

Calculation of Personnel Logistics Costs of Warehousing

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Abstract

Logistics and especially warehousing plays an important role in everyday work and is becoming one of the main factors of differentiation in the market. This is closely related to the calculation of logistics costs. The issue of personnel costs in logistics plays an important role at present time. The aim of logistics cost management is to reduce personnel costs and increase the competitiveness of logistics service providers. Finding effective methods in the process of calculating business personnel logistics costs is very difficult today, but it is a topical issue in the field of management of the logistics costs. A significant part of the logistic tasks are carried out by logistics service providers, these businesses play a key role in operating selected logistic industries more efficiently. The aim of this article is to assemble the calculation of personnel logistics costs of warehousing in a logistics service provider with regard management of logistics. The article is based on research of the world literature, in-depth interviews with senior managers, an analysis of internal data of the logistics service provider and a snapshot of the day. The article shows as a case study how to better calculate the personnel logistics costs in a selected logistics service provider.

KEY WORDS: *personnel logistics cost calculation of warehousing, cost calculation, logistics service provider, warehousing, case study*

1. Introduction

Warehousing is one of the unforgettable activities within the logistic chain. It ensures the warehousing of products in various forms and in many positions within the logistic system. The role of warehousing stems from market needs and product shifting to the consumer. The basic types of stocks can be distinguished whether they are the supply stage or the distribution stage. Warehousing provides both space and time benefits, helping to ensure a high level of customer service. Currently, companies are trying to minimize logistics costs. Logistics also includes warehousing. Customer satisfaction must not be compromised, which results from the reliability of the supplies. The aim of this article is to assemble the calculation of personnel logistics costs of warehousing in a logistics service provider with regard management of logistics.

2. Theoretical Background and Methodology

Logistics is critical to business success because it fulfils the promise given to the customer [1-2]. In today's life, logistics is an area that plays an irreplaceable role in every business and company. The chain of logistics activities ensures the smooth running of the production process and logistics costs are associated with each logistics activity. These costs are significant items that largely affect the company's overall profit or loss [3].

Every company and logistics service provider ask how to reduce costs and waste while maintaining profit growth in a free market environment. This question is partially answered by logistics, which also opens the way for a wide range of business optimization methods and tools [4]. The purpose of logistics is to reduce costs, especially transport costs. While the first remains the most significant logistics cost, the cost of transporting supplies is second. In addition, other goals are time savings and improved service reliability, including flexibility. Companies involved in the physical distribution of cargo strongly support strategies that enable them to reduce transportation costs in a competitive environment [5]. Logistics activities cover three main areas; these are incoming (inbound), internal and outgoing (outbound) logistics. Inbound logistics includes procurement and integration activities. Improved integration with suppliers can affect several dimensions of business performance, including cost, quality, technology, delivery, flexibility and profits [6-7]. Internal logistics can be seen as operations in the production, transfer and handling of materials, and inventory and warehouse management [8]. Internal logistics begins when raw materials enter the company until the product is ready for distribution. Internal logistics activities affect a variety of product aspects, including cost, quality and performance. As a result, they need to be constantly monitored and evaluated for continuous improvement [9]. Outbound logistics includes processes such as distribution, marketing, sales and service. It has been found that an information technology system improves such processes in a number of ways, including accurate order delivery information used to provide adequate capacity at the expert level for customer support. In addition, product tracking allows increased customization, meeting customer requirements and reducing long-term shipping costs. This leads to higher inventory turnover with a higher market share, due to the reliable and readily availability of those products or services that customers most demand [10].

