WAFFLE STRUCTURE

KULIAH 3

https://www.pinterest.co.uk/pin/282179351362849827/

WAFFLE STRUCTURE IN CONSTRUCTION SECTOR

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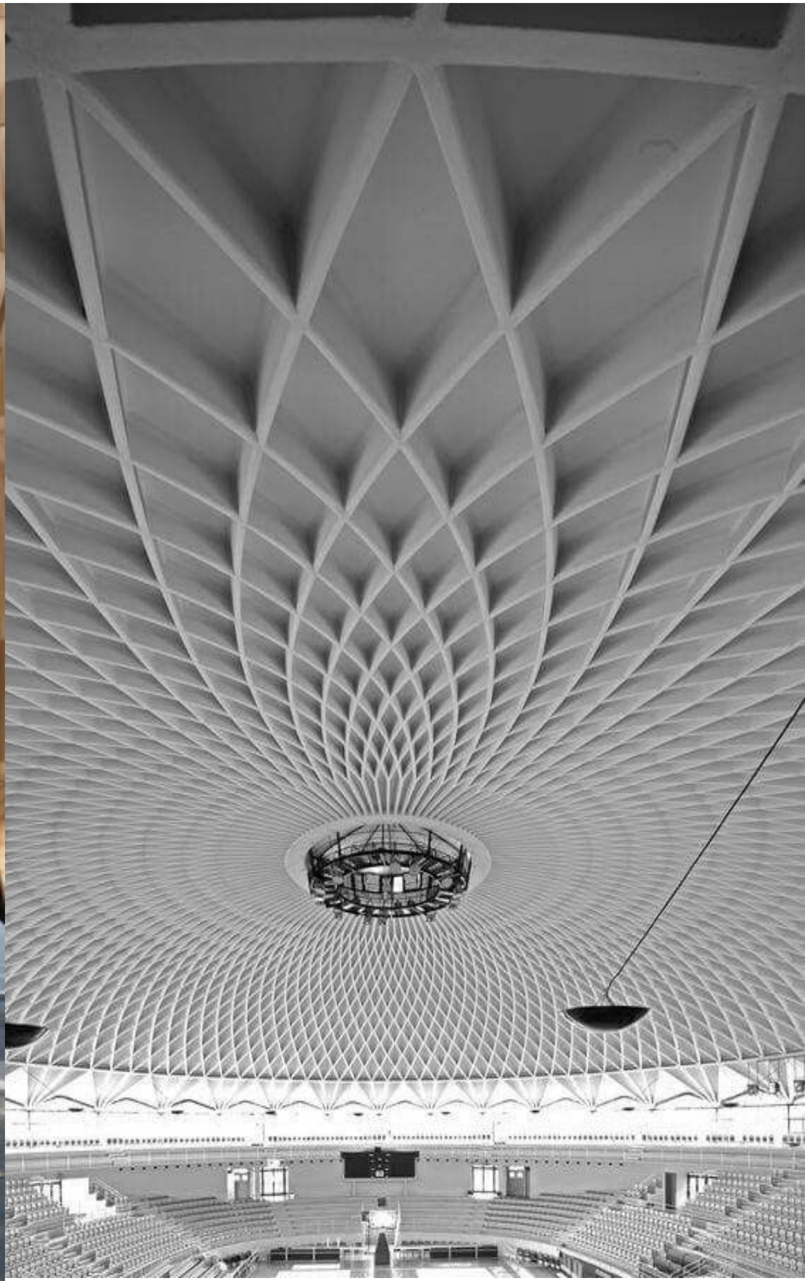

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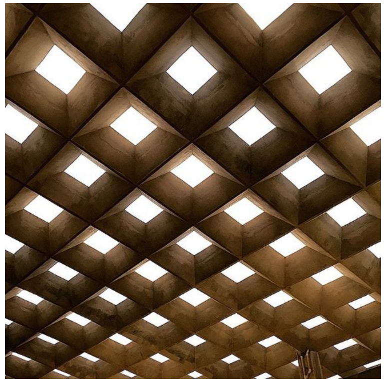
WAFFLE SLAB



Rectangular
waffle slab

Triangular
waffle slab

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https://i.pinimg.com/564x/a0/df/fb/a0dffbc375841908604c4dc5a492518d.jpg
https://www.pinterest.co.uk/pin/709317628601081l3/

Concrete ceiling
with waffle slab
structure

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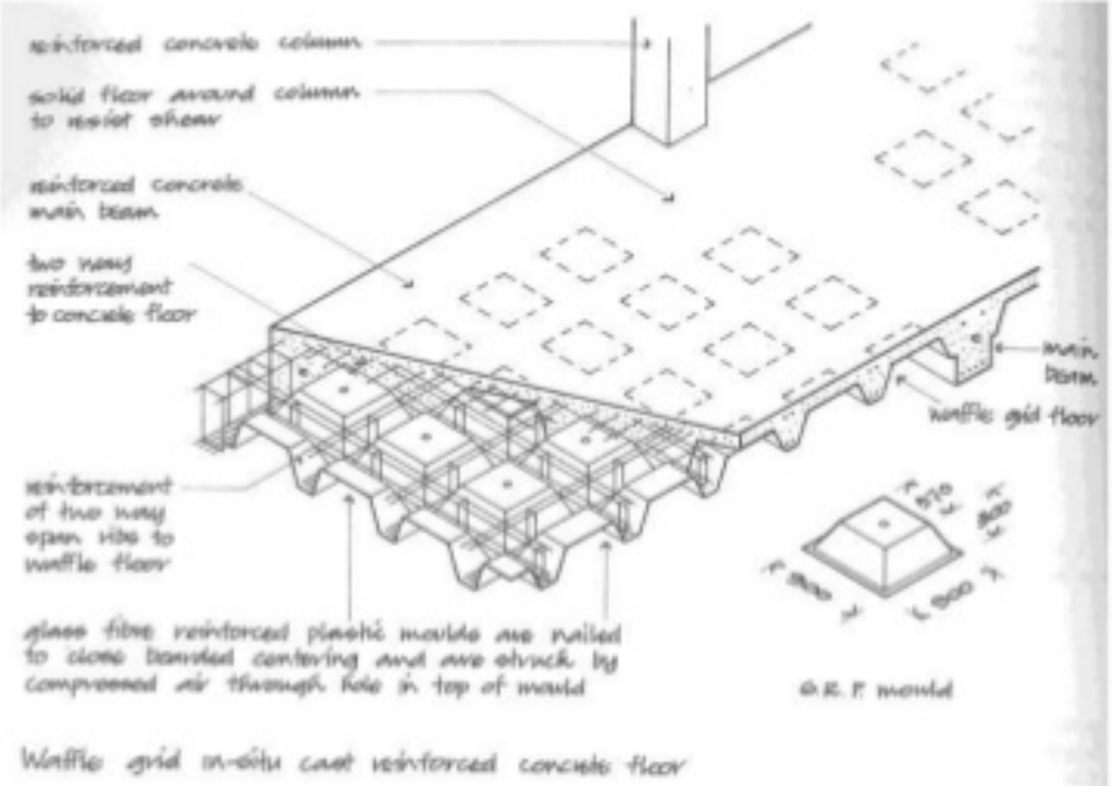
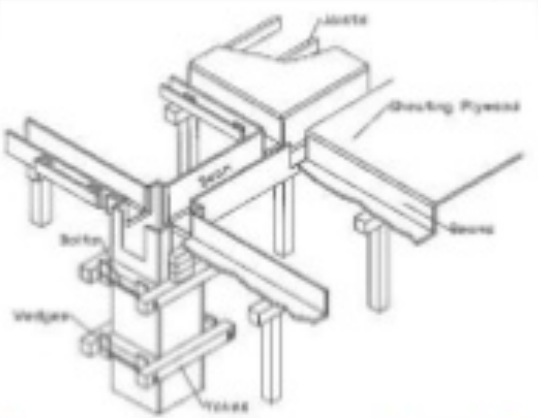
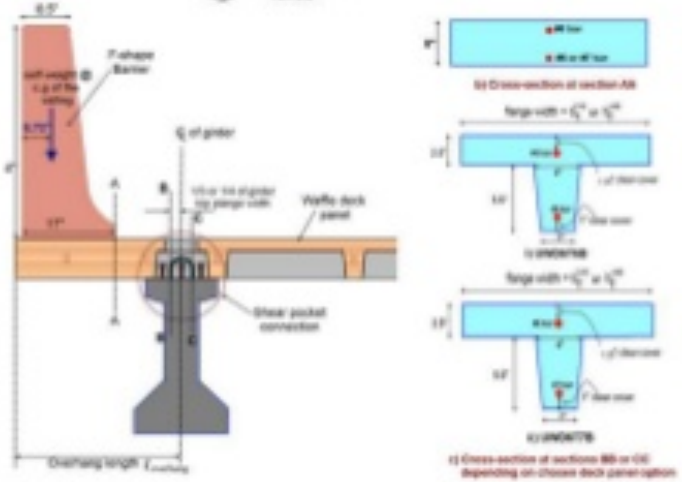
Reinforcements of Waffle Slab







