

## ONE A4 THESIS SUMMARY

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The housing market in the Netherlands faces two challenges which are the housing shortage and the climate crisis. Modular construction can help solve these challenges due to the many advantages that modular construction has over traditional construction. The advantages that are most related to solving these challenges are the reduced construction time, reduced waste production, reduced transportation movements and the reusability of modules. On top of these advantages modular construction offers many more advantages over traditional construction such as reduced construction cost, reduced failure cost, increased quality, increased worker safety, reduced disturbance for neighbouring buildings and reduced need for traditional labour. Despite all these advantages, the uptake of modular construction is still quite low, mainly due to three problems. The summary of these problems comes down to that there is a lack of knowledge about how to implement modular construction properly. Because of this lack of knowledge not all the advantages of modular construction can be realised and project initiators experience more obstructions for the use of modular construction. To increase the advantages and reduce the obstructions of modular construction, this graduation research will give recommendations to increase the performance of modular construction. To do this, the following main question has been used: ***“What is the current performance of 3D modular multistorey student accommodations in the Netherlands and how can this performance be increased?”***. As the research question says, this research will focus on 3D modular construction that is used for multistorey student accommodations in the Netherlands. This research will include theoretical review, a performance measurement of modular buildings, and recommendations to improve this measured performance for future modular buildings. The theoretical review forms the basis for this entire research, as it gives knowledge to the state of the art about 3D modular construction. In this theoretical review, the modular definition is explored together with the advantages of-, and obstructions for using modular construction. The performance measurement is used to measure the current performance of modular student accommodations. Performance is a very subjective topic, because it is dependent on the culture and preferences of people. With this is meant that performance is the capability of something to meet certain objectives. In this report important objectives of the built environment and DUWO have been considered to measure the performance. This resulted in five main objectives, which are: financial health, sustainability, affordability, student satisfaction and student wellbeing. To measure these objectives, the objectives have been split into key performance indicators (KPI). These KPI's have been used to measure the performance of three modular buildings. To measure this performance, the building data has been put into a comparison table per KPI, after which the data was analysed through interviews and supplementary building data. This resulted in insufficient, medium, and good performance of building aspects. The final product of this research are recommendations that can be used to increase the performance of modular construction. These recommendations are based on the performance measurement, interviews with experienced stakeholders and theoretical review. The recommendations that are given can be grouped under the objectives that were defined in the previous sub-question and involve many different topics such as: standardisation, contracting a manufacturer, procurement, program of requirement, total cost of ownership, maintenance, and design for disassembly.

From this entire research can be concluded that modular student accommodations perform well compared to traditional construction but compared to the goals of DUWO and the built environment, the performance should be increased. To do this, housing associations (in this case DUWO) need to change their way of thinking about finances, sustainability, collaboration, and project delivery.

PS for a more elaborate summary see the executive summary in my thesis report