ACTA TECHNICA CORVINIENSIS
– Bulletin of Engineering
Tome X [2017]
Fascicule 3 [July – September]
ISSN: 2067 – 3809

[1.]Marko VLAHOVIĆ, [2.]Mila KAVALIĆ,
[3.]Ljiljana RADOVANOVIĆ, [4.]Darko BAĐOK, [5.]Arben LUNJIĆ

CHECKING THE TIRES AS MEASURE OF EFFICIENCY INCREASE AND REDUCING WORKING COSTS OF FORKLIFTS - CASE STUDY OF COMPANY MERCATOR-S

[1-5.] University of Novi Sad, Technical faculty „Mihajlo Pupin", Zrenjanin, SERBIA

Abstract: By integrating companies IDEA and Mercator-S management of the new integrated company found itself facing the challenge of optimizing business activities in all aspects of work. One of the challenges was also in the field of logistics and administration in the field of transport within the warehouses. In order to try to reduce the cost of tires and increase transport efficiency within their logistics and distribution centers, the company Mercator-S has made an internal decision on additional quality control measures. The company has decided that every 15 days performs tire pressure checks and tread depth checks. Optimal rotation of the tire and adding pressure in those where it was necessary during the audit, the company Mercator-S is for only 2 years, in 2016, compared to 2014, according to the number of kilometers traveled on the fleet of 120 vehicles, increase the efficiency of their forklifts by 10% and reduce the cost of replacement tires by 29%.
Keywords: cost reduction, logistics, quality control, transport efficiency, tires

INTRODUCTION

Restructuring of the company is related to a wide range of activities starting from the reorganization of business units, product lines or divisions to mergers, acquisitions, joint investments, spin-off and the curve-out activities. These activities represent forms of radical restructuring of companies in order to increase efficiency and profitability in the context of increased competition in markets.

Corporate restructuring is can be divided into operational and financial restructuring processes. Operational restructuring refers to those changes in the structure of companies that are registered on the asset side of the balance of the company. Financial restructuring is related to activities which change the structure of the debt and equity of the company, relating to the changes registered on the liabilities side of the balance of the company. Mergers, acquisitions, decomposing company's programs, LBO and MBO programs are used in practice in order to effect the restructuring of companies. What is common in all these programs is that there is a change in the ownership structure, and therefore a change in corporate control. Usually these changes in corporate control are related with changes in the business strategies of companies[13].

In theory it is considered that mergers (fusion) are forms a negotiated integration of two or more firms that maintain an equal relationship in the newly-composed firms. But these genuine mergers in practice are very little because there was always one side dominant. Merger of equal is in the case when participants of mergers comparable in size, competitive position, profitability and market capitalization [8]. Gaughan alleges that the merger is a combination of two corporations, where one is surviving, and one that was merged cease to exist. The company which has a dominant role in the merger takes over the assets and liabilities of the other company[4].

Retail development through the integration, all large companies started with developing the concept of a central repository and central product distribution to the stores. This concept has become topical because of the efficiency which provides better inventory control

and timely delivery of all necessary products to all stores in the retail network. Trade, respectively retail consumer goods is very dynamic economic sector whose results, respectively sales of products and timely complement to inventories of retail sales objects largely depend on the optimal inventory control. The essence of one logistics and distribution center is to do timely reception of required goods, to adequately handle it within the warehouse and, in moment when it is necessary, deliver goods to the stores where it's necessary.

Some selected management tools and logistics tools to improve processes are being presented. The starting points are classification procedures. The classification has positive effects on the planning and controlling of logistics processes. It simplifies the use of items and increases the transparency in summary. The combination of the Value, Rarity, Imitability and Organization (VRIO) model, the identification of technologies types and the characterization of resources allow the definition of logistics strategies, standard procedures and sets of logistics activities [5]. Management of goods within the warehouse by optimization of forklift work, will be the topic of this paper. In the following part of the paper will be presented how and how much the company Mercator-S in Serbia managed to reduce costs and increase the efficiency of logistics and distribution center.

TEORETICAL FRAMEWORK AND BACKGROUND OF RESEARCH

Pokrajac at al (2015) believes that reindustrialization is necessary and possible only in those industries that have considerable potential for growth of competitiveness on the international market. The key assumptions for this are constant growth of innovation and productivity, as well as other factors that essentially rely on new knowledge and new technology. This development trend is present in all advanced economies, including the European Union, to which Serbia aspires.

