

REFLECTION P4



BAMBOO, THE BUILDING MATERIAL OF THE FUTURE!

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INTRODUCTION

Kampung environments are known for self-built structures, which are often unsafe and therefore have a shorter lifetime. Traditional kampung houses are rarely found in the urban kampung of today. Kampung residents have rapidly adopted Western structural building materials like concrete and brickwork. However, structures that arise are unsafe due to wrong building methods and a lack of knowledge. Besides, these non-local materials have to be transported to local material shops where people buy them. The use of local materials is thus insufficient and should be enhanced by proposing for alternatives. My proposal was to renew the use of bamboo and reinvent it as a structural building material. Bamboo is currently seen as the 'poor man's timber' and mainly used for temporary structures or cladding. The problem statement, as written in the graduation plan, was dealing with this conception as well. 'What would be the impact on kampung dwellings if we could change the conception of bamboo as a poor man's timber?' An objective, concerning the aim to change the image of bamboo into a sustainable self-building material, was then formulated (figure 1). Figure 2 visualizes the boundary conditions of the graduation project regarding program (design parameters), context (location properties) and fascination (field of technical research). Research has focussed on this and turns out that bamboo has the potential to be that self-building material. Wood joining techniques have been tested and a rectangular glueless laminated bamboo beam prototype was produced. The elimination of glue in the lamination process will bring this technique closer to kampung residents as it is the craftsman way of laminating. Furthermore a prefabricated building system is developed to propose for the use of bamboo as a structural building material.

The relation between research and design can be described by the search for a rectangular- and structural bamboo beam (research) to be used in a building system that produces safe housing and a faster building process (design). The building system is optimized for the bamboo beam resulting from the research, meaning the building system to allow as much as possibly straight unmachined lengths. Due to the experimental character of research the result was hardly predictable. However, this does not implicate the result to be by accident. Existing techniques for splitting and flattening bamboo were used and techniques for combining these slats were evaluated and innovated. Innovations were done by eliminating glue and searching for wood joining techniques to combine different layers of slats (figure 3). Reinterpreting pin-hole and swallowtail connections led to the use of swallowtail pins pressed into slots that were machined in the slats. In short, both evaluation and innovation of existing joining techniques resulted in a prototype of the proposed beam (figure 4).

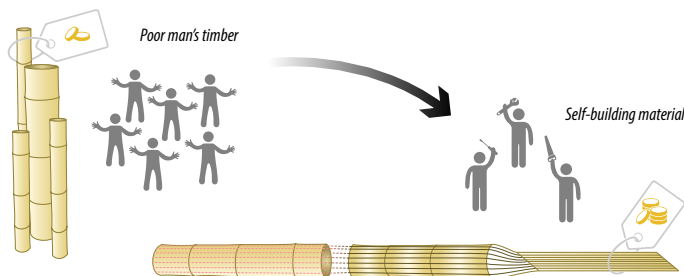


Figure 1



Figure 2



Figure 4

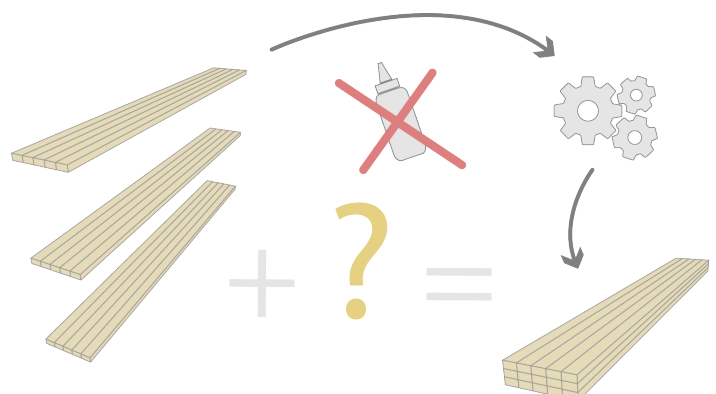


Figure 3

Regarding the specific context in Bandung, Indonesia this research can also be a solution for other self-built environments. Though the structural use of bamboo for building houses is rarely done within this urban kampung Cigondewah. The traditional way of building with bamboo is interpreted to be 'primitive' and 'poor'. Rural kampungs tend to stick to these traditional methods, while urban kampungs try to abandon the material and the processing technique within. My approach is to try and save bamboo-building skills while improving building techniques. This addresses the proposal to reinvent bamboo and change its appearance. In my graduation plan this was formulated as 'using the value of the kampung community and the strength of bamboo as a solid/rigid building material to strengthen each other'. Field research clarified the importance of community engagement in the process of accepting bamboo as a constructive building material.

