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Architectural Timber Graduation Studio

THE PERMANENCE AND TEMPORALITY OF URBAN RESIDENTIAL TIMBER

Keywords
Adaptive timber construction, temporal, permanent, urban densification,

General Problem Statement

With the theme of "Timber for Urban Density", timber becomes immediately entwined within the ever evolving complexity of the city and especially in existing cities where space is already scarce to meet these changing demands. Hence, it lends itself into the modern movement of flexible timber architecture, transformative architecture that adapts to the needs of its residents and the community. As an organic material it is only natural that timber has a relationship with time, stemming from its lifespan as living material to its second life as building infrastructure. Therefore, this paper will delve into how this relationship translates to the connection between the temporality of timber infrastructure and the changing demands of a neighbourhood. Hence, through the consideration of the timber lifecycle and the "lifespans" of several typical residential archetypes an understanding of how timber construction can best support these changing needs will be cultivated. This extends to the idea of flexible architecture translating into temporal architecture hence also spurring the conversation of whether it is logical for flexible timber architecture to become the new residential archetype. Thus bringing the question of how much should be temporal and if permanent architecture is indeed necessary for a neighbourhood. Therefore, this paper will not only investigate the temporal nature of timber construction in a city but also delve deeper into how it can be implemented to meet the changing demands of the various residential archetypes.

As the need for the use of sustainable practices in construction has risen, there has been in an increase in demand for timber and biobased materials in construction. And as timber use has been implemented in the construction of new neighbourhoods it becomes imperative to consider the relationship between the evolving needs of a neighbourhood and that of new timber construction and how these needs can be met. Additionally, with the rapid changing needs of our cities and neighbourhoods the exploration of how amidst the constantly transforming infrastructural landscape the connection and attachment to a place can be preserved. This brings about the question, "What elements within a neighbourhood should be temporal and what should be permanent? Or should everything be temporal?" and "How permanent should permanent be and what are the implications of which?" In this paper, the theme of permanence and temporality surrounding the implementation of timber architecture will be investigated in the context of the Netherlands through the use of literature and case studies. The goal of which would be to further understand how the implementation of flexible architecture should be realised in combination with the existing context and to give insight of the considerations when

introducing new neighbourhoods especially whilst considering the material lifecycle and allocation.

Overall Design Objective

Through the research conducted an understanding of the how timber construction can be effectively implemented within the setting of a new urban residential neighbourhoods whilst considering the lifespans of these construction and how they can be adhered to the current and future needs of the neighbourhood.

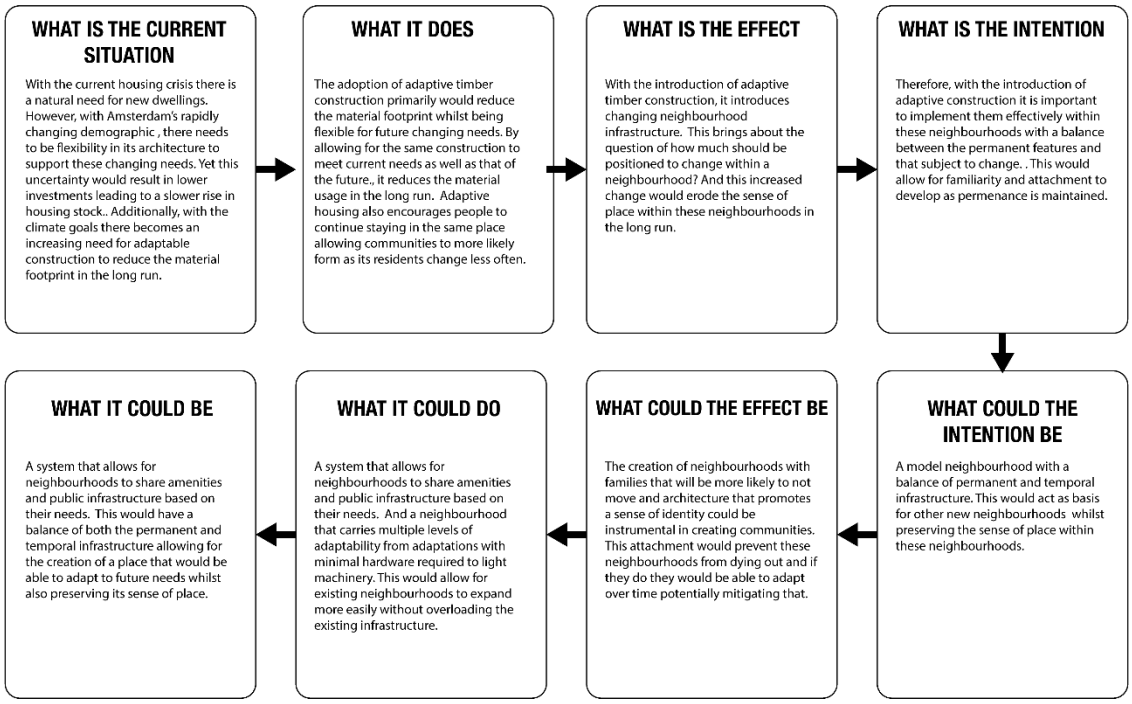
Overall design question

How can adaptive timber construction be effectively implemented within new Dutch residential developments whilst meeting both the current and future demands of its inhabitants?

