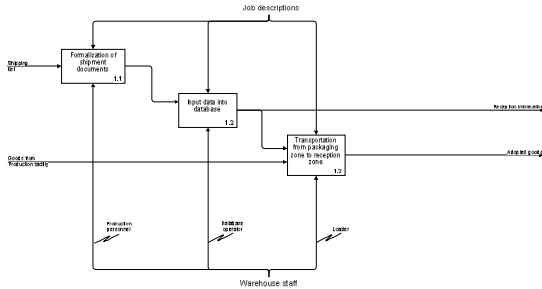


Image 2. Goods reception

At the shipping list receiving the operational personnel executes accompanying documents which then are used by the operator to input data about new goods into the database. After that the loader moves the goods from the packaging area to the reception area. The disadvantage of the examined business process lies in fact that, firstly, until the data is input into the database – the loader will not ship the goods to the storage area, and, secondly, at this stage the goods quality and quantity audit will not be made. This audit is at the stage of goods storage business process which is shown below on Image 3. Only after the most favorable conditions and storage areas are determined and the goods are moved and placed at the areas, the quality and quantity audit will be made. From this it follows that all complaints against the goods and the delivery and acceptance certificate are executed only after this process completion, but

however if we conduct this process during goods reception this will allow us to reduce the time for application of Claim on potentially defective goods, as well as to save the loader operating hours. After the audit of goods the operator corrects the data about the goods in the database. As a result the operator performs the double-work on data entry, but if the quality and quantity audit was made before the data input (i.e. at the stage of goods reception), it would be possible to reduce his operating time twice. The works [7, 8] also show us that it makes sense to enter all supporting processes and required storage and stock availability control terms at the stage of goods storage.

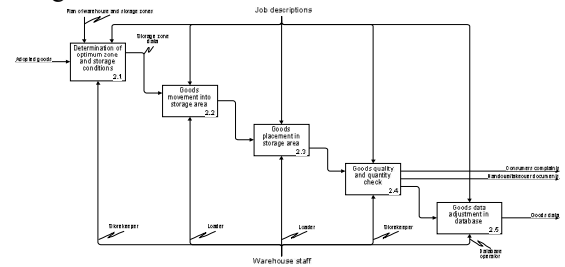


Image 3. Goods storage

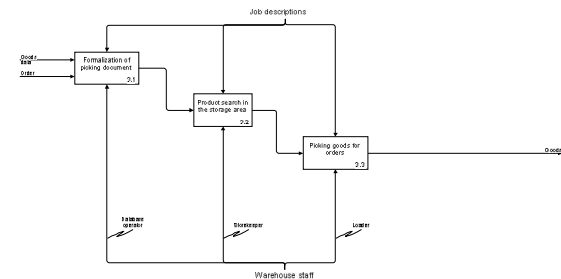


Image 4. Goods picking

The business process of goods picking is shown below on Image 4. When the client makes an order, the operator drafts the picking list. Then the store clerk searches for the goods in the storage area and the loader conducts the selection of goods by orders. The works [7, 9] describe us the picking method with due account for goods movement to the picking area, as well as marking of goods for shipping which allows to reduce the goods shipping time and the loader's workload at the stage of shipping. At the present moment the warehouse has no picking area yet, but if during the quantity audit it will be found out that the picking efficiency may increase in case of such area creation, then it will be necessary to make the re-engineering of whole business process of goods picking.

The process of goods shipping was also modeled and is shown below on Image 5.

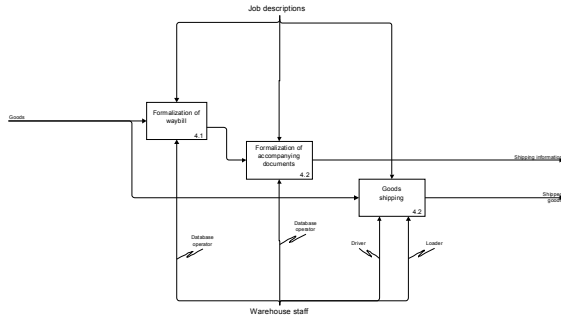


Image 5. Goods shipping

During the goods shipping the operator drafts the delivery notes and after that he drafts the accompanying documents. It is obvious that the operator is loaded at this stage, and since the process of processing of information on goods reserves, document management and formed orders is quite time-taking and requires heavy time expenditures [10], it is necessary to reduce the operators' workload. Due to this the loader's and the driver's standby time will be reduced as well which will allow to ship the goods quicker. Goods storage and goods shipping are the main problem areas that require re-engineering.

Conclusion

In the present work we have modeled and analyzed the key business processes of operation of the gas-concrete production and sale companies' warehouses. The methods of qualitative analysis of the business processes efficiency were used and the key problem areas were identified. In the next work we are planning to analyze the business processes of direct supplies to object, account receivable follow-up and work with distant warehouses. We also plan to make the re-engineering of all business processes and to conduct the quantitative analysis to calculate the economical effectiveness from the re-engineering implementation.

Key findings

Basing on the given results we can make a conclusion about the necessity of re-engineering of some business processes. The main problem areas are the business processes of goods picking and storage. It is suggested to remove the process of goods quality and quantity audit from the goods storage stage to the goods reception stage which will allow to reduce the personnel workload and will add the business processes of stock availability control and storage terms providing. At the goods picking stage it is suggested to create a picking area in order to reduce

the loader's standby time which is connected with the waiting of special transport unit for shipping performance. Due to this the load of the personnel inside the shift will also improve and this will allow to reduce the shipping hours of the coming transportation. Also the transfer of the business process of accompanying documents execution to the process of goods picking will allow to speed up the transport unit shipping hours due to reduce of number of operations after the transport unit coming. In case of cutting time of transport unit shipping and reduction of number of operations, the customer centricity of company will increase, which is the most important task at this stage of its development.

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