IMPROVEMENT OF LOGISTIC PROCESSES IN WAREHOUSE USING INNOVATIVE MANAGEMENT APPROACH

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Abstract

Wide range of warehousing media is used, all with the intention of optimizing warehousing capacity with accessibility, given the high capital and operating fixed and variable costs prevalent in the logistic sector. Optimization of logistic processes contributes to increasing the efficiency of logistic processes within the whole company and also to the rationalization of material flow among logistic service providers. Handling equipment is used for professional relocation, loading and directing of material in production, circulation and warehousing. The handling system forms a whole for a certain area of transport handling, including organization of logistic processes. Any erroneous logistic process leads to an increase in total logistics costs. The aim of this paper is the improvement of logistic processes in the warehouse using innovative management approach in the chosen logistic service provider. This paper applies a case study as one of the qualitative research methods, which is used in scientific researches of logistic processes very often. The paper is based on a search of articles from the Web of Science database, which is connected to the innovative management approach in logistics.

Key words: logistic processes, warehousing, handling equipment, innovative management approach

JEL Code: M11, O31, M21

Introduction

Every company naturally wonders how to reduce costs and waste while maintaining profit growth in a free market environment. Weaknesses, bottlenecks and processes need to be identified and eliminated. It is necessary to thoroughly control business methods, protect them from obsolescence and continuously update them at the same time. Innovation is synonymous with progress and modernity in all areas – from the social sphere, through the education system, to the economic sphere in science and economics, seeking new solutions that contribute to the competitive advantage of the market and thereby increase economic and social development and ensure high quality life nowadays (Witkowski, 2017). The modern turbulent market environment forces companies in logistics to cooperate and organize themselves into supply chains (Chocholáč, Sommerauerová and Polák, 2018). Companies are striving to meet the needs of the most demanding customers and expect ever better customer service in these days. Therefore, a company can quickly lose its market share if it cannot maintain the required level of customer service. Innovation and time are the main competitive advantages (Zalewski, 2010). Based on decades of experience in logistics, innovation and systematic thinking, a lot of scientific authors have found that the current prevailing understanding of logistics is not necessarily holistic. Logistics is a practice oriented and solution based discipline and has evolved under the strong influence of the physical sciences by creating inanimate phenomena with its subjects. The predominant subjects relate to tangible artefacts, but to a lesser extent human intervention or influence (Knez, Rosi, Mulej and Lipičnik, 2010; Zachariassen and Arlbjorn, 2010). Logistics has grown from physical distribution, transportation and inventory management, where physical objects form a structure that includes efficient and effective flow. Logistics is a discipline which is focused on the overall optimization, coordination and synchronization of all activities throughout the supply chain. It is essential for flexible and economical achieving the final effect (Kučera and Hyršlová, 2016). The aim of this paper is the improvement of logistic processes in the warehouse using innovative management approach in the chosen logistic service provider.

1 Theoretical Background and Methodology

The implementation of innovative technologies, the expansion of integrated freight transport services, the implementation of modern international technologies in logistics, the creation of a single integrated national logistic network, the optimization of logistic operations and the improvement of fleet structure and other measures lead to growth of the whole economy (Morkovkin, Nikonorova and Shumaev, 2018). Warehouse and warehousing are part of the logistic chain, one of the activities, which cannot be missed. Warehousing addresses many critical issues, inventory levels, order cycles, warehouse equipment and spatial layout, warehouse management distribution and inventory management (Kučera, 2017). Logistic warehousing companies still do not use automatic computerized planning. The processes are planned by the operations manager with detailed knowledge of the problem, the tasks and commodities processed, the layout of the warehouse, the performance of the employees, the parameters of the equipment or other parameters (Karasek, Burget and Povoda, 2014). The logistic processes must be mutually supportive in order to work synergistically to achieve the set objectives. The logistic coordination and synchronization of material, information and financial flows have struck society in a conflict of partial objectives, which are pursued by individual organizational units and are very diverse and often contradictory (Kučera and Dastych, 2018). Dominant causal models in logistics focus on performance implications of logistic processes. Logistic processes are considered to be designable – explained on the basis of deliberate selection and expected better performance (New and Payne, 1995). The rapid development of logistics accelerates the batch of a large multifunctional perfectly managed and professional logistic warehouse. Risk problems in warehouse are becoming a problem that people have to face with the development of society and scientific technology (Ren, 2012). A logistic service provider is considered to be a specialized company involved in logistic chain, usually either supply or distribution parts of the chain, as an external partner, most often towards manufacturers of tangible products to which it provides individual services (Kučera, 2017). Problems that are solved within the logistic warehouse mostly deal with the optimization of some part of the logistic warehouse, such as the design of the warehouse layout, the design of receiving and shipping areas and the design of other parts of the logistic warehouse. Products handled in the warehouse are also often subject to optimization – optimization concerns product groups, sorting and land use planning (de Koster, Le-Duc and Roodbergen, 2007; Geraldes, Sameiro, Carvalho and Pereira, 2008). Real case study is a qualitative research method based on the study of one or a small number of situations for the application of findings for similar cases.