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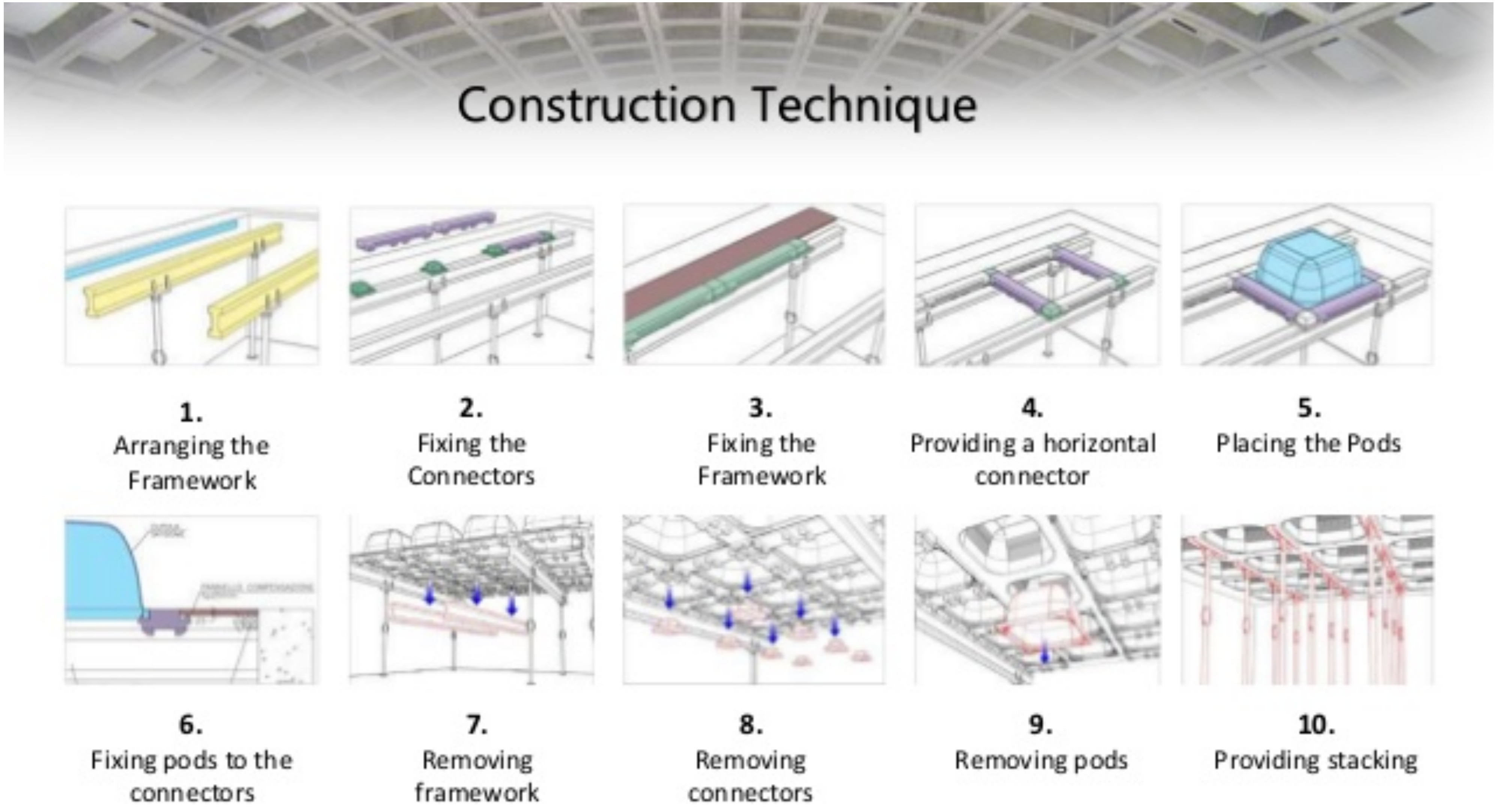
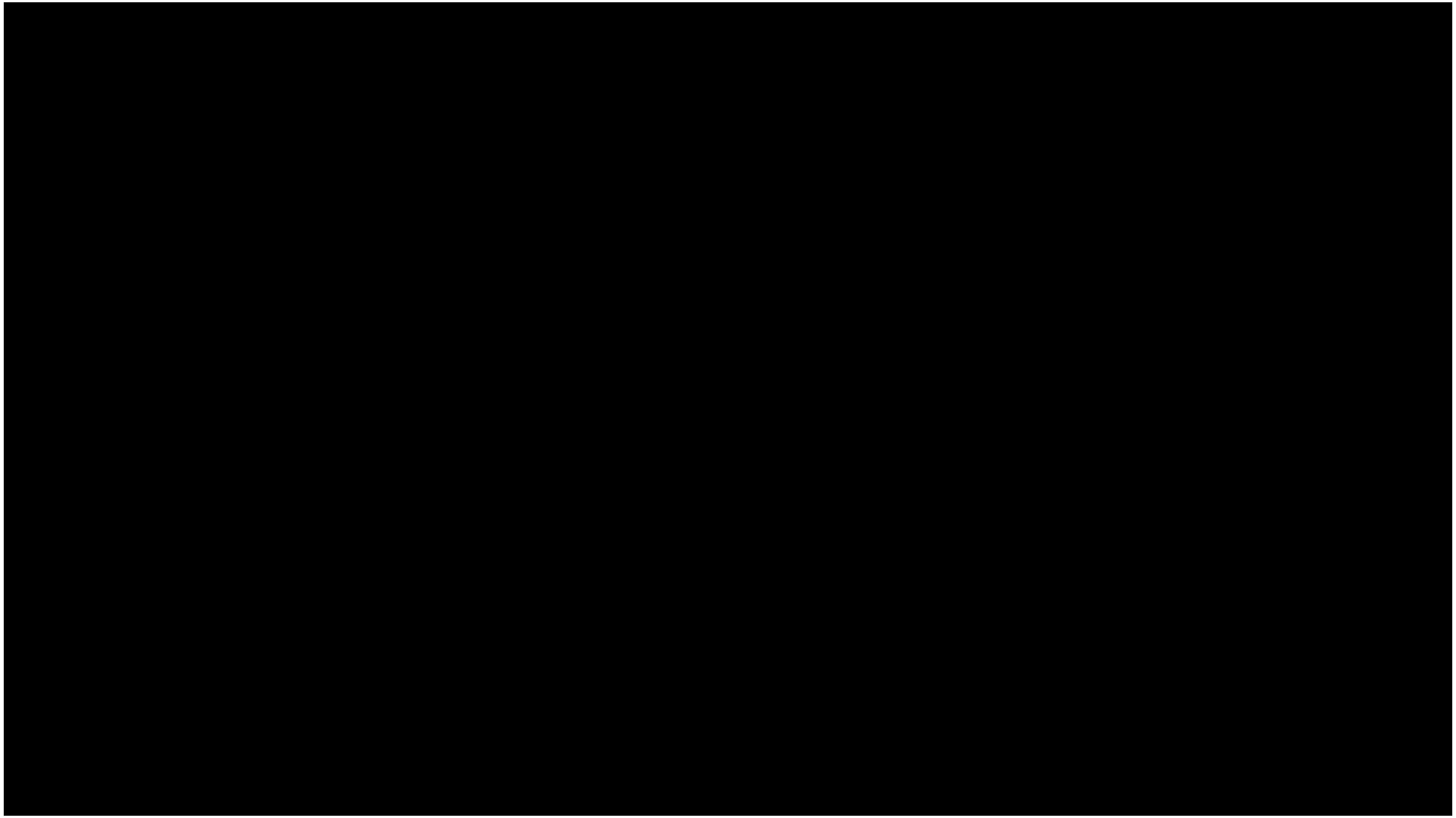


https://image.slidesharecdn.com/presentation1-160110103317/95/flat-grid-waffle-slab-14-638.jpg?cb=1452422556

