

## Reconfiguring an FGW to Improve Operational Efficiency

**In the face of growing demand Alfdex's Finished Goods Warehouse (FGW) has struggled with both the absence of space and utilizing the space it has. This thesis introduces an original design that creates room for a new production area, cutting operation times, improving the working environment, and increasing digitalization.**

To achieve these improvements, the purpose of the thesis was to design a new configuration. A warehouse configuration is the combination of operations, design, and resources. The configuration elements have to be selected under consideration of specific contextual factors, to ensure efficient operations. That is why the design science methodology was applied, to develop an artifact, in this case, a new configuration.

The current situation was investigated to map the contextual factors and find areas of improvement. Retrieved data consisted of (i) observations of Alfdex's FGW and operations, (ii) data from Alfdex's business system, (iii) interviews with operators, and (iv) three external company visits. The FGW at Alfdex, a company located in Landskrona and specializing in crankcase gas separators for diesel engines, experienced a set of issues. These include limited capacity, inefficient picking, a poor working environment, and sparse digitalization. Many of these issues arise from using a First-In-First-Out (FIFO) policy without information system support to identify the oldest pallets, causing unnecessary labor.

Several tools were used to reach the new configuration. The activity profiling tools - including ABC-analysis and Heatmap - were used to investigate the contextual factors. On the other hand, the lean tools - consisting of Value Stream Map, Spaghetti Diagram, and Muda Matrix - were used to identify current problems and respective waste.

The analysis led to the presentation of a new configuration that optimizes the use of available space by implementing single-deep racks throughout the warehouse. By using the ERP system to create specific pallet positions "Pallet flag picking", an operation consisting of manually checking the dates of pallets to follow FIFO, is no longer required. These changes had a substantial impact on performance. The new design nearly halved the time spent each day on daily operations and increased the warehouse's capacity while at the same time improving availability drastically.

Alfdex reacted positively to the reconfiguration. During a validation workshop towards the end of the study, overwhelmingly positive feedback on the validity of data, analysis, and solution was received. This emphasized the practical benefits of the recommended reconfiguration. It can also be generalized for other warehouses operating under similar circumstances. However, the specific contextual factors should never be neglected. This project advanced the field of efficient warehouse design and showcased the significant potential of optimized logistics.

This popular scientific article is derived from the master thesis: *Reconfiguring a Unit-Load Finished-Goods Warehouse*, written by Jakob Bjarke and Oliver Elftonsson (2024).