Case study contains an intensive analysis and a description of a separate unit or system bounded by time and space (Hendl, 2016). The method of generalization is a form of abstraction, which proceeds from a set of simpler cases to higher-order instances.

2 Results and Discussion

Driving directions Milkrun combustion

Real case study will be shown in one logistic service provider, which is specialized in production and warehousing of the combustions control valves (hereinafter CCV) and combustions control electronics (hereinafter CCE). The production hall is divided into two parts. It also follows that the routes are divided into two parts – CCV and CCE.

The repackaging material for both divisions is filled into boxes and is imported to the necessary lines.

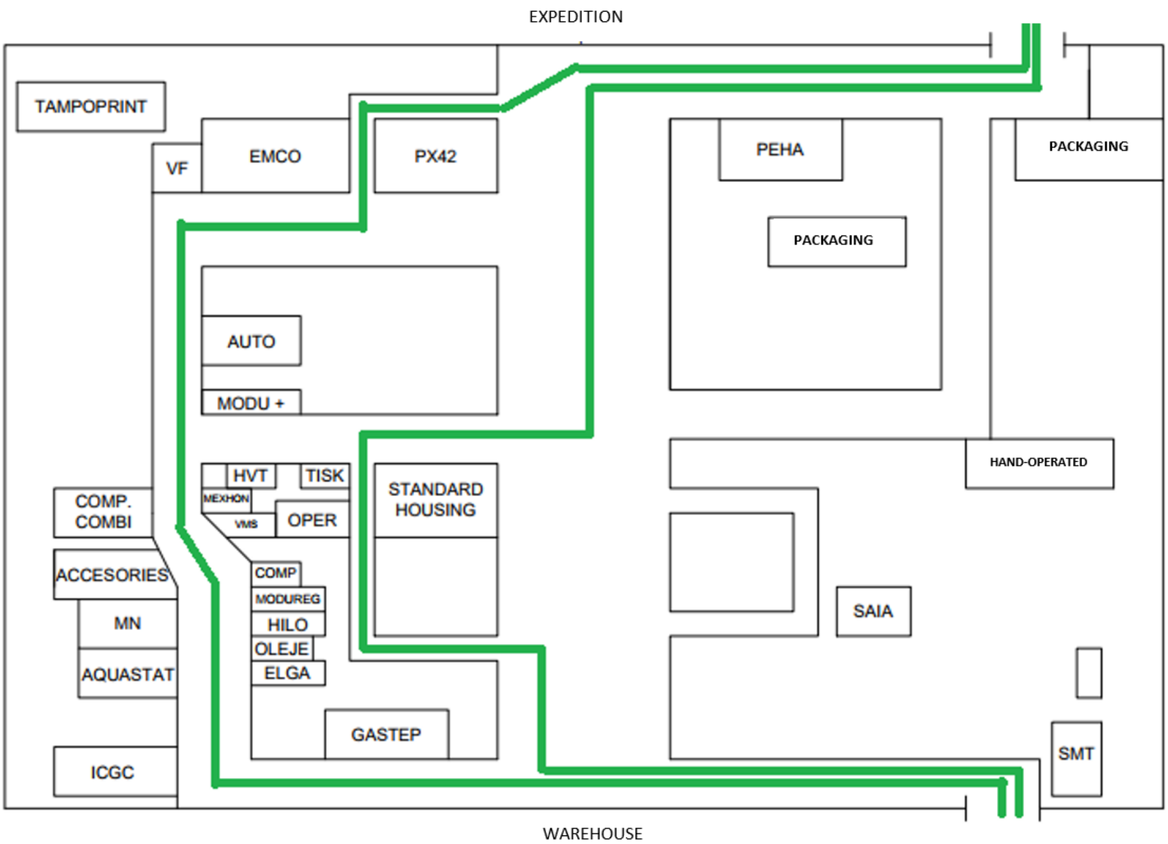
2.1 Route 1 combustions control valves

On every shift (morning, afternoon and night) the wrapping material of CCV comes out every hour. Milkrunist connects necessary carts with filled boxes and puts all the material into the specified kanban of the line – rack.

Milkrunist leaves the warehouse in the following order: Gastep, ICGC, Aquastat, Elga, Oils, MN, Hilo, Modureg, VMS, Comapact, Compact combi, Mexhon, Modu +, Auto line, VF, Emco, PX42 the Envi division, but does not warehouse it in kanban and leaves the entire cart for the division at the specified location.

The return continues to the Standard housing and Operator line and continues on the way back to the warehouse, where he/she hands over the empty boxes he/she collected from the lines (see Figure 1). If there are no empty boxes on the line, the Milkrunist just passes through.