Waffle-Crete Disaster Resistant Construction



https://www.youtube.com/watch?v=j3DhIS4qn8k

The Waffle-Crete Advantage

At the heart of the Waffle-Crete Building System

- **Waffle-Crete molds are lightweight and portable**
- **Concrete panels can be cast right on the job site**
- **Panels can be cast one day and erected the next**

A Typical 6m Waffle-Crete Wall Panel

An entire side of a house can be cast in one panel

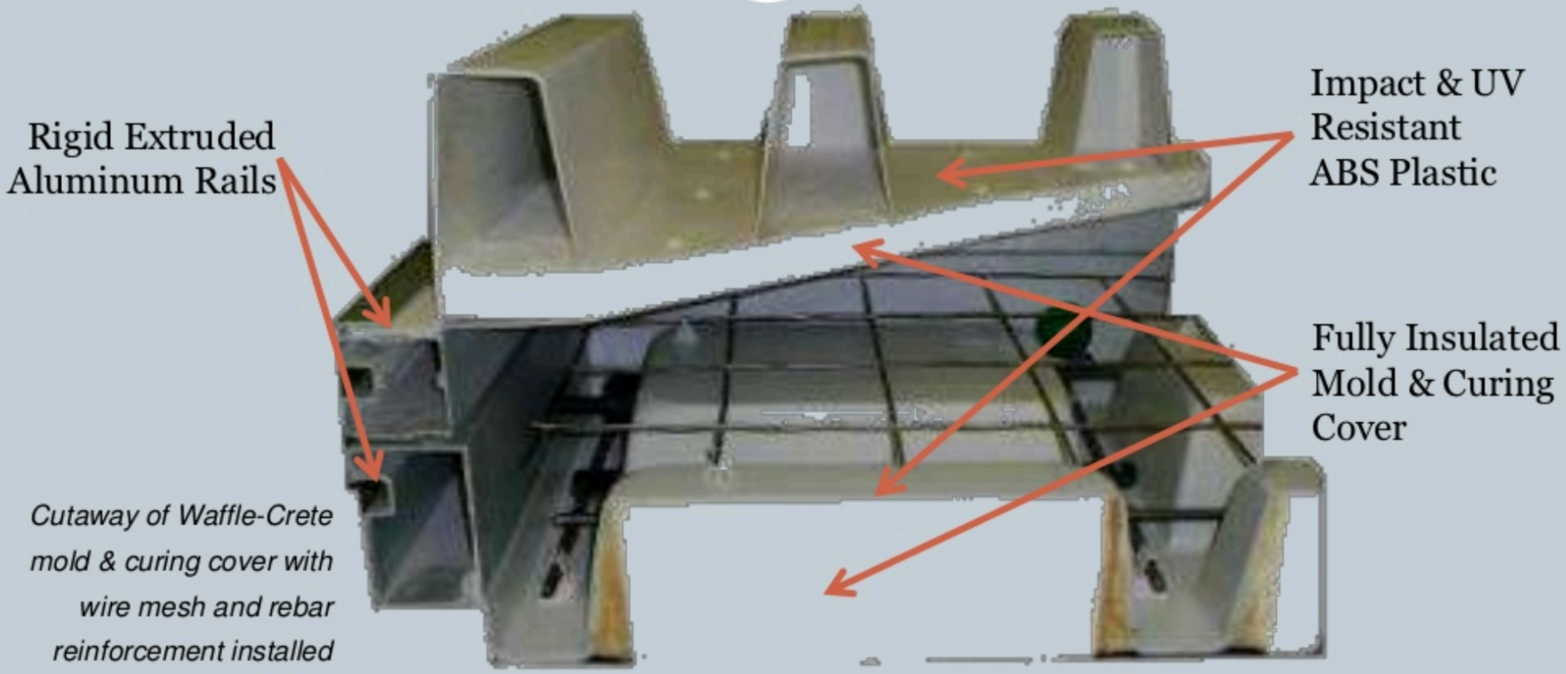
The Strength Is In the Ribs!

The vertical ribs act like columns

The Strength Is In the Ribs!

Up to <u>60%</u> of the concrete and steel is eliminated between the ribs.

Anatomy of a Waffle-Crete Mold



Cutaway of Waffle-Crete mold & curing cover with wire mesh and rebar reinforcement installed

- Waffle-Crete molds are lightweight and portable and useful for all kinds of projects.
- A typical mold can be used up to 500 times before needing repairs or replacement.
- With care, curing covers will last indefinitely.

Waffle-Crete Can Involve the Local Community

- **Local unskilled workers can be trained in hours.**
- **No carpenters, masons, welders or other skilled labor is needed.**

Government subsidized apartments constructed in Guatemala

Panels Go Together Quickly & Easily

- **Unskilled workers can erect panels as well.**
- **A team of four workers can erect up to 25 Waffle-Crete panels a day.**

