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4.510 Digital Design Fabrication
Fall 2008

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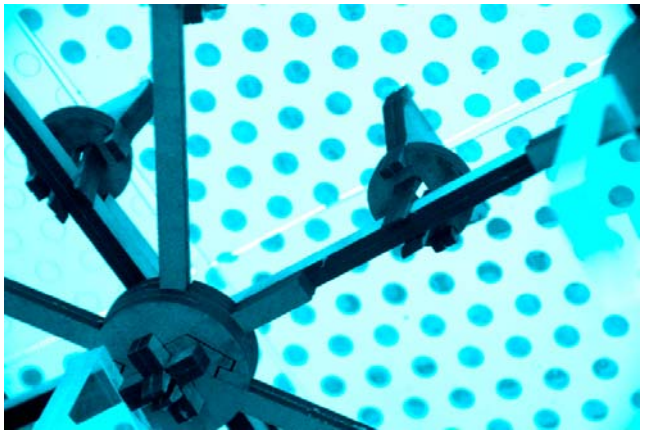
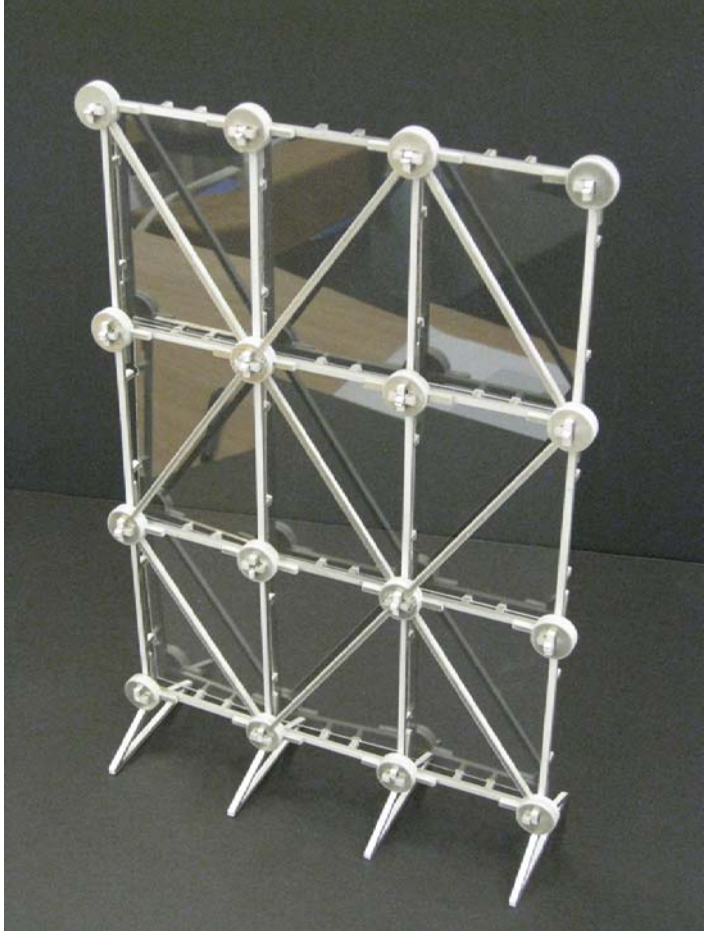


polka dot matrix:

An Exploration of Variation and Parametricization



variation

the 9X9 wall exhibits what we have identified as variation.
a fixed number of parts that can satisfy all normative conditions, whose amount may change, but never their morphology