Fig. 1: Route of combustions control valves



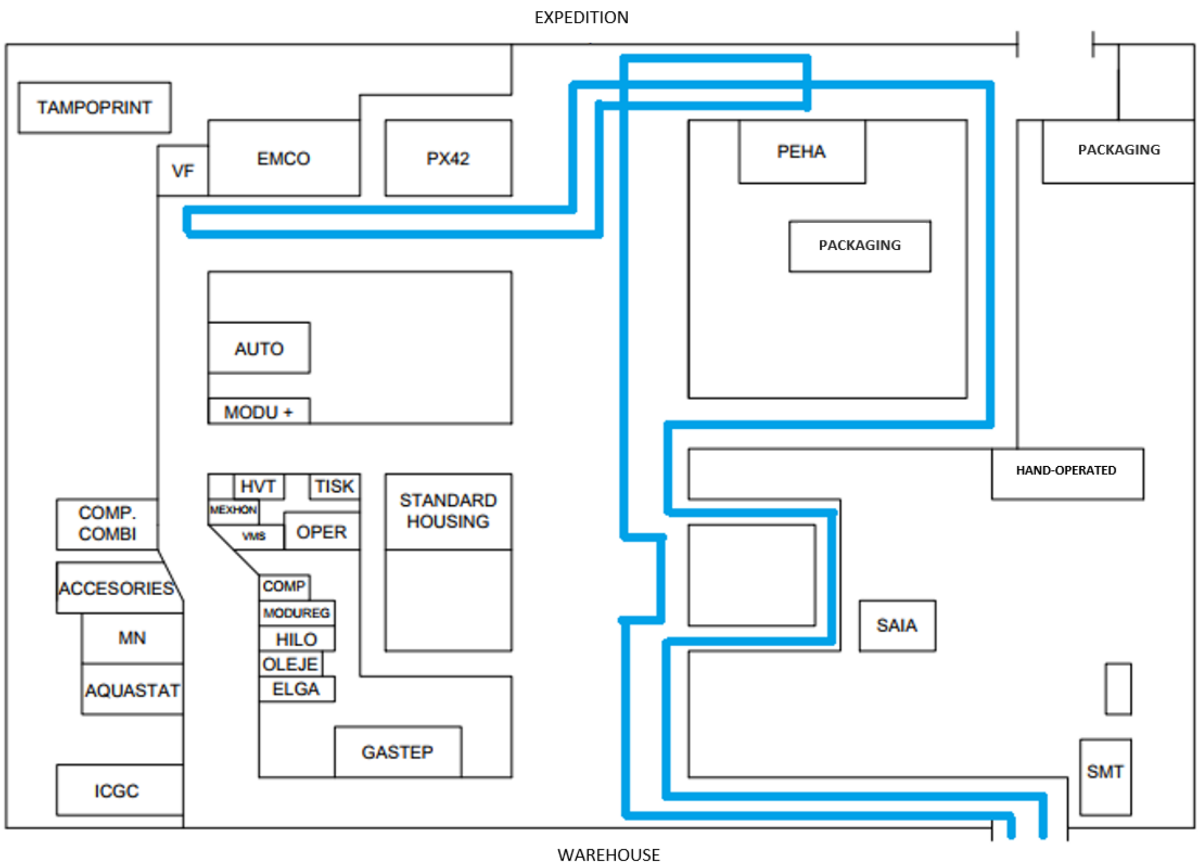
Source: Authors

2.2 Route 2 combustions control electronics

On each shift (morning, afternoon and night), the wrapping material of the CCE division is delivered every 90 minutes.

The Milkrunist prepares the necessary cart in the warehouse and starts out: Saia, then Hand-operated, Packaging, Peha and Tampoprint. At Tampoprint, he/she returns empty boxes of package materials from the Saia and Peha lines, collects boxes filled with package material, returns with these full boxes to the Peha, Saia lines and then goes back to the warehouse (see Figure 2).

