

NEW MODEL OF ORGANIZATION OF LOGISTICS PROCESSES IN WAREHOUSE AND EFFECT OF LOGISTICS COSTS REDUCTION

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Abstract: The topic of logistics costs and their solution through innovative management methods has recently become very actual. The article is based on information that is drawn from the Scopus and Web of Science databases and from the internal data of the logistics service provider and the production company. The article focuses on the issue of processing calculations, taking into account all the costs associated with the logistics activity of the production company. It also deals with the possible application of management synergy effect between a logistics service provider and a production company. The aim of the article is to include in the case study, which is one of qualitative scientific method, the proposal to integrate a logistic service provider not only into the logistic manipulation and warehousing but to involve this provider in a pre-production operations of heating and air-conditioning bonding, including sequential delivery to the production line thereby creating synergies throughout the logistics chain. The resulting innovative solution in the case study should be higher productivity and lower costs for the final product.

Key words: calculation of logistics costs, logistics service provider, synergy effect, warehousing costs

Introduction

Logistics services provided must be a source of value not only for the final customer but for all stakeholders involved. A prerequisite for evaluating the effectiveness of all activities is cost monitoring across the entire supply system, including logistics service providers.

Warehousing as an integral part of the logistics system, is a dynamic and interactive activity that focuses on the level needed to meet demand. When delivering logistics services, it is important to make efficient use of both time and warehouse or local space. Warehousing costs to a large extent affect the total cost because they are mainly reflected in the overhead cost category, which shares a growing trend in total costs.

An essential step in the process of logistics cost tracking and evaluation is to define business processes whose costs are counted into logistics costs and their assignment to cost objects for decision-making tasks.

Once the relevant processes have been determined, appropriate quantities must be selected to express the logistic outputs, respectively. Logistic performances corresponding to these costs, since from the point of view of management, an indicator of cost-performance.

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The solved issue is also a major problem for logistics service providers.

A significant part of the logistics tasks are implemented by logistics service providers, these companies play a key role in the more efficient operation of selected industries.

The main aim of this article is to include in the case study the proposal to integrate a logistic service provider not only into the logistic manipulation and warehousing but to involve this provider in a pre-production operations of heating and air-conditioning bonding and also sequential delivery to the production line thereby creating synergies throughout the logistics chain.

The resulting innovative solution in the case study should be higher productivity and lower costs for the final product.

Review of Literature and Methodology of the Research

Proper and reasonable calculation of the logistics costs of the manufacturing company will be one of the important ways to face stronger competition in the market (Zhu, Liu 2007).

Cojocariu (2012) emphasizes that logistics is an important factor in promoting globalization and developing international trade flows. Bokor (2011, 2012a, 2012b) points out that logistics costs have become one of the main factors determining the competitiveness of the economy.

Logistics and warehousing costs play an important role in everyday work and become one of the main factors of market differentiation as highlighted by Gunasekaran and Kobu (2007), Melnyk i in. (2009) and Bowersox, Closs and Cooper (2013). Kučera (2017) argues that logistics managers are usually interested in providing high quality services to their customers at minimum cost.

Bokor (2008 and 2009) notes that requirements for the quality of logistics services are getting higher and higher. At the same time, however, the financial resources available to companies are rather limited. In such a business environment, according to Bokor (2013), logistics companies have to pay special attention to the optimal allocation of resources in various decision-making tasks.

Bokor (2009) emphasizes that the costing of logistics costs has become a real challenge in logistics and supply-chain management. Bokor and Markovits-Somogy (2015) state that it is necessary to obtain reliable and accurate information about the structure of the calculations to achieve efficient allocation of resources within the logistics service provider.

All three problems logistics costs, warehousing and logistics processes have the same importance in this article.

The application of calculation of logistics costs in warehouse will be presented on the real case study which is the method of the qualitative research based on the study of one or a small amount of situations for application of the findings for the similar cases according to Nielsen, Mitchell and Nørreklit (2015). Lloyd-Jones (2003), Verschuren (2003) and Hancock and Algozzine (2006) feature the case study among qualitative research methods.

Král i in. (2010) argue that the method of the case study is most often used in the calculation of logistics costs. This method identifies the most important information that is necessary for proper managerial decision-making tasks.

Results and Discussion

The case study is focused not only into logistic manipulation and warehousing but to involve logistics service provider in a pre-production operations of heating and air-conditioning bonding, including sequential delivery to the production line.