In recent years, reindustrialization has become an increasingly dominant development strategy on a global scale. It involves a very ambitious plan related to the development of modern and sophisticated, environmentally responsible and energy-efficient industries, especially manufacturing sectors, which employ highly professional workers and foster close cooperation with universities and research institutes. In this context, governments, rather than the markets, are becoming the main change drivers, as they can contribute to creating the necessary industrial "state of mind", which implies new redistribution of tasks and effects of labor among the key stakeholders in the process of creating new values: employees, owners, government, science, education, etc. [16]. Creating new value for the company should be a priority action of all sectors. Operation and objectives should be focused on increasing efficiency and reducing costs at all levels. Today, as the experience of developed countries show, multiple sources of innovation are advisable to be developed in addition to the traditional linear model of innovation process [14].

Innovation of the process of functioning of certain sectors is a key link in achieving the productivity goals of enterprises, which is very important because each process innovate adequately and thus can improve the operations of the entire company. In turbulent commerce which characterizes all its branches, quality represents one of the rare tools that for companies provide possibility for diversification and separation from (dis)loyal competition.

In order to achieve the competitiveness of the company, the first to be made such processes within each sector that may affect the profitability of the company. The profitability of distribution center in retail chains represents one of the key objectives and this goal should be followed by innovation and to implement changes for better business productivity. In distribution centers, maintenance and improvement of work of transport resources is crucial for the effectiveness of the sector.

Transport resources that are commonly used in storage facilities are rack cranes and forklifts. Depending on the storage system, method of loading transport units from a truck in the warehouse, as well as finance, depends the choice of the machinery equipment. The choice of transportation means usually depends on the weight of the transport unit to be stored, the width of the corridor between racks and lifting height[15].

A contact between a vehicle and a surface on which it travels is maintained through its wheels i.e. tires [6;18]. Because of that, the characteristics of tires and their contact area with the surface and the physical processes that are developing there all have a major impact on vehicle's handling and tire wear [1;2]. Tire wear is influenced by a variety of factors, among others being a driving style, which is often neglected. A driving style is determined by the three major factors, firstly the way a vehicle is accelerated from the standing position, secondly the intensity of braking and finally, the velocity during negotiating road bends and curves. Apart from the other factors, a tire wear is primarily dependent on energy absorbed within the tire grip area during braking or during vehicle acceleration [7].

A modern tire merges up to 300 different chemical elements, both organic and inorganic, natural and synthetic. During manufacturing, various processes are present such as mixing, calendering and extrusion, forming dozens of individual parts. Then, moulding and vulcanization inside special moulds provides the tire its final shape. Since the surface quality of moulds strongly affects the quality of tire, mould cleaning is a

fundamental aspect of the whole tire production and cleaning techniques are in continuous development [3]. Maximum availability of cost intensive machinery is highly dependent of minimizing downtime caused by maintenance.

Permanent monitoring of a machine guarantees a reliable detection of most faults. An interactive diagnosis system can guide the maintenance staff to accomplish their tasks.

A system architecture which supports permanent monitoring, interactive diagnosis as well as repair at site needs knowledge representation techniques which are specifically designed for these tasks [17].

RESEARCH METHODOLOGY – OBJECT AND RESEARCH PROBLEM

The research problems in this paper represent increase efficiency and reduce labor costs of forklifts. The problem is also reflected in the fact that the quality control of tire does not work often enough. Due to the integration that has resulted in the increased number of retail outlets, and therefore a greater flow of goods through the warehouse, was followed by a greater utilization of forklifts.

The subject of this paper is to analyze the company Mercator-S forklift work through the measurement of the costs and efficiency of forklifts in warehouses through the procedure of necessary tire checks and tire tread depth checks.

» Objectives of research and main questions

The scientific objective of this research is to identify some of the possible factors for assessing the quality that significantly affect the increase of work efficiency and reduce costs, while the social objective of the research is a recognition of all that in practice contributes to the development of logistics, optimal inventory management and internal transport.

Based on the need to distribution and logistics center is managed effectively and efficiently, it is necessary to consider the use of transport vehicles, in this case forklifts.

Based on of this stemmed the following research questions:

- RQ1: Does control and timely complement to the tire pressure affects on greater efficiency and exploitation period?
- RQ2: Does check of the tire tread depth affects on forklifts greater efficiency and on exploitation period?
- R Q3: Does timely complement of pressures and check of the tire tread depth affects on cost reduction of forklift tire?