Fig. 2: Route of combustions control electronics



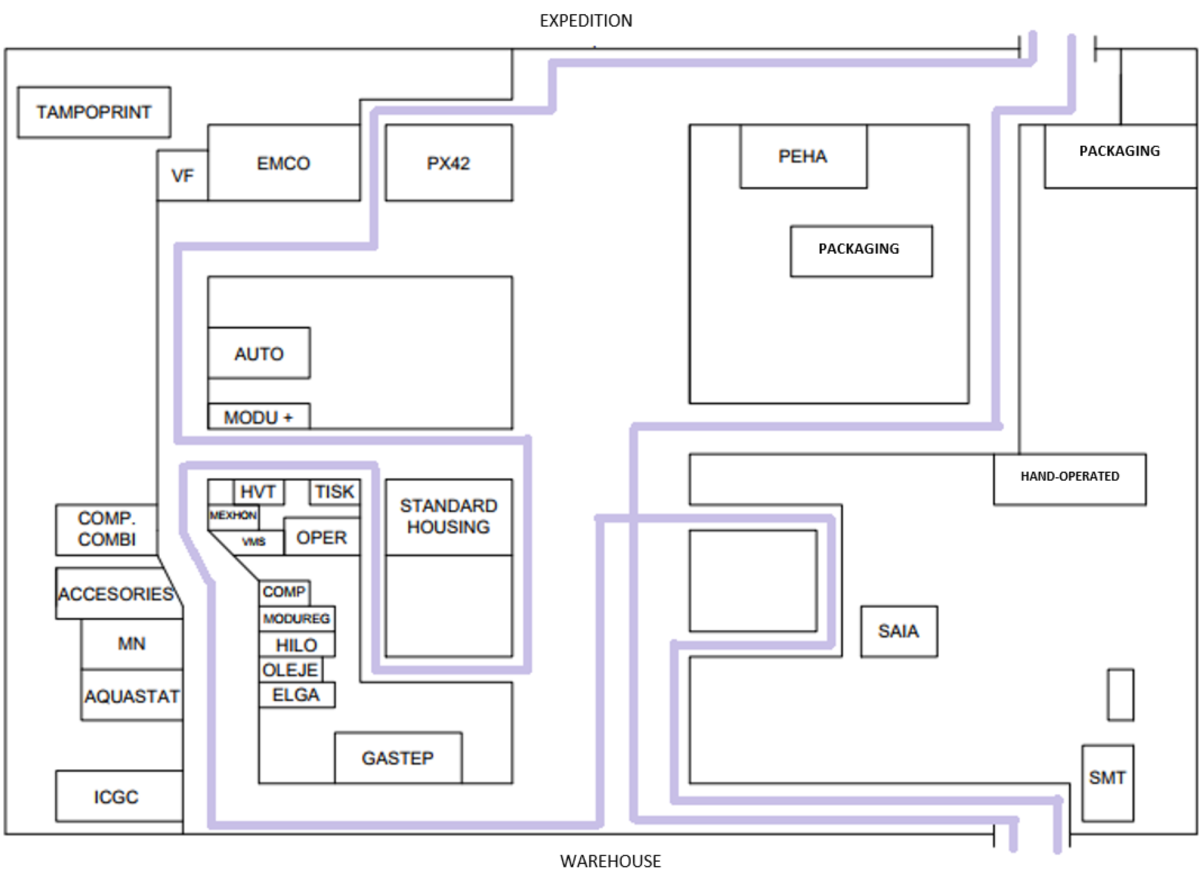
Source: Authors

Route 1 repackaging CCV and route 2 repackaging CCE are unsatisfactory.

2.3 Connection of the route CCV and CCE

It is possible to connect two routes by innovative approach. CCV and CCE route can be combine into one ride. The reason for this innovation is to save empty cart travel, which will increase Milkrun productivity and save cart and Milkrun wear. The disadvantage will be the extension of the time of passing through the whole production hall as well as the time of filling the overwrapping boxes. The innovative proposal includes a sequence of individual sites along the route for the CCE and CCV wrapping material in order: from warehouse to Saia, where the Milkrun turns and then continues to Gastep, ICGC, Aquastat, Elga, Oils, Hilo, MN, Modureg, Compact, Accesories, VMS, Compact combi, Mexhon, behind which Milkrun turns to HVT, at Tampoprint passes the direction of Operator, Standard housing, bypasses to Modu +, then continues as Auto line, Tampoprint, VF, Emco, PX42, Peha, where Milkrun unloads filled boxes from Tampoprint. The next stop is on the Expedition, where the Milkrun unloads filled boxes from Tampoprint for the Envi Division. From the Expedition, it departs in the opposite direction on the previous route to Packing, where unloaded filled boxes from the Accessories line are unloaded, then continues in the direction of Hand-operated. If the boxes are filled from Tampoprint for the Saia line, it will also be unloaded and go back to the warehouse (see Figure 3). Each line is loaded with empty boxes that are weighed for filling in the overwrap zone located in the warehouse.