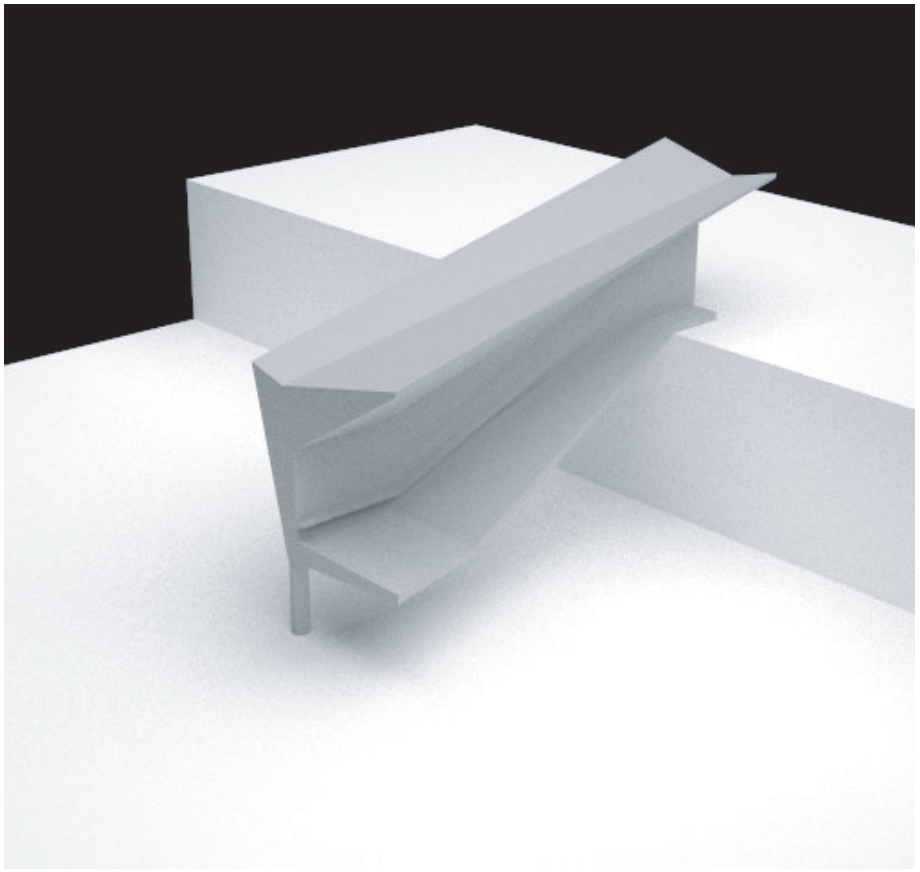
intent

*to investigate the implications of **variation** versus **parametricization**.*

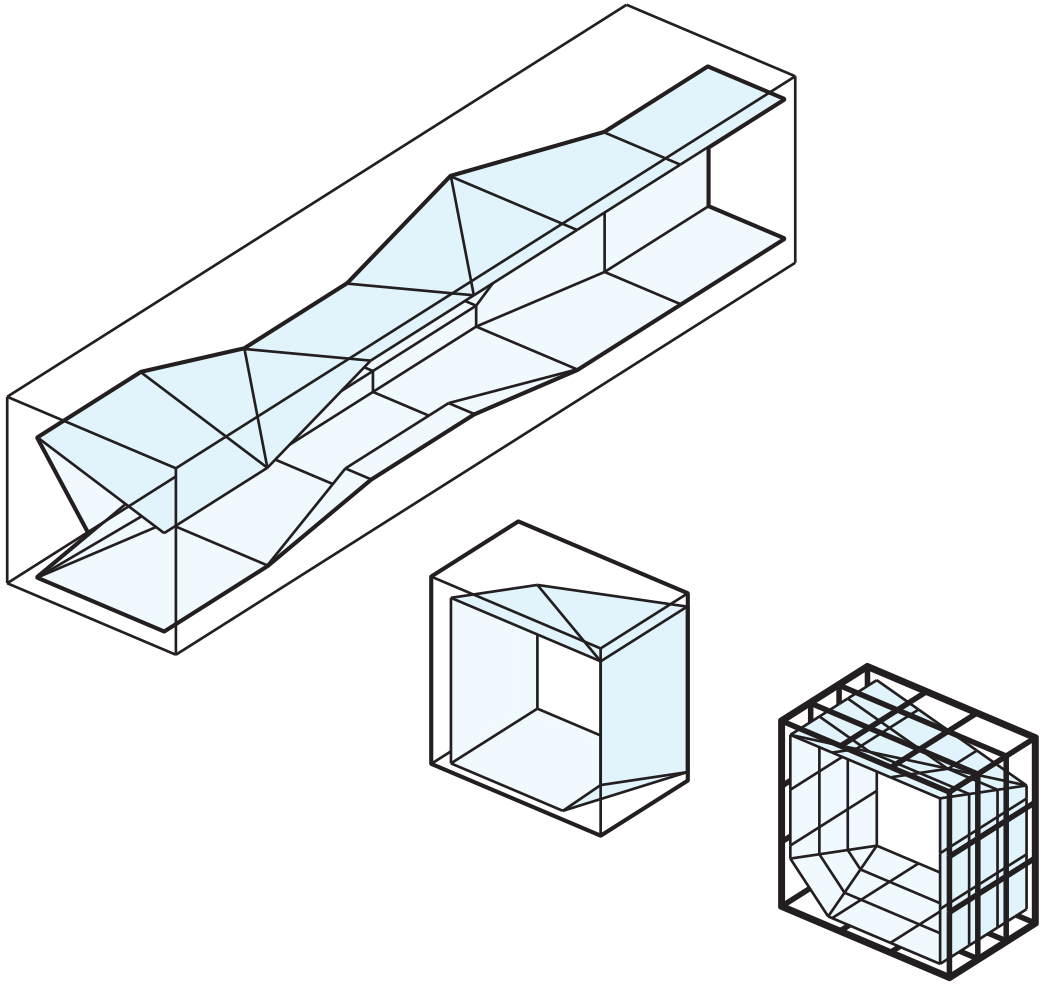
procedure

by segregating the skin from the structure,
the structure can be regularized and the skin can expressive
and elements that vary parametrically can be isolated.

