REFLECTION PAPER

Master of Science Architecture, Urbanism & Building Sciences

Community-based materials' process centers: Applying the concept of Buildings as Material Banks to post-war community

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Introduction:

Many post-war social housings in the Netherlands await renovation. In the last century, the construction of these low-technology post-war estates helped alleviate the housing shortage in the Netherlands for a short period. However, because of small living areas, and poor insulation, these dwellings no longer meet the needs of contemporary use. Amsterdam released a document called "Richting Parkstad 2015" in 2001, which presented a plan to renovate post-war housings.

The renovation of many post-war housings poses a great challenge to manage the waste produced by demolition. According to the Dutch Material Flows Report, a large proportion of construction waste in 2014 comes from post-war housings between 1945 and 1970. Furthermore, many new materials are needed for the renovations.

Circular principles in the construction industry advocate reusing materials via the R strategies. Some of the materials that have been discarded due to building renovation still had the potential for secondary use. Therefore, introducing reuse practices into post-war neighborhoods presents a great opportunity for controlling waste flows especially today when there is still a large circularity gap.

I. The relationship between my graduation (project) topic, the studio topic (if applicable), your master track, and my master program.

My project revolves around how to achieve circularity at the community level. It is not only about increasing the recyclability of building materials in post-war communities through the reuse of used materials, but also trying to use a sample building built by circulation technology to arouse the awareness of circularity among the community. AE studio's goal is to create inspiring architectural solutions through technology and innovation. Circularity is also an area of focus for AE studio. My project demonstrates the potential of circularity to the community in a visible way through the use of old materials on the building facade and reversible design of almost every component in the building, which coincides with the goals of AE studio. The architectural design gives residents of post-war communities an example of the reuse of materials, and thus gives a possibility of implementation of the circular economy. This is the power that technology demonstrates and the impact that architecture can have on people. Architecture does not only provide its functional role; it should also provide the impetus for the implementation of the circular economy. It is also the responsibility of the construction sector to contribute to the world environment.

II. The relationship between research and design.

The project began with a study of the circular economy, which was used to determine the design of the building with circularity as a guideline. In the process of the research, the definition and the current state of the circular economy were

understood. At the same time, BAMB was also studied as a means of realizing a circular strategy in the construction sector.

BAMB is a concept that sees buildings as temporary material banks. The implementation of BAMB in a community is a complex process: Inventory, harvesting, processing, distribution, and reuse, each of which requires the cooperation of many people involved.

My graduation project is based on the BAMB concept. The building is not only used for its function, but also as a temporary storage place for materials. In my design, every part of the building can be removed with less damage. Every material used in the construction of the building is recorded in the online material passport database. When the material is removed from the building, the material passport will serve as a record of its future reuse.

The BAMB process is complex, so it is essential to conduct research before design. Is it possible to design based on recycled materials from around the site? Can the project work with the surrounding waste recycling centers? Is there a chance that the materials used in the project could be returned to the local material distribution market? These are all questions that can only be answered through research. Therefore, the development of the project is dependent on the preliminary research.

III. Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

My project focuses on the possibility of implementing circularity in the community. When every component of a building can be recycled, the value of the materials can be maintained at a high level for a long time.

Recycling is no longer just a concern for the building industry, it is an urgent issue across a wide range of sectors - at a time of dwindling resources, how can we contribute to the environment in our field. A demountable building design in itself may not make a big impact, but recycling-based design guidelines can turn the perception of material recycling around at the ideological level.

On the national scale, a circular economy achieved in a specific region will contribute to the goal of "50% reduction in raw materials consumption" by 2030 for the whole Netherlands. If it is possible to realize a circular economy in a post-war social housing area by designing a material processing center based on exhibition and education, can we also look for universal principles in this approach? This universal principle will have the opportunity to facilitate the achievement of a circular economy in different areas through appropriate localized modifications. This strategy offers the possibility to achieve the Dutch 2050 target----a circular economy by 2050, which is a waste-free economy that runs entirely on reusable materials

On the international scale, the circular economy, including waste and eco-design and reuse measures, can effectively reduce total annual greenhouse gas emissions,

whereas the production of materials we use every day accounts for 45% of total CO2 emissions and the waste generated at this stage poses a major hazard to the environment and human health. Considering that only 8.6% of the world is recyclable today, there is a very large potential for the world's circular economy to be tapped, thereby further reducing environmental pressures, improving the security of raw material supplies, creating employment opportunities, and promoting economic growth.

IV. Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

AE is a studio based on technological innovation, so my research started with a study of the concept of BAMB, a hot topic in the field of circular economy in recent years. Unlike previous design experiences, the basis of the project shifted from spatial and humanistic research to technical research. This does not mean that humanities and space are no longer important to architecture, but rather an attempt to focus on technology. It is an interesting attempt to bring out the value of space on top of the already defined direction of technological innovation.

V. Discuss the ethical issues and dilemmas you may have encountered in (I) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.

Because of the limited time available, the project was generated based on just one area, the Western Garden Cities. Different areas will have different recyclable materials, which may lead to changes in the overall design principles. Small changes in design may affect the potential for BAMB to be implemented in larger areas.

At the same time, the uncertainty of recyclable materials in a region makes design difficult. Although every part of the project was designed to be of a common type of material in circulation, there was no guarantee that every part could be built with used materials. The randomness of the source of used materials can make it difficult to get this project off the ground.

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Finally, it is important to note that in the transition to CE, the most important thing is not top-down policymaking and business model changes, but bottom-up awareness. Only when every individual involved in the material circular flow realizes that waste is not just waste, but another form of resource can CE move forward more smoothly.