Within the graduation lab 'research by design' is the most common method to unfold the chosen research topic. The definition of the research follows from a specific technical fascination. My personal fascination, on the use of bamboo to produce safer housing and increase local craftsmanship, is rather driven by function instead of design. In a sense, the architecture is the expression of strong, simple and rigid systemic building elements. This method, to design for function, expandability and solidity, has led to a building system more than a unique piece of architecture. The engineering has strengthened the architecture in this project as the system is well readable and therefore expresses a clear type. The type of architecture that describes unitized dwellings and is strong when used in repetition. The repetitive character incorporates opportunities as well as threats. Threats are caused by the unpredictability of kampung residents to informally continue or tweak the building system. Nevertheless the system is additive and stackable to avoid failure in the assembly process.

As described in the introduction there is a tendency of self-building within the kampung. Building construction therefore is a social activity and relies on people cooperating to build another's houses. Building materials are expensive and construction knowledge is low, while local craftsmanship is widely available. Although craftsmanship has to be improved it is a strong social or human power that is obvious. The power to change the image of bamboo is in the people willing to use it for their own good. In the graduation plan I was proposing the idea of a 'public workshop' that would function as a centre for community, building knowledge and as a production line for prefabricated housing. It should be a place for people to both build their own house or join a building team to improve their bamboo construction knowledge. This goal, to involve the community in developing a sustainable, local, solid and self-building system, has been a guideline through the entire graduation project. It is not a piece of outstanding architecture that Cigondewah residents are asking for, it is a solution for improving their quality of living. Kampung environments are unhealthy and unsafe whereas on the other hand they are a source of creativity and craftsmanship. By proposing for a certain building system their weaknesses will be addressed and strengths enforced. An example of a small family house is shown in figure 5. Size, walls and roof can be altered to personalize every house.

In terms of planning I have to notice that my workflow was more abrupt and less scheduled. This seems to be a recurrent phenomenon regarding previous research and design processes. Personally I can deal with this approach, though I realize that it is more convenient to unfold a planning gradually. In this case the experimental character of my research, not following an existing method, could be an explanation to deviate from a schedule.

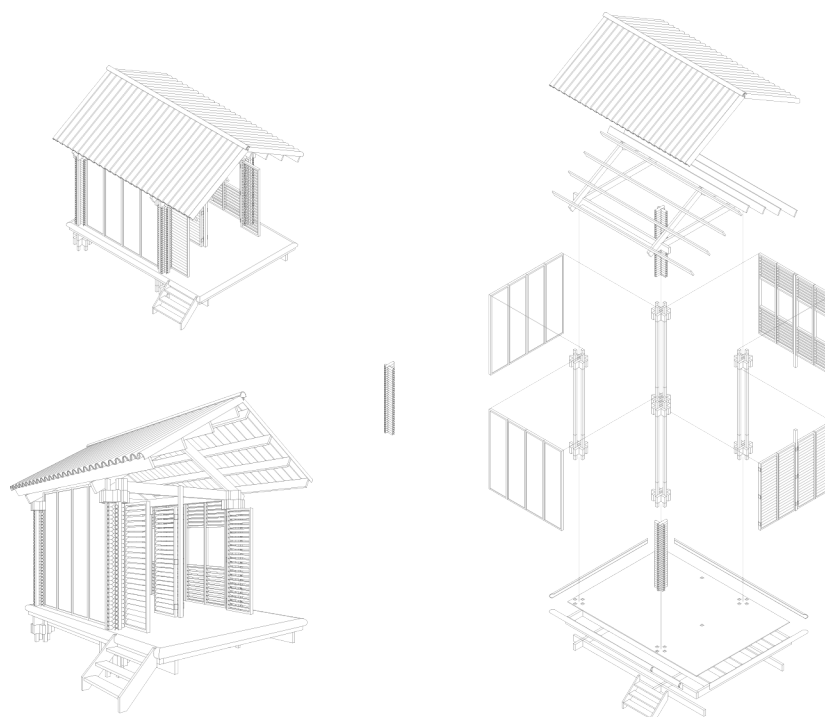


Figure 5