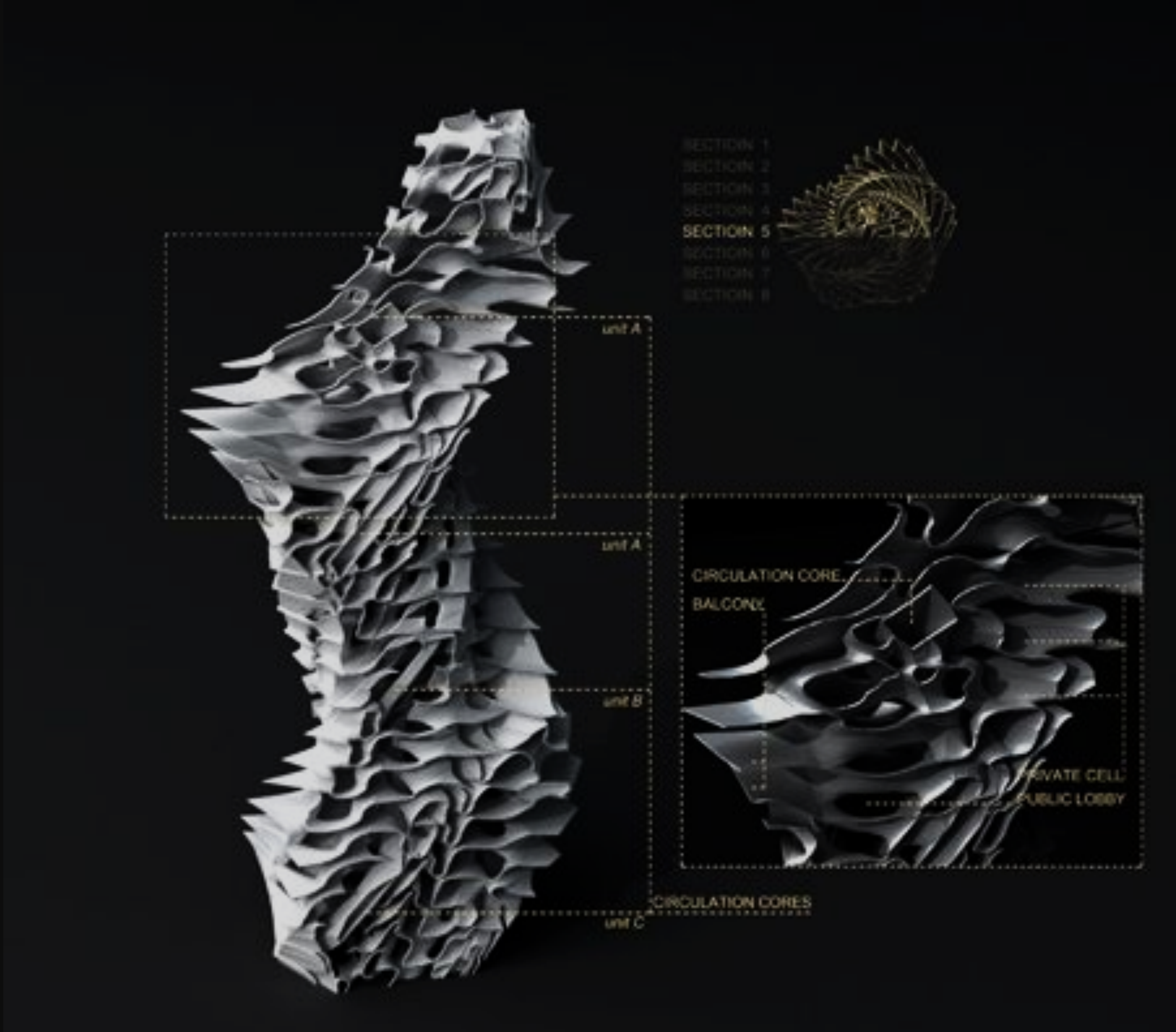
More Examples of Waffle-Crete Projects

Steel columns supporting Roof

Waffle-Crete panels supporting roof

Waffle-Crete panels used as a curtain wall

WAFFLE STRUCTURE IN PARAMETRIC DESIGN



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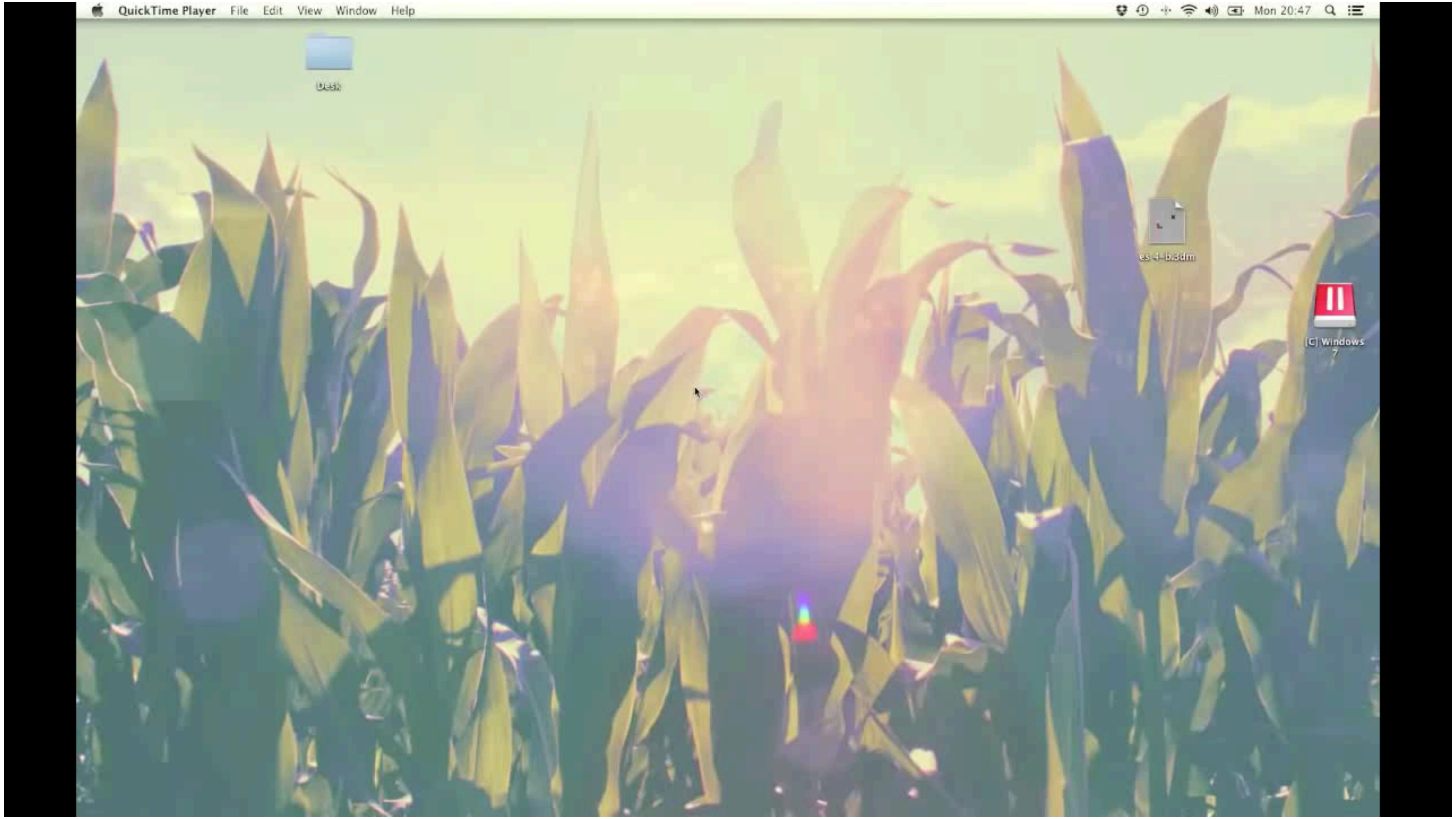
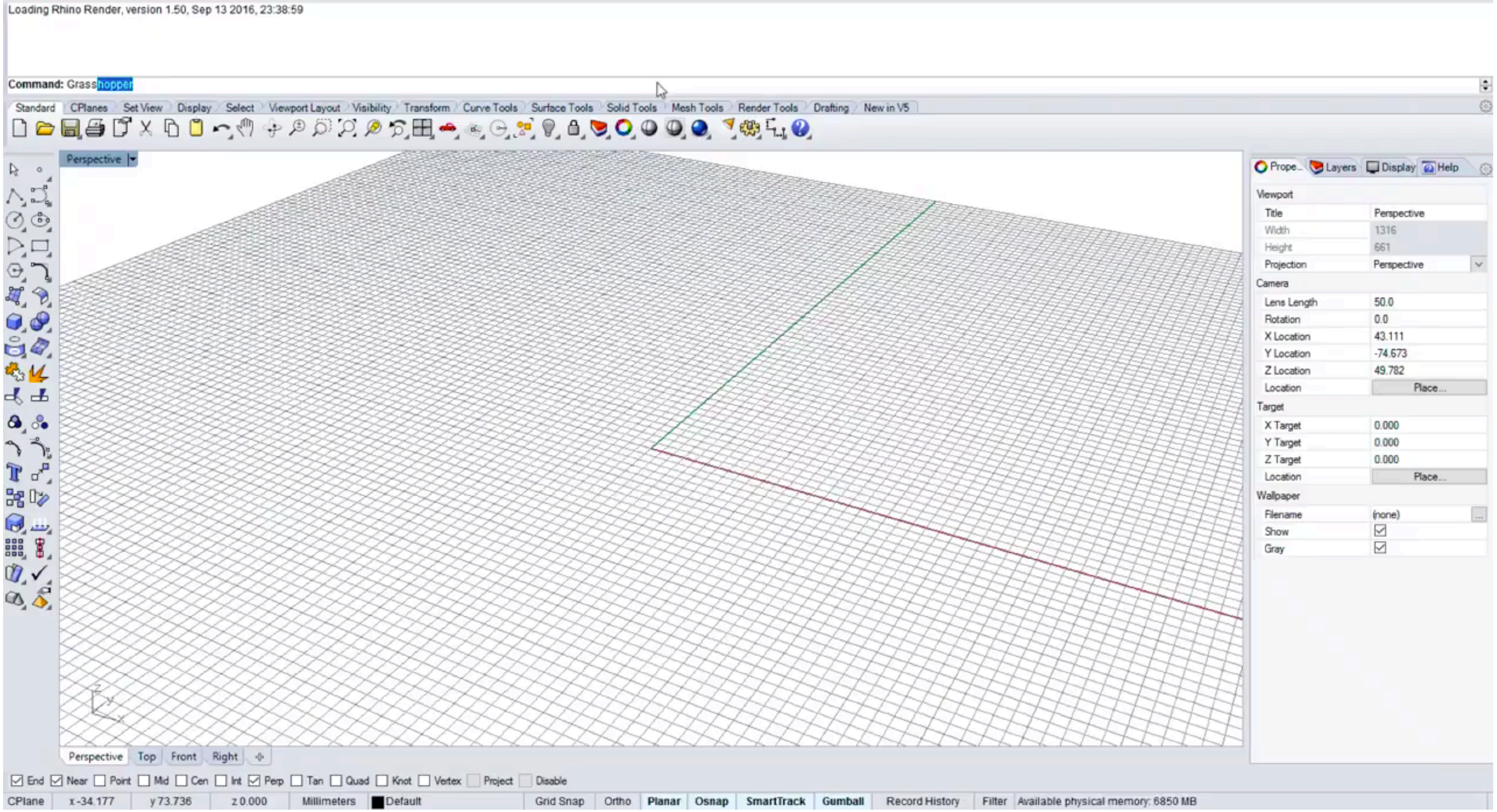
Waffle Structure tutorial (Rhino + Grasshopper)



