Improve Warehouse Performance by Handling Material-Flow Bottlenecks

A popular science abstract of the degree project: Improving Warehouse Picking Performance by Using Contextual Factors and Lean Practices

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As warehouses play an important role in the supply chain and are vital for the success of a company, it is important that they operate efficiently. Thus, it is crucial that the material-flow bottlenecks in the warehouse do not have any unnecessary activities, also called wastes, that hinder efficiency. As there are gaps in the literature on how to handle bottlenecks and wastes in a warehousing context, this thesis provides a solution that aims to solve material-flow bottlenecks and wastes by matching configuration with context.

The solution involved developing a theoretical framework that are based on prior theories related to warehousing, lean practices, and contextual factors. The framework consists of two parts. The first part is the current state of the warehouse and that is used to support the data that should be collected about the warehouse. The second part is the analysis to improve the processes. It aims to analyse the collected data to identify bottlenecks and its wastes. It also involves identifying suitable configurations based on the context, which reduces the wastes.

By using the framework, it is possible to understand how to increase performance in a certain context. The result is formulated as general propositions that can be used by companies. Thus, the propositions are also part of the solution that aims to solve bottlenecks and wastes.

To see how the framework performs, it was tested by applying it to the production warehouse of Tetra Pak Processing Equipment in Lund. The scope was limited to the picking process and its closest related operations because the company wanted to improve their picking performance.

Three potential bottlenecks were identified at the production warehouse, which were space utilization, pallet picking process, and vertical storage lift put-away and picking process. Different types of wastes related to them were also identified, as well as the contextual factors of the warehouse. As wastes are indicators of performance losses, they suggested where configuration did not match with the context.

The current state of the warehouse, prior theory, wastes, and contextual factors helped to formulate 12 general propositions. These could be used by the company to provide recommendations on how to reduce the wastes of the bottlenecks and increase their picking performance.

The recommendations for Tetra Pak Processing Equipment involved increasing collaboration and maintenance to improve space utilization, use a new pick zone configuration to remove wastes at the lift and pallet processes, and use batch picking to increase the performance of the lift and pallet picking.