» Methods and organization of research

When selecting methods and organization of this research, it was decided that from existing reports can get all the necessary data that could show whether the application of these procedures contribute to greater efficiency and / or reduce total cost of tire maintenance. All data were analyzed using the base index and the data obtained for 2015 and 2016 were compared with the year 2014, which, in this case, we observe as the base. The total number of these vehicles is increasing from year to year, but the cost unit per vehicle or kilometer is able to clearly demonstrate that Is there any reduction in costs.

In 2014, the fleet consisted of 120 forklifts, 2015, 133, and in 2016 had a fleet of 144 vehicles available. Besides the changes of interannual total cost we have implemented and the method of calculation "Like for Like", in which we observed the total cost so that the total increase in the number of vehicles does not affect the overall value of cost unit. That is, everything is based on the number of 120 vehicles how many there were in 2014.

RESULTS AND DISCUSSION OF RESEARCH

Until the moment of integration, the company IDEA and Mercator-S were two separate companies whose logistics sectors had a task to supply their supermarkets on daily basis. Until the moment of integration IDEA 191 is supplied 191 store, and Mercator-S its 126 stores.

After integration, that is merger, which was completed in November 2014, the company Mercator-S had on the market 317 shops that were needed to supply. Portfolio retail network before and after the integration is shown in Figure 1.

Due to the optimization of storage space, there was a great need to rationalize costs and increase efficiency, and one of the segment which has been paid special attention were forklifts.

Because of a permanent price increase of construction land, rationalization and optimization of costs, there was a need for better use of expensive storage space. In order to make transport more efficient in the warehouses, the company Mercator-S has decided that besides regular procedures implement and emergency procedures for checking the quality.

All drivers who are in the warehouses were instructed to check every 15 days the tire pressure and tire tread depth. If the tire pressure is less than the one defined then approach to supplement the pressure, and if the tread on the tires is reduced to less than the prescribed measure, then access to the rotation of the tire.

Rotation of the tire is the tire moving from one axle to another, in order to achieve their equal consumption, and performance durability of the vehicle. Tire rotation depends on the type of vehicle and drive of vehicle. The distribution of weight on the front and rear axles is

different for every vehicle. Also, the tire wear on different axles is uneven because usually the drive is on one axle, except for vehicles with all-wheel drive. This means that, depending on the drive, the tires wear unevenly.

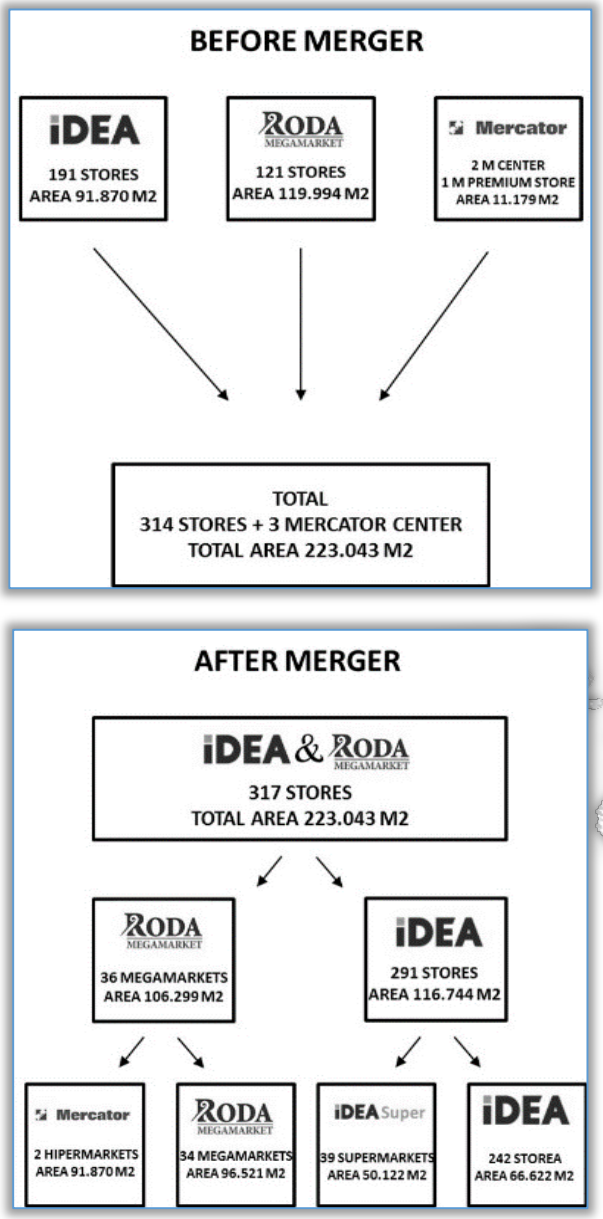

Figure 1 – Overview: The portfolio of retail network before and after integration
Source: Mercator-S (2017)