Logistics is an important factor supporting globalization and international trade flows. Modern logistics systems savings are based on inventory reduction as the speed and reliability of supplies eliminates the need for warehousing. Consequently, the reduction of stock requirements is one of the advantages of logistics. However, this means that stocks have been transferred to some extent to the transport system, especially to roads but also to terminals. In fact, stocks are in transit, further contributing to congestion and pollution. Environment and society, not logistics service provider, assume external costs [5]. Deconcentration of demand and supply, increasing customer requirements lead to increased logistics costs [11]. Companies and logistics service providers are increasingly paying attention to distribution costs, which can range from 30% to 40% of total product costs. Such data based on research carried out among Polish companies are given in the literature [12]. Total distribution logistics costs consist of transport 37%, inventory financing 22%, warehousing 21%, customer service and distribution 20% [13]. The issue of improving distribution logistics is particularly relevant for express courier services and logistics service providers [14]. Logistics costs are becoming increasingly blurred. Price is the focus of the company and the survival of the company. Many companies are paying more and more attention to this problem [15].

The new innovative approach in logistics can bring for warehousing the reduction of the logistics costs, mainly personnel costs for the logistics service provider. This is especially thanks to the implementation of warehouse management system and calculation of logistics costs [16]. Through an efficient management process, logistics costs, especially personnel costs can be effectively reduced, and conversely, efficiency and better resource allocation can be increased [17-18]. Express courier companies and logistics companies must strive to increase the level of customer service provided with the optimal pricing policies [19].

Transport is a major component of logistics costs, but it is not the only one. Others include warehousing, capital costs, insurance, obsolescence/loss, packaging and logistics management [20-21]. Logistics costs can be calculated using different methods and data sources, although the literature review shows that they can be divided into two main classes [22-25].

- using available data from national accounts or other statistical sources such as national customs data or cif/fob ratios provided by the International Monetary Fund;
- is to obtain data on sector-specific logistics costs and wholesale industries or offers from carriers and logistics service providers.

Total logistics costs can be divided into the type of kidnapping tax [3, 26]:

- transport and handling costs related to the movement of goods come from internal and external freight, packaging and damage to goods during handling;
- packaging costs include all costs associated with packaging materials and packaging and labelling processes;
- inventory management costs are costs of maintaining good inventory levels;
- administrative costs include all costs associated with long-term planning and operational management of material flows;
- order costs can be attributed to order processing and production orders;
- capacity related costs are annual depreciation and maintenance costs;
- cost of shortages and delays;
- environmental costs.

Personnel and distribution logistics costs represent one of the highest shares of total logistics costs and their rationalization can bring great commercial and competitive advantages [27].

A case study has been selected as one of the qualitative research methods, as it is one of the most commonly used research methods aimed at implementing various managerial approaches into organizations' practice [28]. The case study is defined as an empirical overview of the current phenomenon in its natural environment using multiple sources of evidence. Study cases are selected based on predefined case conditions [29-30]. A real case study is a qualitative research method based on a study of one or a small number of situations to apply findings for similar cases [31].

3. The Case Study

Table 1 provides an analysis of the time required for the occupation of warehouse space, according to which the personnel costs are determined. Hourly labour costs are determined according to the wage regulation of the selected logistics service provider. These costs include basic salary, afternoon and night shift supplements, variable salary, share of the 13th salary, subsistence allowance, tax levies and other items. The table counts with three shift managers and a warehouse manager. No time analysis is performed for these positions. For other positions, i.e. forklift driver, administrator and production operator (worker), time analysis is performed (hourly wage costs are shown in green fields). 21 working days will be considered, which means a total of 63 shifts per month in 3 shift operations. The monthly time-lapse image revealed that the number of pallets in and out was 39,500 pieces per month, which, after dividing by 63 shifts, can obtain the number of pallets handled per shift, i.e. 627 pieces.

The time analysis was performed as follows:

- Detection of all activities to ensure operation.
- Designation of the worker performing the activity.
- Measure the time required to perform a given activity (per pallet).

- By multiplying this time by the number of pallets per shift, the duration of the activity per shift is obtained.
- The sum of these times is equal to the number of minutes needed to ensure shift operation.
- By dividing 60, the number of hours is determined.

This number divided by seven (the number of hours of active work of an employee) is the desired result, i.e. the number of employees required per shift (multiplying by three will result in the total number of employees in three shifts without management).