rather than adjust all structural elements to fit the skin, only clips holding the skin back to the structure need to have parametric variation.



Design Model

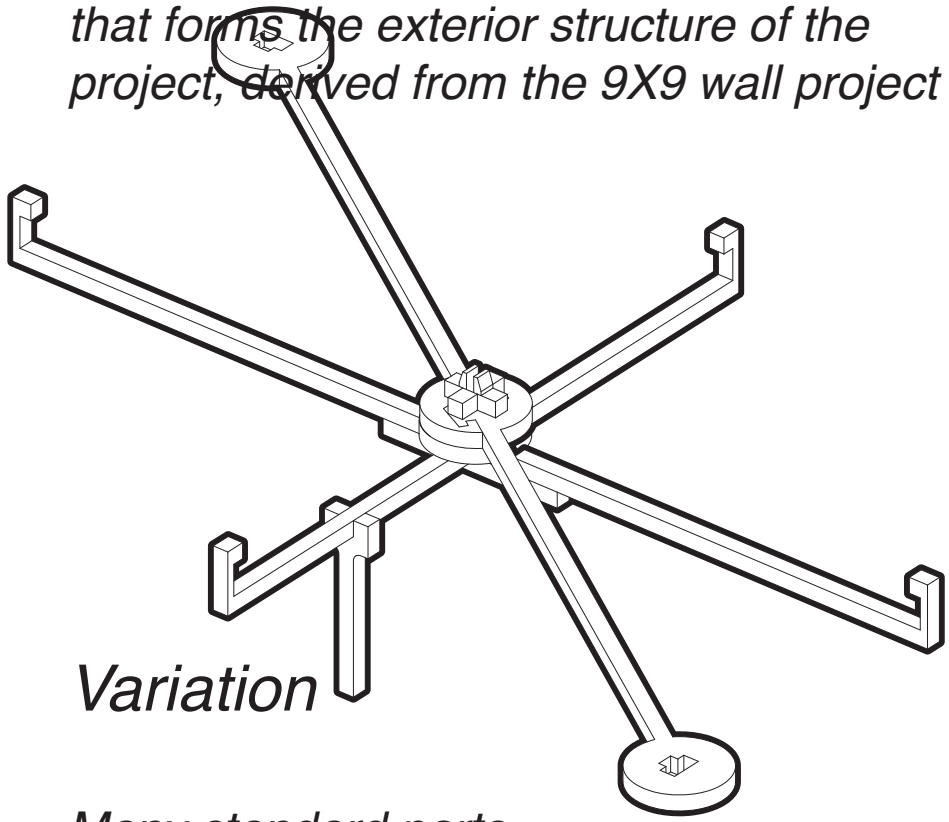


Design Vignette

Separation of regular structure
and eccentric skin

Structural Logic -

A standardized set of 17 repeatable parts that forms the exterior structure of the project, derived from the 9X9 wall project

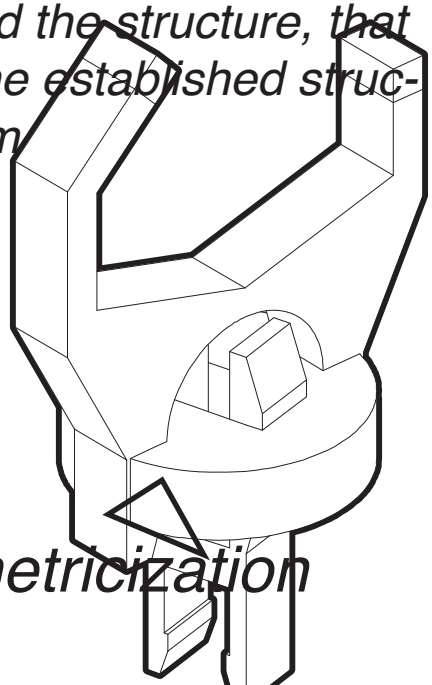


Variation

Many standard parts

Skin Logic -

A single unit with adjustable parameters that can be altered to fit any condition between the skin and the structure, that clips into the established structural system



