Research meeting „reciprocal self-interlocking systems“

Paris 16th to 19th June 2013

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Participants:

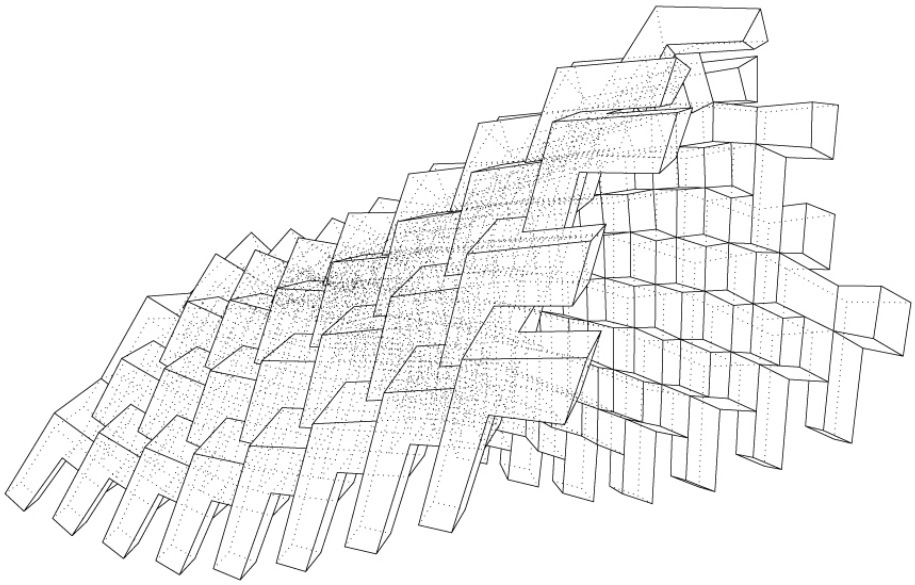
• Pierre Cutelic	Adjunct Assistant Professor Ensam Paris-Malaquais Founder & principal of the computational monkeys
• Ursula Frick	ioud | Institute of Urban Design Innsbruck co-founder [uto]
• Thomas Grabner	ioud | Institute of Urban Design Innsbruck co-founder [uto]
• Rupert Maleczek	Institute of Design / Structure and Design Innsbruck

Report

2013 Koge - Institute of Design / Structure and Design and the Digital Knowledge Teaching Department decided to collaborate on an exchange research program for the conception and construction of “reciprocal self-interlocking systems”.

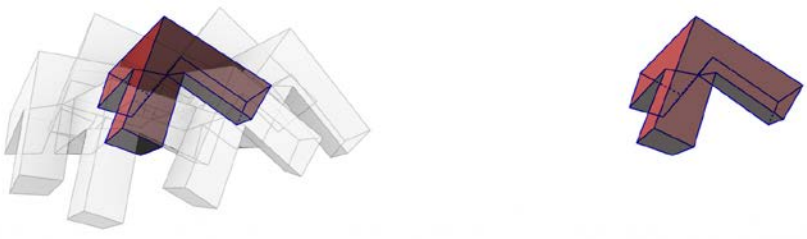
As mobility, portability, reuse and obsolesce remain recurrent topics in the physical realm of the building industry, the research program will focus on the use and reuse of materials for the design, fabrication and construction of full scale mock-ups addressing the wide range of morpho-structural components within a reciprocal and self-interlocking assembly.

During a first meeting in Innsbruck, initial approaches and theories were developed. This meeting at the ENSAM – Paris - Malaquais, was to proof some aspects of the established theory and also reveal new aspects regarding the prior defined geometrical dependencies. Meetings with Professors and Research Assistants to discuss the topic and their point of view helped to improve the setup of the cooperation.



generation of interlocking elements on a freeform surface

An implementation of a physics-based simulation engine was developed and proved to be working. Furthermore, the algorithm that produces interlocking elements on freeform surfaces was successful tested and refined. The implementation offers a new and widespread platform to test several combinations and variations of the element. The next steps are to investigate under what circumstances the system remains stable e.g. by a change of curvature, certain border conditions, etc...



Single interlocking elements

A scaled model, of an approximated surface was built during the workshop. This first physical setup allowed the participants to study possible issues regarding fabrication within the material thickness and geometry dependencies. This led to the pending development of a special unroll procedure, dependent on the geometrical constraints of each unique module.

As these theories and thoughts need to be further articulated, a recurring meeting seems beneficial, and should be one future objective to consider.

The participants are currently working on first drafts and images for a publication on this research. It seems that the field of these interlocking systems is widely discussed, but not yet has it been deeply explored based on this element that our team is currently exploring.

Pierre Cutelic, Ursula Frick, Thomas Grabner, Rupert Maleczek