To confirm that the rotation of the tire and check the pressure in them can give results, in the company Mercator-S is conducted a case study. Movement of the total cost, the number of kilometers traveled and the number of vehicles will undoubtedly show that the above-mentioned activities produce results.

In Figure 2 we can see the movement of the total cost over the past 3 years. By applying the methods of the base index can be seen that the costs are in a significant decline. Interannual change in costs shows that, despite the growing number of vehicles, the overall height of the tire and maintenance costs in 2015 and 2016, is significantly lower than the observed 2014.

Besides the inter-annual total cost changes we applied and the method of calculation "Like for Like", where we looked at the total cost so that the total increase in the number of vehicles does not affect the overall value of the costs. That is, everything is based on the number of 120 vehicles how many were in 2014. According to that criterion, the maintenance costs of tires in 2015 were lower by 20% and in 2016 by 40% compared to 2014, which we consider as the base year for this analysis.

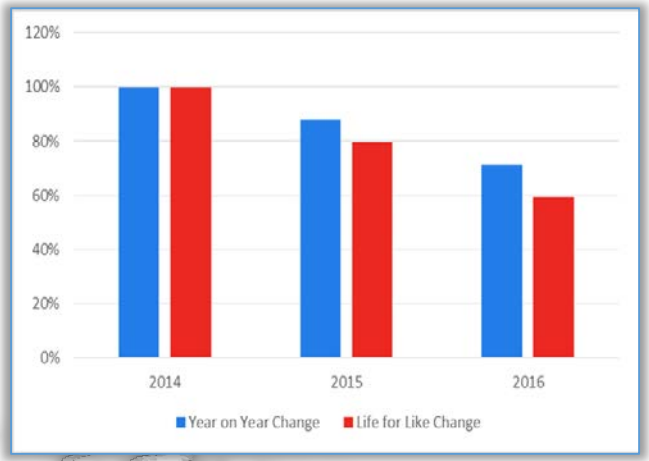

Figure 2 - Overview: The total cost for tire of forklifts in warehouses. Source: Mercator-S (2017).

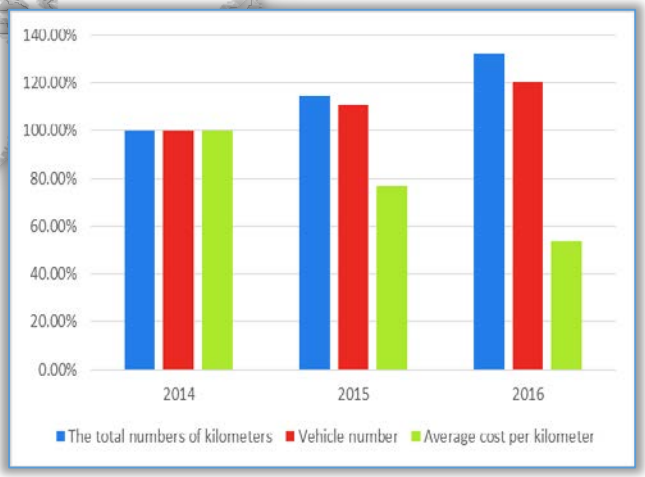

Figure 3 - Display: The cost per kilometer.
Source: Mercator-S (2017)

However, in addition to the above analysis, in which the level of overall results proved claim of reducing costs, we started another analysis. In Figure 3 we can see the ratio of the total number of kilometers traveled, the number of vehicles and the cost per kilometer. On this figure, using basic index clearly shows that the number of vehicles and the number of kilometers traveled in 2015 and 2016 compared to 2014 increased, while the cost per kilometer recorded a significant drop in cost. The cost of one kilometer of distance traveled in 2016 was lower by 46% compared to the cost of one kilometer of distance traveled in 2014.