Reflection on the relevance

Considering the current housing crisis within the Netherlands along with the climate crisis, the need for urban densification through the prudent use of sustainable materials has increased. Therefore, further research into the implementation of timber, the most common bio-material is essential. With the idea of further densifying existing cities, it is essential to understand how timber can best be utilised to adapt to the rapidly changing nature of these cities and neighbourhoods. Hence, it is logical to consider the viability of the flexible nature of timber construction in meeting these needs . Hence, this paper intends to investigate this and map the development and changing demands of neighbourhoods within cities in the Netherlands. And through this compare it with how timber construction can be effectively implemented to adapt to these needs. Therefore, not only densifying the residential spaces but also developing an understanding of how the future demands of a neighbourhood can be incorporated into its design thus reducing the need for additional materials when adapting to the future needs of the neighbourhood. The addition of adaptive timber construction would allow for the not only the living spaces but neighbourhoods to adjust to the needs of its residents, therefore reducing the need for its inhabitants to move to meet their changing needs. This would allow for there to be reduced change in the inhabitants within the neighbourhood resulting in increased familiarity between these inhabitants. Thus, increasing the likelihood in which attachment and a sense of community within these neighbourhoods can be fostered.

RESEARCH PRUDENT IMPLEMENTATION OF ADAPTIVE TIMBER PUBLIC INFRASTRUCTURE



Thematic Research Objective

The main objective would be to map out the correlation is any between the evolving demands of a neighbourhood and the lifespan of flexible timber construction and how new construction can best taper to the demands of a changing neighbourhood whilst leaving the option for future adaptation to take place.

Thematic Research Questions

As the demographic within a neighbourhood changes how do its needs change and how does its infrastructure adapt to these changes? And how can adaptable timber infrastructure be facilitated to effectively adapt to these needs?

What are typical Dutch residential demographic archetypes and how do they tend to evolve?

- What are the main driving factors that contribute to changing demographics within a neighbourhood?

<u>Sub-questions establishing the parameters of the research</u>

Why should cities have permanent elements?

Why should cities have temporal/flexible elements?

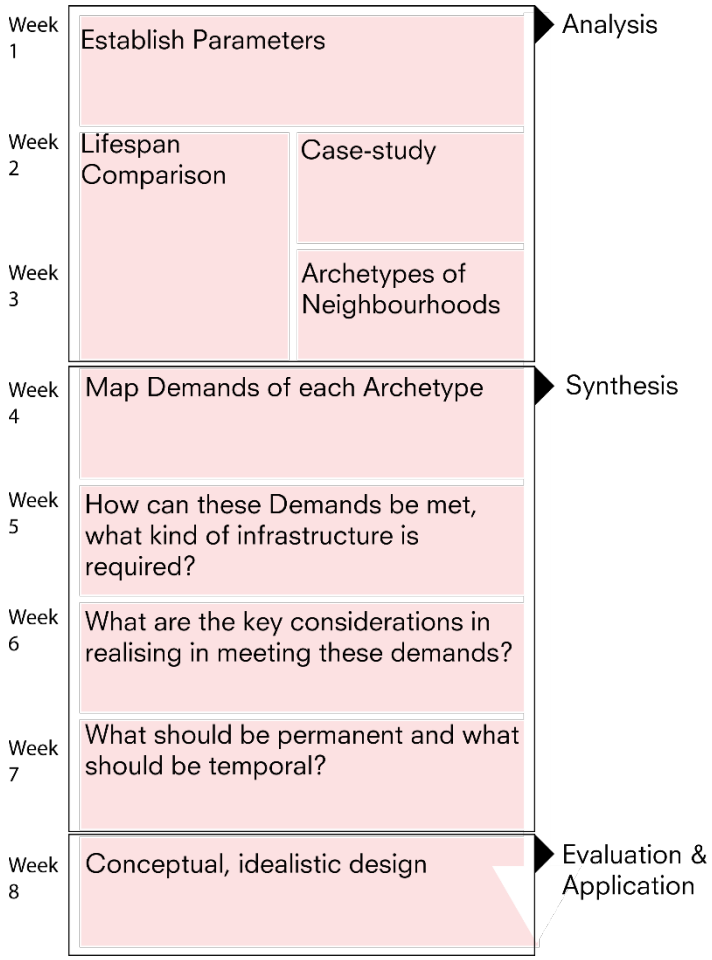
How can temporal infrastructure be imposed onto cities whilst allowing for these elements to remain adaptive and how can this flexible nature be adapted to the changing needs of a neighbourhood?