https://www.youtube.com/watch?v=gmsrgbPTmjQ&t=512s

Waffle Structure on unconventional shape (fast version)



https://www.youtube.com/watch?v=_xJzzzScjIU

Slow Version: https://www.youtube.com/watch?v=66yUmXUCcTo

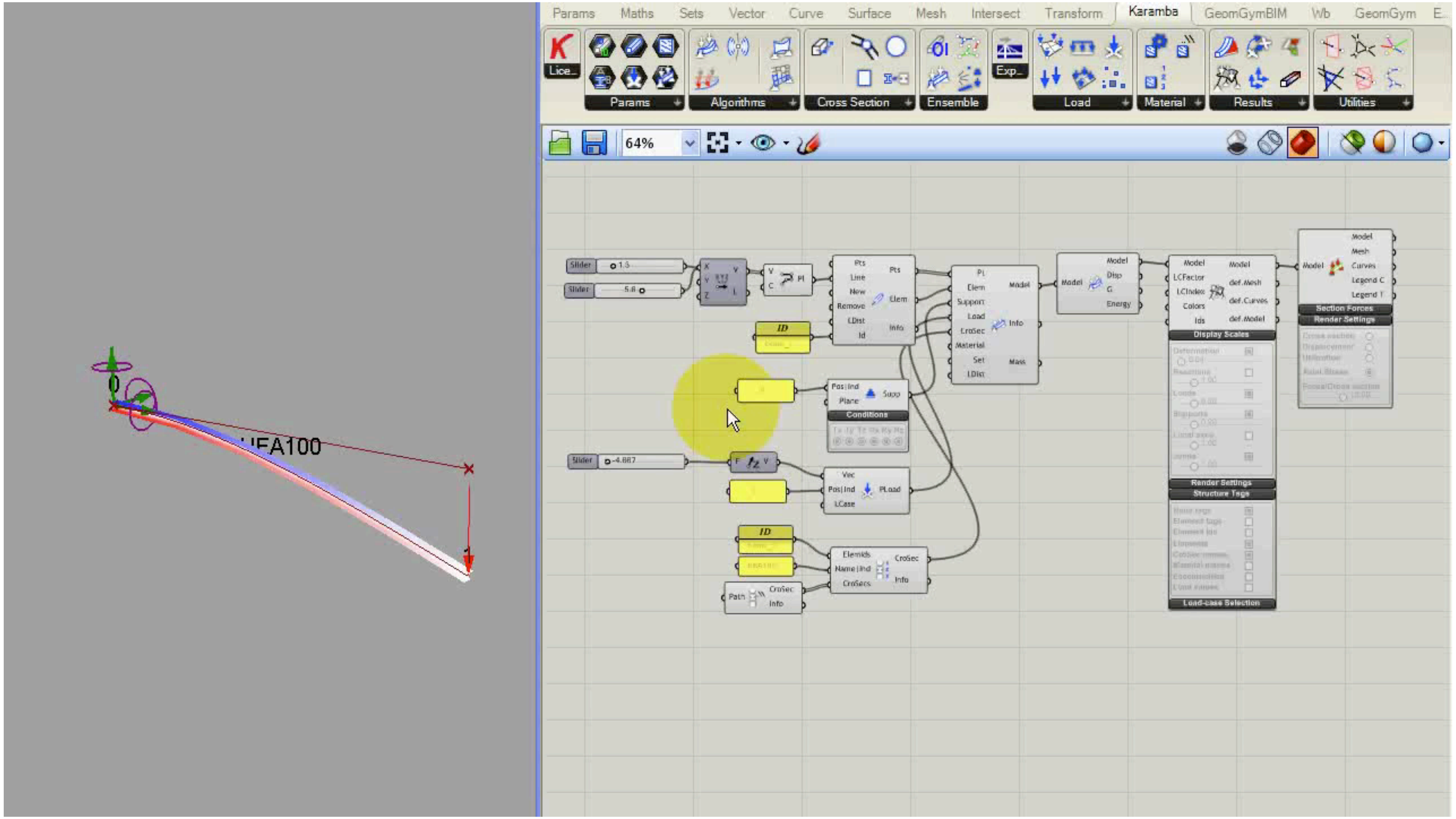
MATERI RADIAL WAFFLE STRUCTURE
(PAK AGUS)