Quality control of pneumatics from all of the above, is undoubtedly prove that it can be a significant impact on reducing the cost of maintaining them. However, in addition, this measure of quality control has influenced the efficiency of the vehicle.

Figure 4 shows the number of kilometers traveled per vehicle in 2015 compared to 2014, despite a reduction in costs, increased by slightly more than 3%, while in 2016 increased by more than 10 percent.

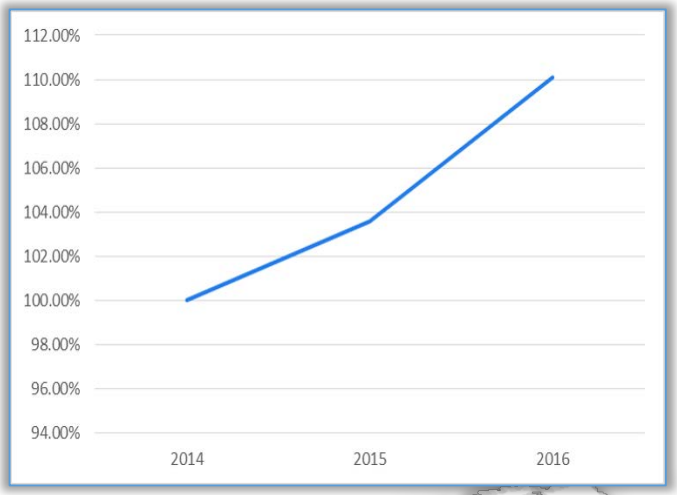

Figure 4 – Display: Number of kilometers traveled per vehicle. Source: Mercator-S (2017).

CONCLUSIONS

Retail development through the integration all large companies started with the concept of developing a more central warehouse and central distribution of products to the stores, for reasons of efficiency to achieve a better control of inventory and timely delivery of all necessary products to all stores in the retail network.

Management of goods within the warehouse was intended to reduce costs and increase efficiency as in this study confirmed. According to all of the above, we can conclude that the control of tires on forklifts is important for two reasons. First, because it impact on reducing the total cost which is shown by examples in Figure 2 and Figure 3, which clearly shows that maintenance costs of pneumatics are reduced in every aspect.

Another reason is that with the reduced costs efficiency of the vehicle is increased. Figure 3 clearly shows that the number of kilometers traveled per vehicle, despite a reduction in costs in 2015 compared to 2014 was increased by slightly more than 3%, while in 2016 compared to 2014 increased by more than 10 percent. These figures are a clear indication that the economy and efficiency of logistics and transportation within a warehouse can be achieved by various quality control measures which, even in this domain, is necessary to apply.

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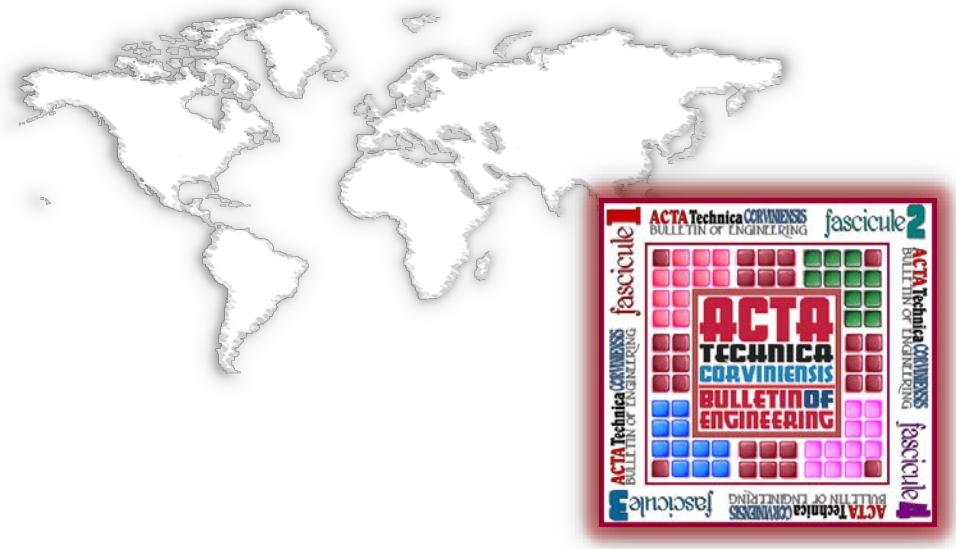

ISSN:2067-3809