Based on the stakeholder collaboration model used so far, a logistics service provider provides logistic manipulation services to ensure trouble-free warehousing. The calculated warehouse servicing staff required and the entire organization chart are shown in Figure 1. The total number of staff was calculated for 15 people in two-shift operation.

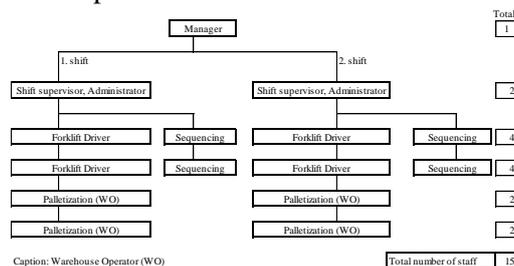


Figure 1. Organisational Chart - Logistic Manipulation and Warehousing Staff

Source: Author

On the basis of data collection of in-depth interviews with managers, the number of service staff was determined of the heating and air-conditioning bonding. A clear organizational chart of the individual work positions is shown in Figure 2. The total number of staff required for the heating and air-conditioning bonding was calculated for 20 people in two-shift operation.

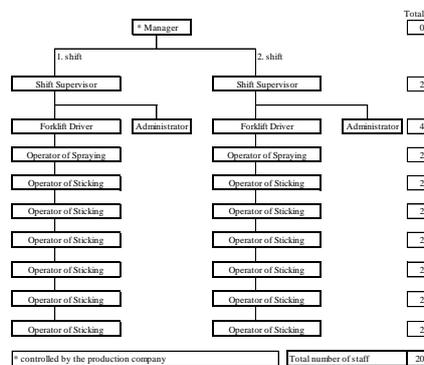


Figure 2. Organisational Chart - Pre-production Operations Staff

Source: Author

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The article deals with logistic manipulation and warehousing but also with pre-production operations of the heating and air-conditioning bonding. Based on in-depth interviews with managers, article offers the accumulation of individual jobs: the manager, the forklift truck drivers and the administrators. The logistics service provider involvement in this way brings the resulting synergy effect. Figure 3 shows a new organizational chart for the staff of both logistics activities and the occupancy of the heating and air-conditioning bonding workplace. Necessary service staff, due to the involvement of a logistics service provider in pre-production operations can be reduced from 35 to 29 workers.

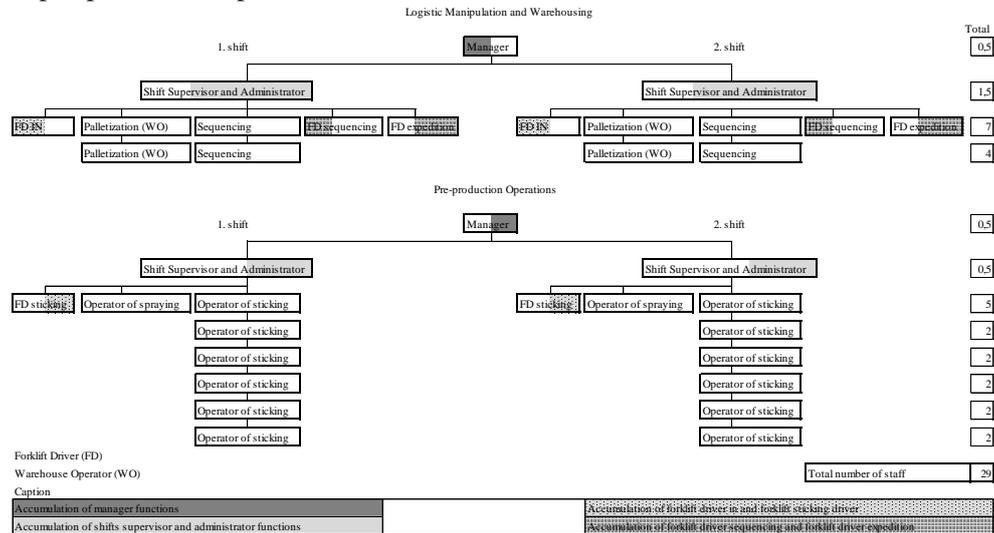


Figure 3. Organisational Chart – New Model

Source: Author

Table 1 shows the calculation of logistics costs and the cost of operations of the heating and air-conditioning bonding (on the basis of data collection of in-depth interviews with managers). Involvement of a logistics service provider not only of logistic activities but also of pre-production operations of the heating and air-conditioning bonding may lead to a reduction of total costs. All calculated costs will be reduced and, in particular, the cost of the final product will be reduced. The cost of initial logistics service provider engagement will be 1,882,998 CZK while the new synergic engagement of the logistics service provider into pre-production operations will reduce the cost to 1,629,357 CZK. The total personnel costs and the costs of the forklift structure will be reduced.