PARAMETRIC DESIGN – STRUCTURAL ANALYSIS

Karamba
parametric engineering

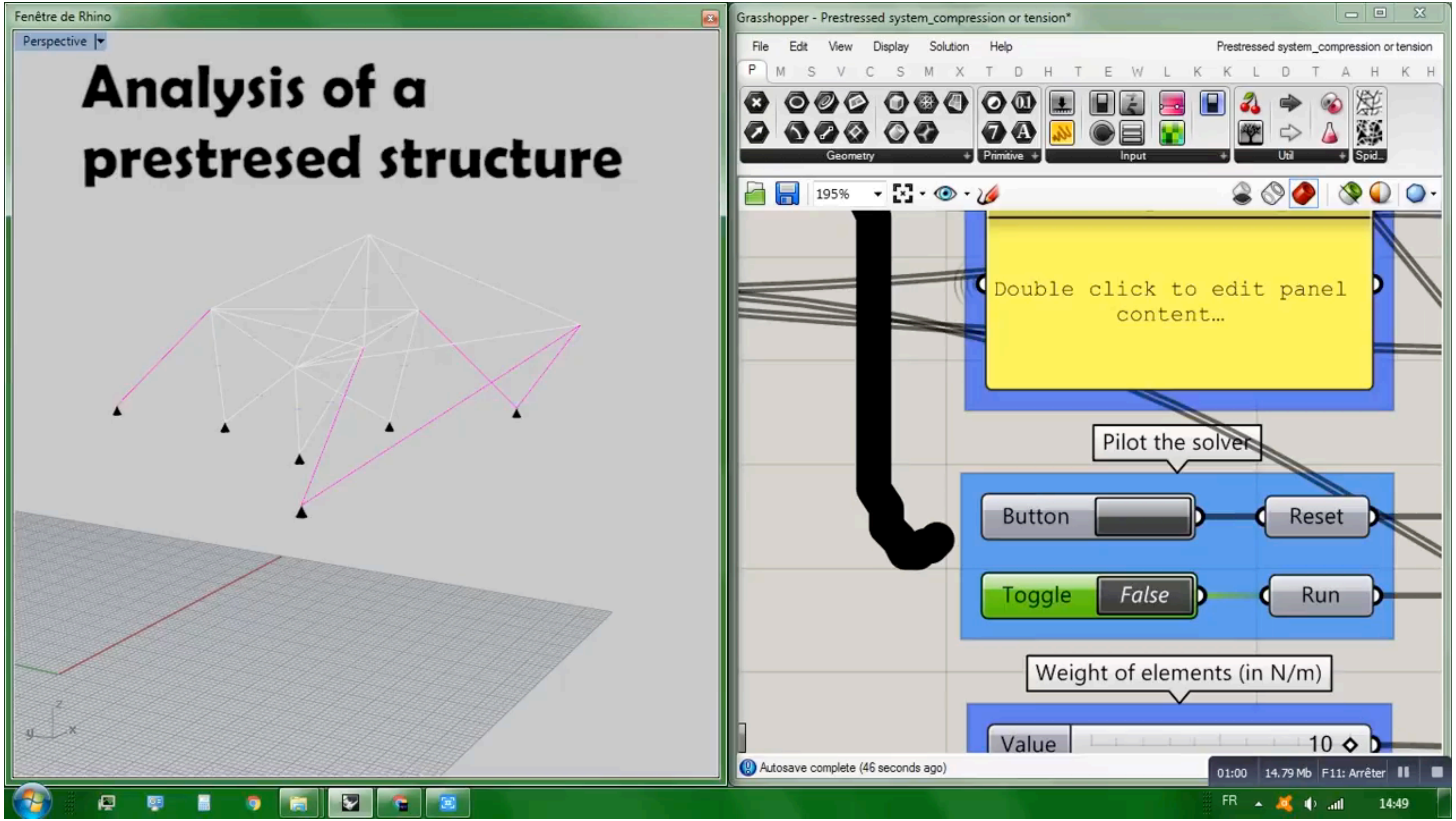
+

Karamba simple parametric truss



https://www.youtube.com/watch?v=k8KSadEPnaA

Kangaroo Pre-stressed structure analysis



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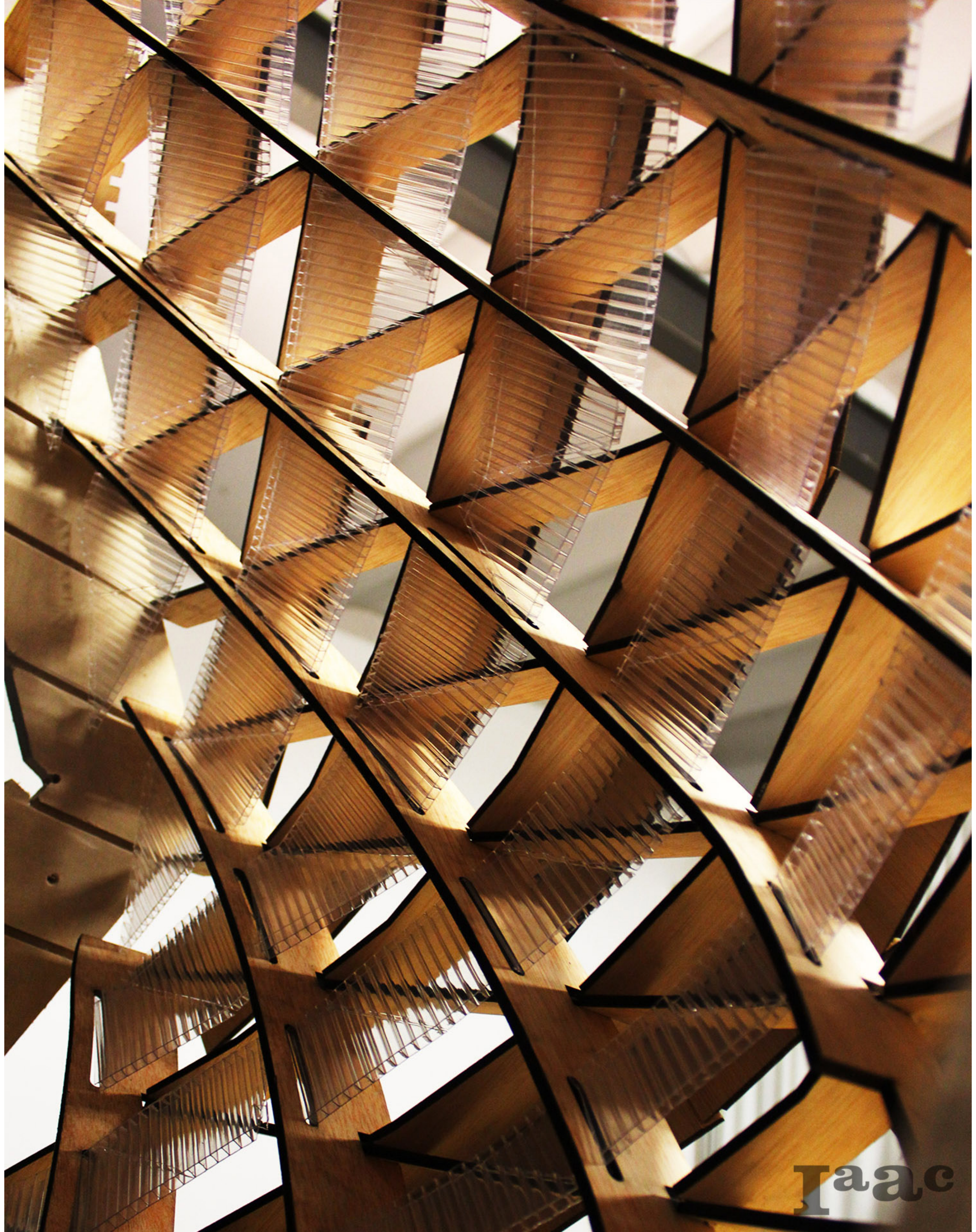
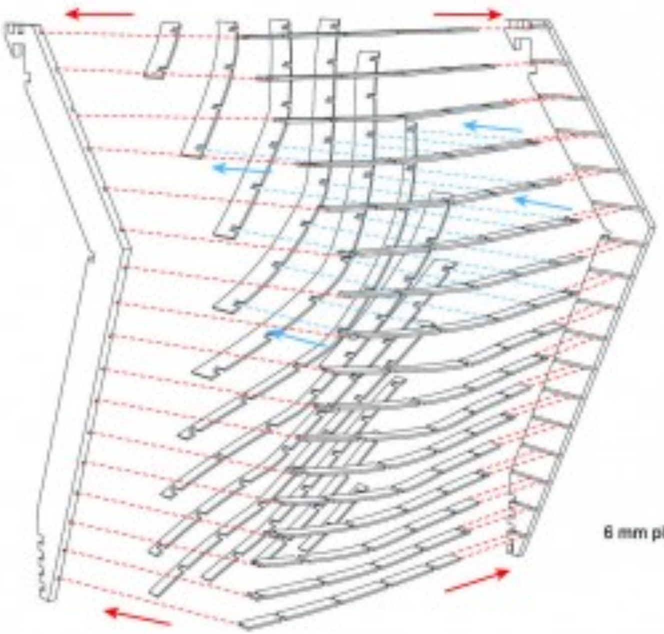
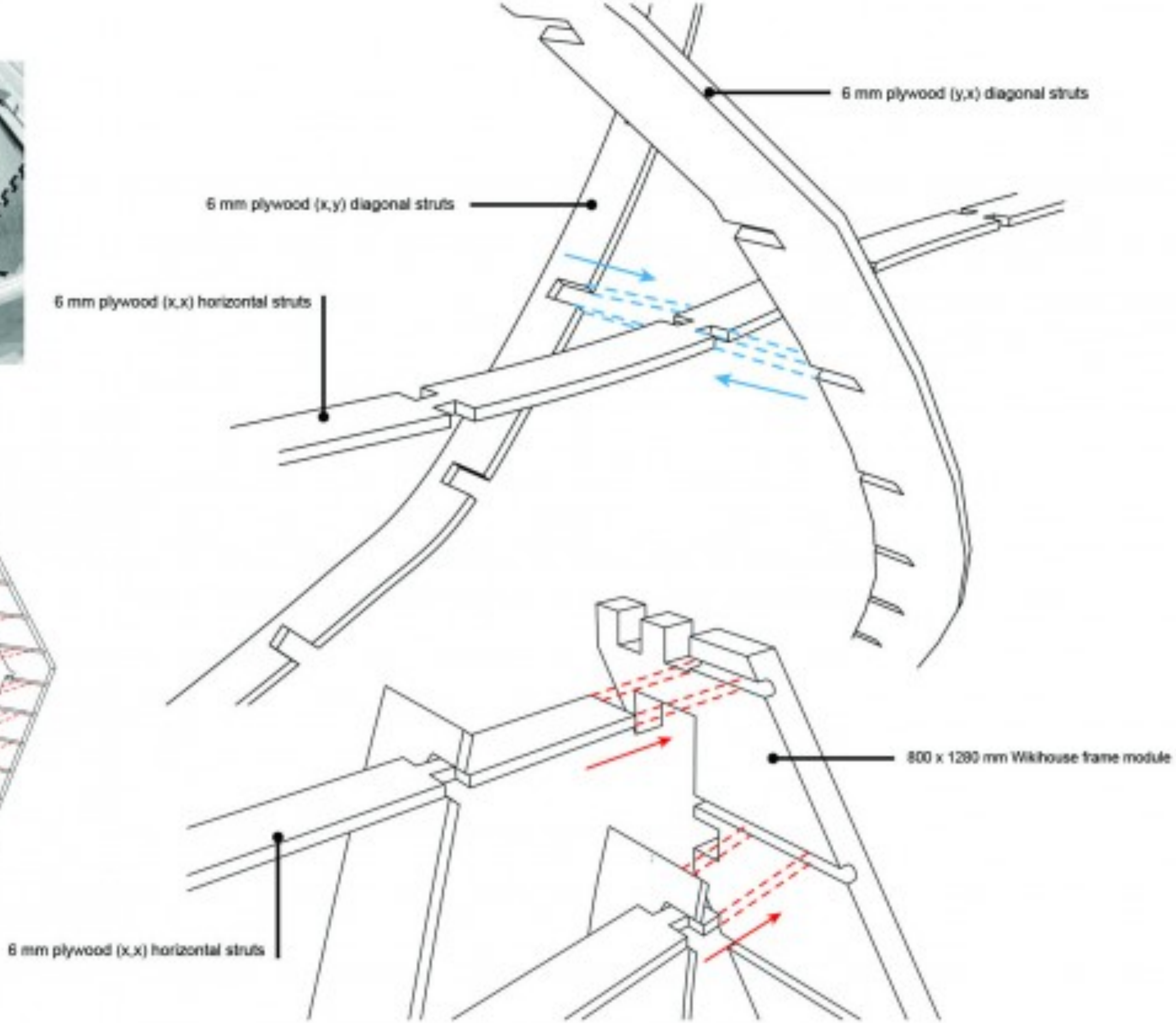
WAFFLE STRUCTURE
FABRICATION