Reflection on the relevance

The research will be limited to the context of Netherlands more specifically Amsterdam. Therefore, analysis will be conducted on neighbourhoods within and around the city. This directly translates into the implementation within the context of Houthaven in Amsterdam. In considering the rapid demographic changes and uncertainty in the future within the city of Amsterdam, it is important to have new infrastructure that has the allowance to adapt to future needs. This adaptive architecture that not only adapts to the needs of its inhabitants but of the needs of future residents and the neighbourhood, this minimises the risk taken on by its developers. This lowered risk increases the likelihood of increased investment and development of new housing infrastructure, thus increasing the supply of housing stock. This flexibility would also allow for the possibility for future needs to be met through lowered costs as the existing architecture would be able to be adapted to meet these needs. Hence, this would directly affect multiple stakeholders from the users, developers to the municipality.

Thematic Research Methodology & Planning

The research will be primarily literature based in the initial weeks in combination with analysis through case studies through site visits. This research will utilise lifespans and timelines in creating a clear comparison between the changing needs and that of the implemented infrastructure. Additionally, in developing a further understanding of the how these demands can be met and to generate innovative and effective ideas, research will be conducted through a conceptual design, acting as a framework for its implementation.



- (1)The initial week will consist of establishing the parameters on the significance of the research: The significance of both temporary and permanent infrastructure and what the expected lifespan of typical infrastructure currently is. Additionally, what the current practice of adaptable construction is.
- (2/3)Subsequently, several neighbourhoods within and around Amsterdam will be surveyed and based on the amenities and features of these neighbourhood against the age of the neighbourhood an understanding of the needs of these neighbourhoods can be deduced. From there several archetypes can be drawn out. Additionally, a general understanding of the evolution of these neighbourhoods can also be formulated through several timelines. The analysis will be focused upon the amenities and public infrastructure within these neighbourhoods, their condition and the traffic centred around these spaces.
- (4)Additionally, the changing demands of each archetype can also be understood with its evolution. Therefore, a direct link can be drawn between how these archetypes evolve and it how their needs change and how its public infrastructure and amenities change accordingly.

- (5)In understanding how these needs are currently being met it and what the current limitations are, it will allow for more effective implementation of timber construction within these neighbourhoods. With the consideration of the adaptive nature of timber construction it could potentially allow for more targeted and specific interventions.
- (6) Outlining what the limitations currently are and how they could be circumvented
- (7) Answering the sub-question of the significance of permanence and temporality within a new development and how they could be implemented effectively within the context of Amsterdam. Through this a framework consisting of the various archetypes, documenting the role of its amenities, reflecting the changing needs. Additionally, it would include the duration in which these amenities were present and if they were in use.
- (8) A conceptual and idealistic cityscape will be designed with these considerations in mind. Summarising the main developments from the research.

Expected results of thematic research and design implementation

The main goal behind the research is to attain an understanding of how adaptable timber construction can be effectively implemented within Dutch urban settings. And in this case, the focus would be on the neighbourhoods within Amsterdam. Therefore, residential demographic archetypes will be distilled from the initial case study analysis. Additionally, a matrix of the various amenities and public infrastructure within these archetypes will acts as a measure of the demands pertaining to each demographic. The activity within these amenities will also be accounted for in determining their necessity within each setting.

With the initial archetypes corroborated against literature, the driving factors between the changing archetypes will be briefly researched, through this it would be possible to postulate the correlation between the neighbourhoods and how they develop. Additionally, a matrix depicting these public infrastructure and amenities against their relevance within the context of each archetype (age, traffic, its presence) will be made. This would provide further insight into the role of these amenities, what the demands of each situation are and how permanent they may be.

Based on the data and insights attained a concept design for Houthaven at an urban level will be designed considering there to be no limitations (budget, materials, existing infrastructure and the context). This will allow for the overall research to be synthesised and directly applied to the site, providing an optimal scenario where adaptive timber infrastructure is effectively implemented within the neighbourhood, considering both its current and future implications. This concept design will also act as a bridge into the design phase of the project, providing an ideal basis for the initial steps of the design.

Additionally, at the end of the project this concept design will be instrumental in its evaluation and a comparison between the design and concept design will allow for a better understanding of why design decisions are undertaken and how these considerations limit the overall design.

Notifications

**Your research plan (written text + visual diagram) is due to be submitted to Brightspace in the Research Plan Course AR3A010 and aE Studio Course AR3AE100.

***The Board of Examiners (Examencommissie-BK@tudelft.nl) asks for the submission, to your mentors and delegate, of a Graduation Plan one week before P2 at the latest. The graduation plan is a very concise summary of your research plan, which is mainly used by the external delegate to prepare for the formal progress reviews (P2, P4 and P5). The official BK TU Delft template for the graduation plan is available on Brightspace.