The resulting innovative solution in the case study is a higher productivity and lower costs for the final product. Costs for the final product will be reduced from 289.69 CZK/piece to 250.67 CZK/piece.

Table 1. Two Possible Models of Cooperation - Calculation of Logistics Costs

Production of the Company: 78 000 pcs/year				Costs for participation LSP in the pre-operations					
Costs according to the standard model of cooperation				Logistic Manipulation and Warehousing					
Logistic Manipulation and Warehousing		Profit %	Total / month	Logistic Manipulation and Warehousing		Profit %	Total / month		
1. Forklift	Total forklift day/month	5 31	0%	78,802 CZK	1. Forklift	Total forklift day/month	5 31	0%	94,832 CZK
2. Staff	Number of staff	15	10%	514,112 CZK	2. Staff	Number of staff	13	10%	418,934 CZK
3. Other costs					3. Other costs				
Management fee			0%	10,000 CZK	Management fee			0%	10,000 CZK
Telecommunications			0%	1,500 CZK	Telecommunications			0%	1,500 CZK
Warehousing costs			0%	302,045 CZK	Warehousing costs			0%	302,045 CZK
Energy (without profit)			0%	52,500 CZK	Energy (without profit)			0%	52,500 CZK
Operating costs			0%	35,000 CZK	Operating costs			0%	35,000 CZK
Labels			0%	12,500 CZK	Labels			0%	12,500 CZK
Start - up costs			0%	5,000 CZK	Start - up costs			0%	5,000 CZK
Total costs + profit				1,011,459 CZK	Total costs + profit				932,311 CZK
Pre-production Operations (Production Company)				Pre-production Operations (Logistics Service Provider)					
1. Forklift	Total forklift day/month	3 31	0%	44,454 CZK	1. Forklift	Total forklift day/month	2 31	0%	20,212 CZK
2. Staff	Number of staff	20	10%	766,585 CZK	2. Staff	Number of staff	16	10%	606,334 CZK
3. Other costs					3. Other costs				
Management fee			0%	0 CZK	Management fee			0%	10,000 CZK
Telecommunications			0%	1,500 CZK	Telecommunications			0%	1,500 CZK
Protective devices			0%	18,000 CZK	Protective devices			0%	18,000 CZK
Operating costs			0%	35,000 CZK	Operating costs			0%	35,000 CZK
Postage			0%	1,000 CZK	Postage			0%	1,000 CZK
Start - up costs			0%	5,000 CZK	Start - up costs			0%	5,000 CZK
Total costs + profit				871,539 CZK	Total costs + profit				697,046 CZK
Total costs based on the standard model (per month)				1,882,998 CZK	Total costs based on the new model (per month)				1,629,357 CZK
Total Costs per Product				289.69 CZK/pc	Total Costs per Product				250.67 CZK/pc

Source: Author

The overall contribution of the article is shown in Table 2. This is mainly about reducing the cost of one made product. The monthly difference is 253,640 CZK (expressed in Euro 9,947), the cost difference for one made product is 39.02 CZK (1.53 Euros) and the reduction of the service staff by 6 people. Total annual costs will decrease by synergy in the logistics chain by 3,043,683 CZK (equivalent to 119,360 Euros). The resulting synergy effect is savings in total costs per product of 13%.

Table 2. Summary of all Benefits of Cooperation (in CZK and Euros)

Difference (per month)	253,640 CZK	9,947 Euros
Difference (per product)	39.02 CZK/pc	1.53 Euros/pc
Reduction of the staff	6 persons	6 persons
% total costs savings per product	13%	13%
Annual costs savings	3,043,683 CZK	119,360 Euros

Source: Author

Summary

The chain of logistics activities ensures the smooth running of the production process and logistics costs are associated with each logistic activity. These costs are not negligible items that affect to a large extent the overall profit or loss of an

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enterprise. The need to monitor costs in terms of logistics activities is a prerequisite for identifying rationalization measures in logistics activities and optimizing the logistics costs of an enterprise.

The aim of this article was to design and evaluate the possible closer cooperation of the logistics service provider not only in logistic manipulation and warehousing services but also in pre-production operations, thus creating synergic effects throughout the logistics chain. The resulting effect is higher productivity and, in particular, lower costs for the final product, which will decrease from 289.69 CZK/piece to 250.67/CZK piece.

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