TRI-AXIAL 'WAFFLE' FAÇADE
INSTITUTE FOR ADVANCED ARCHITECTURE OF CATALONIA

http://www.iaacblog.com/projects/tri-axial-waffle-facade/





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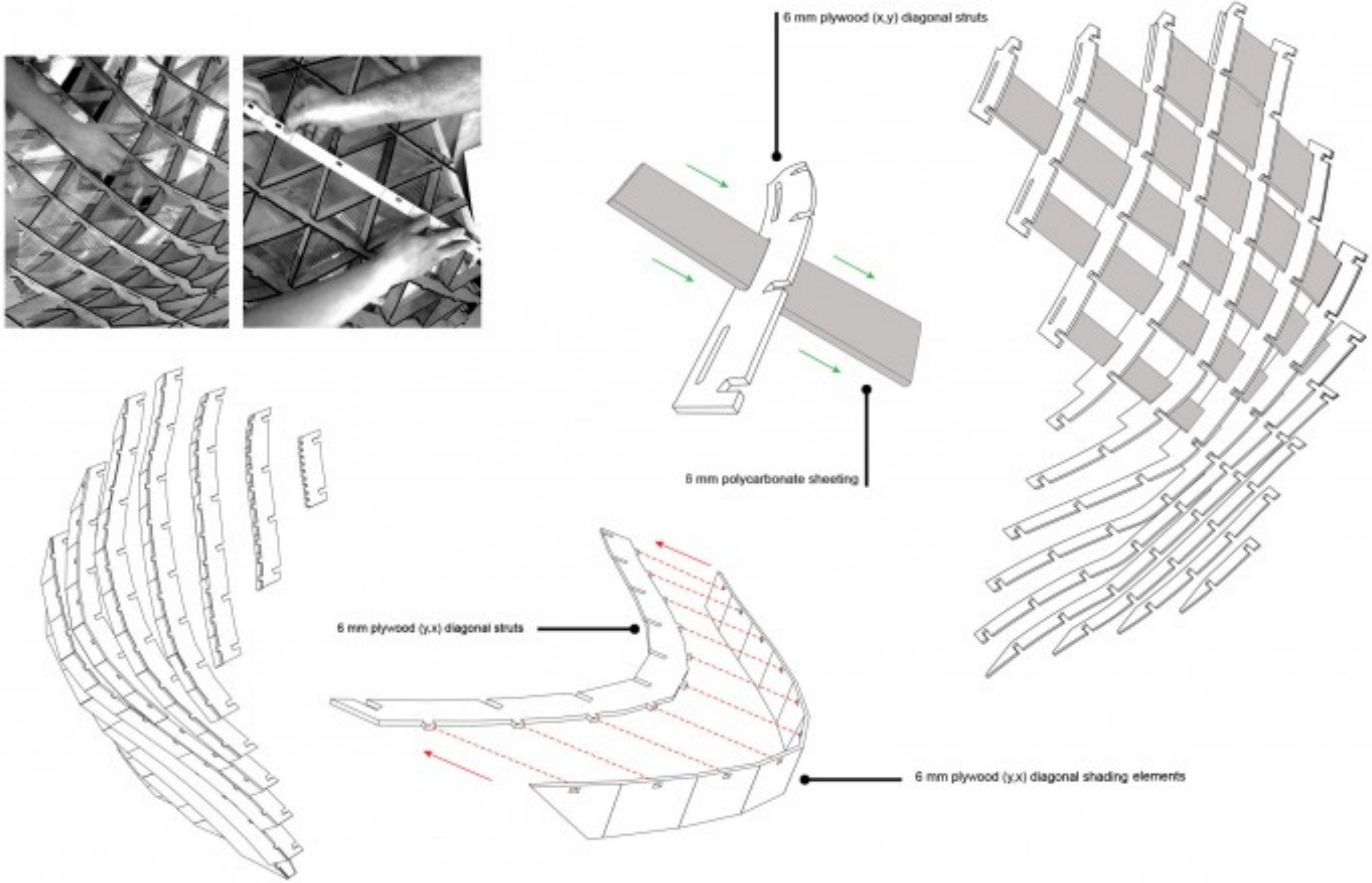

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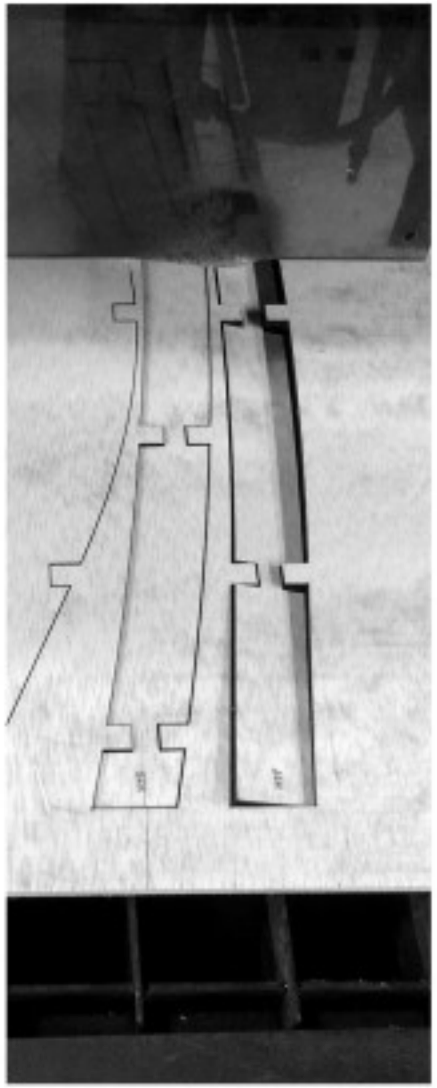