4. Calculation of Personnel Logistics Costs of Warehousing

Based on the number of employees, wage costs are determined as the product of hourly wage costs, the number of employees and the working time fund (21 working days and 8 hours working hours, i.e. 168 hours per month). Management costs are added to these costs (see Table 1).

Table 1: Analysis and calculation of time and personnel logistics costs of warehousing in CZK

Income - Warehousing - Expedition		Shift Manager	Warehouse Manager				
Management Costs		107,031	45,190	39,500 pallets/month			
Number of Working Days		21		627 pallets/shift			
Number of Shifts/Day		3		193.35	197.48	168.57	
Number of Shifts/Month		63					
N.	Activities	Forklift Driver	Administrator	Worker	Forklift Driver	Administrator	Worker
1	Unloading of pallets	0.50	0.00	0.00	313.49206	0.00000	0.00000
2	Administrative activities related to unloading	0.00	0.10	0.00	0.00000	62.69841	0.00000
3	Goods receipt - quantity control	0.00	0.10	0.50	0.00000	62.69841	313.49206
4	Software entry of material into stock state	0.00	0.10	0.00	0.00000	62.69841	0.00000
5	Repackaging	0.00	0.00	0.00	0.00000	0.00000	0.00000
6	Pallets warehousing	0.70	0.00	0.00	438.88889	0.00000	0.00000
7	Order receipt - find material	0.00	0.10	0.50	0.00000	62.69841	313.49206
8	Picking at the dispensing point	1.00	0.00	0.00	626.98413	0.00000	0.00000
9	Delivery completion - dispatch control	0.00	0.50	0.50	0.00000	313.49206	313.49206
10	Depreciation from warehouse	0.00	0.30	0.00	0.00000	188.09524	0.00000
11	Issue of delivery note, packing note	0.00	0.30	0.50	0.00000	188.09524	313.49206
12	Loading of pallets	0.50	0.50	0.00	313.49206	313.49206	0.00000
13	Receiving empty packages - cargo control	0.00	0.00	0.00	0.00000	0.00000	0.00000
14	Warehousing of empty containers	0.00	0.00	0.00	0.00000	0.00000	0.00000
15	Removal of empty packaging	0.00	0.00	0.00	0.00000	0.00000	0.00000
16	Evidence of packaging	0.00	0.00	0.00	0.00000	0.00000	0.00000
	Minutes/pallet (In-Out)	0.00	0.00	0.00			
	Minutes/shift	2.70	2.00	2.00	1692.85714	1253.96825	1253.96825
	Hours/shift	0.05	0.03	0.03	28.21000	20.90000	20.90000
	Employees/shift	0.01	0.00	0.00	4.03000	2.99000	2.99000
	Employees/day	0.02	0.01	0.01	12.09000	8.96000	8.96000
Total number of employees without management				30	12	9	9
Total personnel costs without management costs					389,796	298,593	254,871
Total number of employees including 3 shift managers and a warehouse manager					943,260 CZK		
Total personnel costs including management costs					34 Persons		
Total personnel costs including management costs					1,095,481 CZK		

Source: Author

The analysis shows that a total of 34 employees are required to ensure operation, representing a total of approximately CZK 1,095,500 (approximately 41,339 Euros) per month. Exchange rate Euro to CZK is: 1 Euro is 26.5 CZK.

5. Conclusion

The continuous development of technologies, the expansion of companies and the increasing growth of competition force companies to improve the quality of provided services. In order for the company to focus on its core business and to achieve quality results, it is preferable to outsource activities to companies specializing in the field. Such organized cooperation requires a close relationship between companies; continuous communication, exchange

of information, solving common problems, etc. Integrating branches of outsourcing companies directly into customer premises becomes very advantageous. The case study from this article showed the calculation of personnel costs of warehousing in selected logistics service provider. This analysis showed that the total of 34 employees are needed to ensure operation, which is approximately CZK 1,095,500 (approximately 41,339 Euros) per month.

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