

Layout design and implementation of an engineered flooring line

Degree programme : Bachelor of Science in Holztechnik | Specialisation : Process and Product Management
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Australia's largest vertically integrated hardwood manufacturer, Australian Sustainable Hardwoods Ltd (ASH), is adding an engineered flooring production line to its processing site. This thesis determines the final layout design, supports the first implementation steps and provides basic economic metrics for the whole project.

Initial situation

ASH wants to be the first Australian engineered flooring manufacturer and therefore wants to implement a new production line. The existing two sheds with the already evaluated machines serve as the initial situation for the thesis embedded in the already-running project. The company relies on a mix of second-hand machines and new acquisitions. The engineered flooring formerly produced abroad roughly defines the end product specifications.

Objective

This thesis aims to design a functioning engineered flooring line within the given circumstances and accompany the first steps of the installation and commissioning. Additionally, the elaboration of the paper shall prove the project's economic viability and evaluate the production costs.

Methods

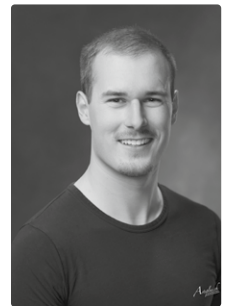
With a competitor analysis based on publicly available information, the manufacturing process of other producers is shown and later serves as a reference point for the process design. A detailed situation analysis of all the machines and processes involved, from raw materials to packaging, forms the basis for the subsequent layout planning. The final layout is to be found with a variant study and a following discussion with the stakeholders.

An economic analysis is used to determine the effective product costs, break-even point and payback time.

Results

With a variant study in the first phase, it was possible to achieve an agreement with the involved Stakeholders on a variant to be studied in depth for each shed. After the following detailed planning of the selected rough layouts, the sequence of installation of the systems up to commissioning is planned. The final layouts ensure an optimal material flow within the given circumstances and allow expansion possibilities at critical points of production.

An economic analysis shows that the costs can be covered with the single-shift production volume planned at the beginning below the maximum capacity of the plants. The calculations also highlight that the theoretical capacity limit of the entire production line should be aimed at to maximise the contribution margin. Initial tests of the first individual units were successful but have shown that further trials and optimisations in the material and the processes still need to be accomplished before the product is ready for the market. During commissioning, persistent delivery delays changed the planned sequence and pushed it back in time. Thus, the entire production line could not be commissioned within the time frame of the thesis.



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Sample of the engineered flooring produced externally at a previous stage