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THE TRAVELLING OF FORKLIFTS IN WAREHOUSES

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Abstract
Around 75 % of warehouses retrieve products manually. In these warehouses forklifts are the most expensive machines. The study pays special attention to the travelling of these machines. In order to determine potential travel distance savings, a simulation model is created. The experiments demonstrate that the travel distance of forklifts can be reduced by 27-37 % when RF-based process is implemented comparing with travel distance when paper is used in the process. Research provided herein also defines how to optimize travelling by implementing multiple-tasks approach in WMS. The presented results show that the travel distance of forklifts can be also reduced by 9 % when multiple-tasks approach is used. In addition, it is identified, how stock accuracy affects the travel distance of forklifts. The correlation between the travel distance of forklifts and stock accuracy is presented herein.
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Key Words: RF, Forklifts, Travel Distance, Accuracy, Multiple-Tasks

1. INTRODUCTION

Nowadays, the main issue for warehouses is how to increase their productivity. Seeking to address this issue, the research studies warehouse processes, which govern the productivity of warehouse. In order to determine possible improvements in warehouses, the travelling of forklifts is examined.

Modern Material Handling magazine has made survey with regard to warehouse systems. Representatives from different trade sub-sectors (such as electronics, automotive, medical, paper, industrial products, and others) have responded information about the automation of warehouses. The research has find out that 75 % of warehouses retrieve products manually. In such warehouses forklifts are the most expensive machines due to equipment, labour and maintenance costs [1].

This shows the importance of researches in such area. In addition, the analysis of scientific literature published by leading world publishers (such as Oxford University Press, Cambridge University Press, Harvard University Press, Springer, M. E. Sharpe, Routledge, etc.) shows that only 1 % of the authors, which focus on logistics issues, have taken into account forklifts and each twelfth of authors have taken into account both forklifts and productivity. In the literature authors mention that minimisation of duplicative and/or multiple handlings of pallet, as well as non-productive movements and construction of routes for the most-costly forklifts can help to increase productivity. The most of authors mention that the implementation of RF-based process and the usage of multiple-task approach are used as advanced practice seeking to increase productivity. On the other hand, scientific knowledge of circumstances and scientifically-proved solutions should be used to determine the effect of such implementations. In such complex situations it is necessary to resort to simulation models [2]. One simulation model (which is created by the author) is presented in this research.

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