Prototyping Protocols/ Protocolling Prototypes
Automated Resilient Sustainable Architecture

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After nearly 90 years of absence in Estonian timber construction, the current move towards automated and sustainable building industry, rises possibility for renewable materials to position themselves back into large scale building economy. Socialist ideals and norms of the building efficiency like panelization, modulation and element based construction and material innovation found their application merely in precast concrete scale. In recent past has timber reached higher levels, once again becoming part of mass production and re-entering the materials library of the architectural practitioner. Nonetheless, for an architect, being overwhelmed with the abundance of possible directions and applications what contemporary digital tools are offering, the field of construction remains brutally simple, driven by laws rigid and ignorant towards collaborative work.

Introduction

Redefining the production chain of architecture from design to fabrication based on computational understanding of modulation makes it possible to move towards more flexible and adaptable architecture. With particular collaborative workflow between architects, engineers and fabricators, modulated prototyping provokes apparent design implications in tectonics and space organization. The dynamic relationship between the digital, material, design protocols and the experimental prototypes have became key elements in design and fabrication process.

Live Geometry/ Living Material

This thesis looks at adaptive design and fabrication methods for working with undulating substances - to capture the potential of live geometry and living materials. Monitoring the changing relationship between the protocol and the prototype, has opened up premises for the successful design and construction process. Workflow, based on discrete syntax, proposes methodology, that allows all composing participants in the building process - architects, engineers and fabricators, work in non-narrative looping manner, around common platform. Fabricating with natural living material, with fluctuating properties, could be taken into account until the very end of the fabrication process. Methodology allows dismantling the workflow by defining relationship between design protocols and fabricated prototypes.

Methodology

Unfolding the design process is the key method of ongoing research. The presentation focuses on three tectonic assemblies and geometrical modulation studies of PART office: bespoke structures, aggregational modularity and somatic modularity.

Early office work, bespoke structures, focused on non-repetitive element timber structures. The overall gesture of an object overwrote the joinery and element intelligence. In last few years aggregational projects have focused on structural space filling systems, negotiating between modularity and smart joinery. Most recent, somatic structures, are closed modular elements, that carry aside structural qualities also space dividing and membranous qualities.

In each case, designs are preserved and evaluated with relationship between protocol and the

prototype. With this methodology of workflow analysis has enabled new knowledge about how we design and how the specific tectonics have emerged and extracted from my work.

Modularity

Collaborative effort calls for defined design protocols and constant prototypical output. Investigation of means, tools and regulations for large scale construction, that could become automated protocols of early design process until finalization of the building. Information gained from prototyping modular systems, joinery, combinatory material tests and defining more intelligent components, has become part of the design process and architectural intention. Design driven by joinery and combinatory surface subdivision provide more homogenous, timely feasible and resilient architecture.

Conclusion

This project, therefore, is focusing on protocolling and prototyping production chain for timber architecture, with a proposal for sustainable architectural design intention. PART office projects vary from bespoke elements towards repetitional aggregational elements towards somatic structures that combine structural, space defining and membranous qualities. Unfolding processes of my practice is discussed through case studies, demonstrating its design limitations, embodying material driven advantages of common platform and revealing necessity for modularity and repetition in large scale construction.

Short bio

Sille Pihlak is an architect, laureate of Young Architect Award 2017. She studied at the Southern California Institute of Architecture in the US and graduated from University of Applied Arts Vienna, in Austria. She holds interior architecture bachelor and is currently PhD fellow and junior researcher in Estonian Academy of Arts. She founded architectural office PART together with Siim Tuksam in 2015.