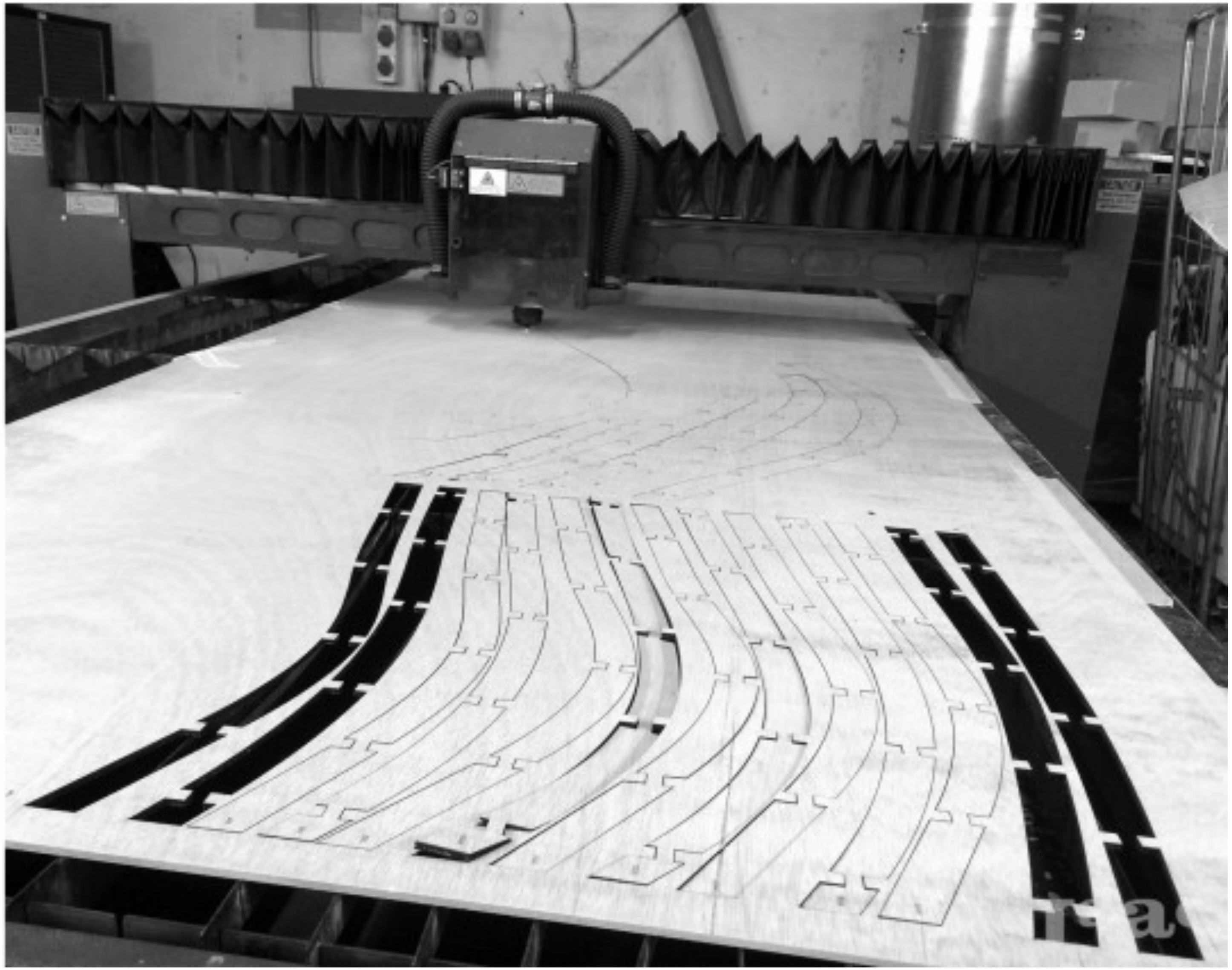

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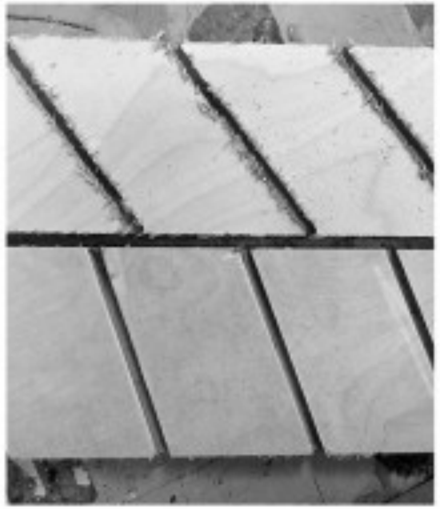

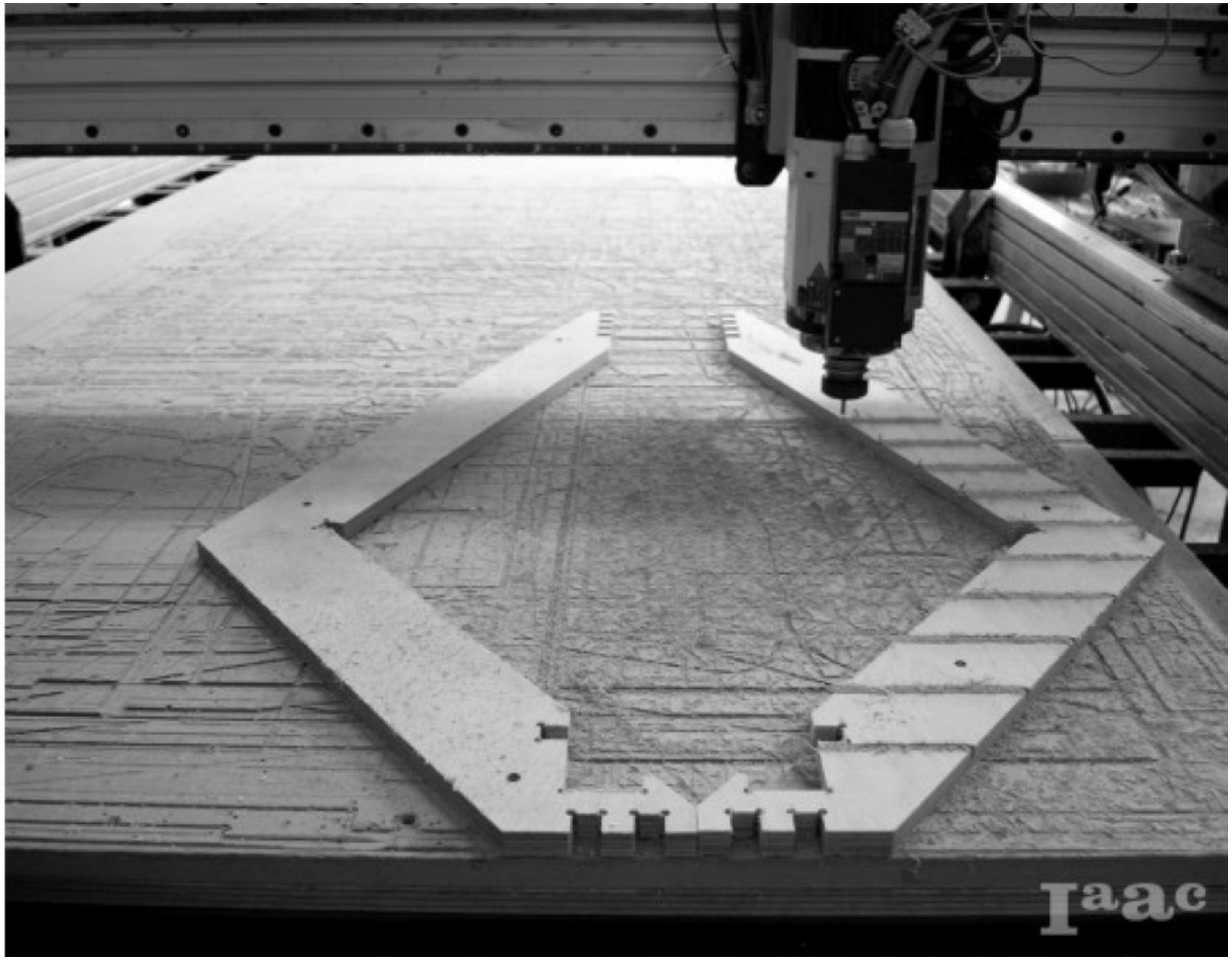

http://www.iaacblog.com/projects/tri-axial-waffle-facade/

WAFFLE STRUCTURE FABRICATION

Project Example (Parametric Design + Fabrication):

Waffle Structure on Sinuous Form

https://www.youtube.com/watch?v=keCnX7MTygQ