Fig. 3: Connected routes of CCE and CCV of repackaging material

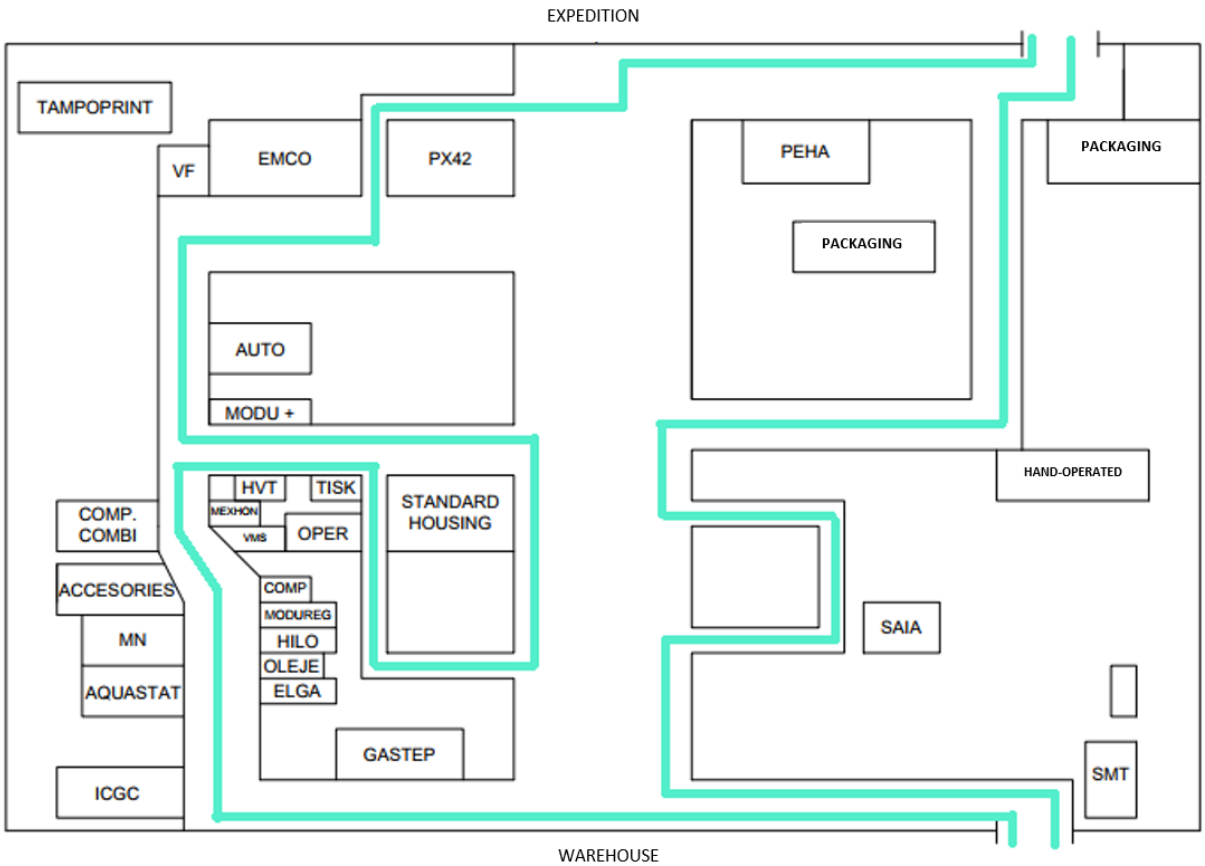


Source: Authors

Another innovative suggestion is a kanban material route for CCE and CCV. This system was previously chaotic and it was up to the Milkrunist to choose his/her own route. This innovative solution is intended to provide order and meaningful material transport.

The innovative route starts in the warehouse, direction is Gastep, ICGC, Aquastat, Elga, Oils, MN, Hilo, Modureg, Compact, Accesories, VMS, Compact combi, Mexhon, Standard housing. The route then goes back to Modu +, Auto line, VF, Tampoprint, Emco, PX42, Peha and Expedition. From the Expedition, it leaves for Packaging, Hand-operated, Saia and SMT back to the warehouse (see Figure 4). If the kanban material on a particular line is not required, it only passes along that line.

Fig. 4: Connected routes of CCE and CCV of kanban material



Source: Authors

2.4 Evaluation of routes of repackaging material and kanban material

New innovative routes of both repackaging material and kanban material for Milkrun combustion were defined in this scientific paper. The estimated travel time of the wrapping material is approximately 25 minutes. It is not possible to estimate or calculate travel time for the kanban material route, as it depends on the time of the ordered material and the specific line. This innovative solution achieves better clarity and the whole logistic process is simplified. The improvement of logistic processes in the warehouse using innovative management approach in the chosen logistic service provider is not useful for just this one company, but it can be use in any other logistic service provider, which is focused on the optimization of the warehousing processes. This approach can bring significant cost savings in various areas of warehousing logistics and related production processes.

Conclusion

The dynamic environment of the logistic sector especially in warehousing generates constantly new demands for quality, flexibility and type of provided services. Many factors influence the efficiency of the logistic and warehousing processes in particular. The efficiency of warehousing operations has a significant impact on the company's ability to satisfy customers' needs and achieve the required sufficient profit for the company. For this reason, one of the core goals of the company should be to achieve efficient management of the logistic services. Innovative logistic solutions are implemented to support the logistic processes in most modern warehouses in the whole world. The new innovative intralogistics solution for a selected logistic service provider leads to overall synergy in the company. New routes for the Milkrun combustion are addressed in this paper. These kanban and wrapping material routes are designed to save handling equipment and Milkrun and improve overall ride productivity. Carts will not run empty such as often. The disadvantage will be prolongation of the driving time through the whole hall. The driving time is measured to 25 minutes. All logistic processes will improve and there will be an improvement in logistics for the selected logistic service provider in overall view. This innovative approach in warehousing logistics can ensure more efficient and clear processes but also guarantee significant cost savings in other logistic service provider. It will facilitate the simplification of logistic processes in any logistic service provider in following other processes in the company. This innovative approach to logistic processes can be used in almost any logistic and production company.

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