

Reflection

Rinze Wassenaar

The goal of my graduation project is the design of an alternative densification strategy for high-density environments, using the advantages of computational design and robotic fabrication.

In my approach to reach this goal I broke up my design in three scale levels: macro (building scale) meso (apartment scale) and micro (detailing). For each scale level I developed a method which generates (part) of a building which enables more responsible use of inner-city space:

- Macro: design of a building envelope based on solar access of surrounding buildings and public squares.
- Meso: design of an apartment growth model which allows for the generation of apartments with varying space sizes according to set requirements in a certain bounding volume. This enables us to generate housing configurations without the need for all spaces having the same height, which inherently wastes space: a sleeping area can be small and cozy while a living room is desired to be large and spacious. With continuous floors this distinction cannot be made.
- Micro: development of a structural system which makes it possible to build a non-standard apartment building (as is the output of macro + meso) using robotic fabrication techniques and structural analysis.

My method of separating the goal has several advantages and disadvantages. The first advantage is that it allows for three problems to be developed in parallel, without much interference. This reduces the complexity of the individual problems and makes it easier to solve. The second advantage is that the product of each scale level can be relatively easily applied in another setting. For example: the generation of a building envelope based on solar access on the surroundings is something that municipalities, for example, can use as a good tool to give insight in volumetric limitations on the site, without them needing to incorporate the other products of my thesis as well.

A main disadvantage of my method is that, of course, the different scale levels are interconnected; when designing a bounding volume, one should also be aware of the fact that certain bounding volumes are more suitable for fitting in apartments than others, because of the ratio between façade area and volume, for example. By isolating these scale levels this direct connection is somewhat lost. For the most ideal output, one would have to develop a method where the generation of apartments happens simultaneously with the shading impact on its surroundings and structural optimization. This is however a very complex problem.

During my research I also stumbled upon some ethical issues, mainly concerned with the research output of my strategy. This is because my strategy will result in quite non-standard apartment spaces, which lack continuous floors. This is quite problematic since it means that my design will be basically unfit for elderly and people with special needs. On the other hand, however, one could argue that a lot of apartments that are currently available are already unfit for these groups since we also design buildings specific for them, for example single floor apartments without doorsteps.