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State-of-the-art approaches to material transportation, handling and warehousing

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Abstract

Providing a desired level of customer service in the business is an important part of logistics management. The role of logistics is to provide transport right material in the right quantities and the right quality to the right place. The problem arises when harmonization logistics requirements. This article focuses on solving the problem of increasing the level of customer service through effective material transport, handling and storage. The first part focuses and compares different types of warehouses and the order picker's inventory management technologies. The second part is devoted to logistics and supply. Warehouse management and transport of the material is connected with tractive control system that reacts flexibly to changes in customer requirements. Authors in solving based on the results of realized survey of the current situation in enterprises in the described areas.

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1. Introduction

Everyday task of workers of logistics is to provide the transport of material and products with the required amount and quality to the required place – from warehouse to production workstations. The customer requires still larger range of products; therefore, it is necessary to set the production system appropriately, and to synchronize the logistics with

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customer's requirements. By the efficient transport, handling and storing, it is possible to solve the issue of the increase of customer service level. [1]

At present, the trend is to maximize warehouse capacity, which can be achieved, for example, by the block storing, horizontal enlargement of the warehouse, or by the application of narrow aisles in warehouses. If it is needed to dispatch any items, the application of upward racks or narrowing of aisles is required. It is necessary to consider the capacity and available area, the number of warehouse items and their turnover, and from the perspective of pallets, it is needed to consider the fact whether each pallet must be accessible, whether whole pallets are dispatched, and what the count of pallets is. An efficient warehouse optimally interconnects the rack system with the employed handling machinery. [2,3]

2. Theoretical backgrounds

The customer service can be viewed from three perspectives. In the majority of organizations, the customer service is understood in one of three following ways: [4]

- As an activity or function that needs to be managed, e.g., taking care of orders or processing complaints from customers.
- As an actual performance of certain parameters, e.g., the ability to dispatch the complete order until 24 hours after its receiving in 98 % of all orders.
- Customer service is viewed as a part of the overall business philosophy rather than individual activities or measurement of performance.

The availability of supplies is the most important aspect of customer service. The inventory carrying costs are usually the highest costs within logistics. [5] The objective of inventory management is to increase the financial return on inventory, and simultaneously, to increase the customer service level.

There are five initiatives leading simultaneously to the increase of inventory turnover and to the increase of service level. These five initiatives represent the base of each continuous progress in logistics and supply chains:

- Improved accuracy of a forecast.
- Shorter cycle times and lead times.
- Lower costs of orders/setting.
- Improved visibility of inventory.
- Lower inventory carrying costs.

Improvement in these fields can be done using many tools and methods, e.g., efficient consumer response (ECR) and efficient foodservice response (EFR), quick response (QR), continuous flow manufacturing (CFM), lean manufacturing and Just-in-time (JIT). [6] Lean logistics is a dimension of lean manufacturing based on the pull principle. Its task is to get the right material to the right place, with the right quantity and in the right way. Lean logistics considers the requirements of the structure of various items, and it also considers the material and information flow. This pull system is based on the movement of material when the place of placement signalizes that it is ready for the material. By an appropriate combination of storing, order picking and material handling, it is possible, for example, to shorten cycle times, improve visibility of inventory, or to lower inventory carrying costs. Inside an enterprise, there is the trend of using warehouses with narrow aisles and milk run supplying system, when small volumes of high count of items are being transported inside the enterprise (e.g. from a warehouse to manufacturing workstations) in short, predefined times, and with the loading and unloading exactly defined on the exactly determined route. [7]

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