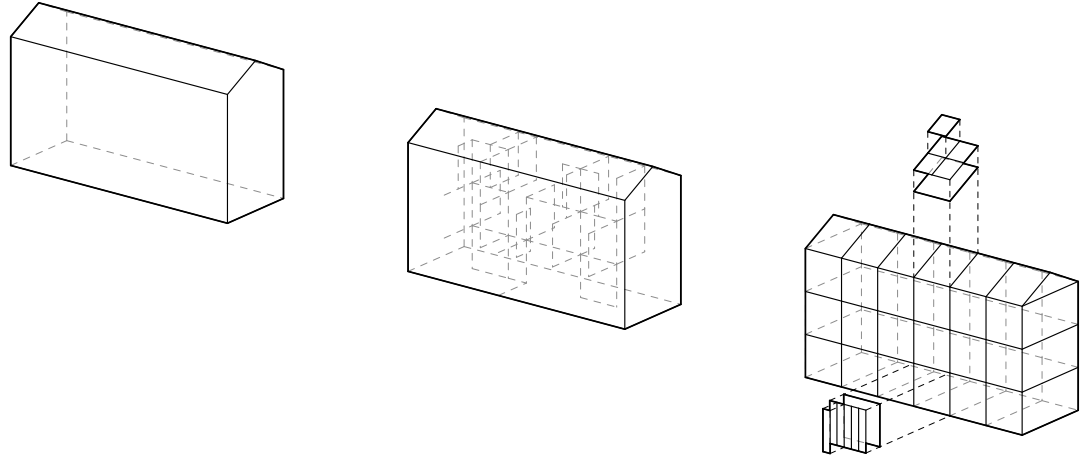


NINA FALK DANAUSKIS

BUILDING OVER TIME

- Designing for adaptability, disassembly, and material loops in prefabricated wooden structures.



BUILDING DESIGN FOR SUSTAINABILITY

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A building is often focused on the first-time user with very little thought on the second user and the possibilities to adapt to their needs. The energy in buildings is embodied in the building components and materials and if these would be put in a circular system instead of discarded as waste, the total energy use and CO₂ emissions would reduce. The environmental footprint of a building is affected by which materials are used in the construction and the emissions connected to the production of them. The aim of this thesis is to explore the possibilities to improve the adaptability of the floorplan and design for disassembly features in a specific and existing prefabricated wooden building system. Adaptability is used as a strategy to meet different kind of needs and respond to changes. Design for disassembly is used to make physical changes possible and to separate components and materials when the building finally reached its technical limit, to enable material loops. The research inquiry is explored in two prefabricated building systems in wood for multi-storey residential buildings from the company Derome. One of the building systems are explored further with the goal to present an improved system.

This thesis is divided into three parts with an initial research part based on literature studies, a second part with an inventory of the building systems based on drawings from and interviews with Derome, and the third part consisting of a design proposal explored through sketches, drawings, and digital models.

The design proposal presented is a building system where the apartments could change both in size and number of rooms to adapt to different users' needs and respond to changes over time. Adaptable strategies of elasticity, flexibility, and generality are applied in the system and transformations are possible by adding or removing walls, keeping within the frames of Derome's original system. The adaptable features of the design proposal result in larger apartments compared to apartments based on the system from Derome. The modules are possible to screw apart into components or specific materials.

Key words: Adaptability, design for disassembly, prefabrication, material loops, wooden structures