Parametricization

many unique parts, but not nearly as many as would be required in a parametric structure

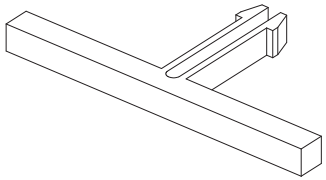
procedure

by reducing the structure to the smallest number of repeatable and standard parts

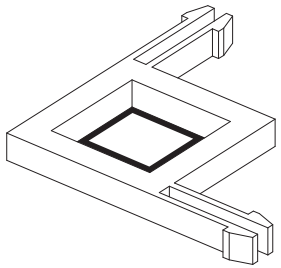
and developing an adjustable clip system that can addresses the manifold conditions required to support the interior skin

parametric clips,
not a parametric structure

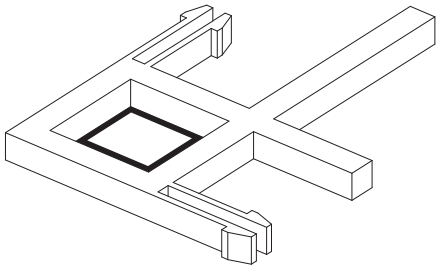
Pins



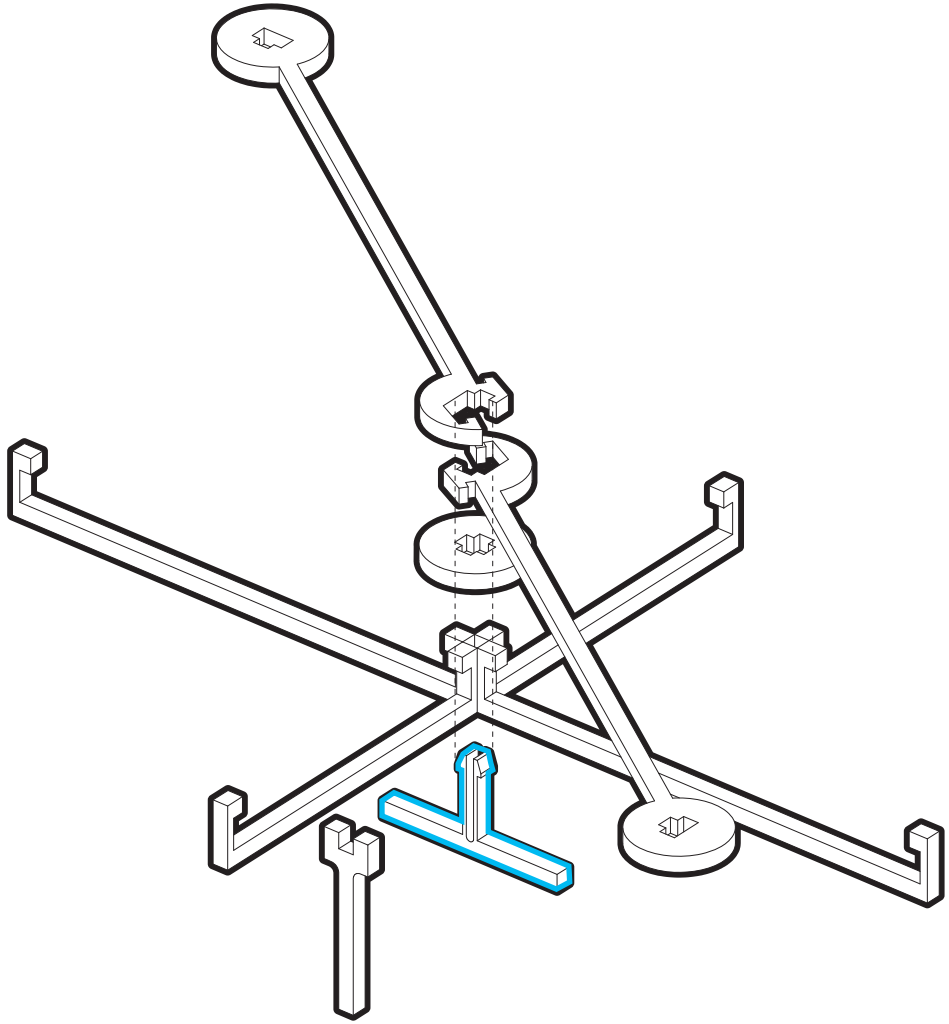
Field Condition - Transfers bending across beams, ties together joints



Corner - Provides moment at horizontal and vertical intersections



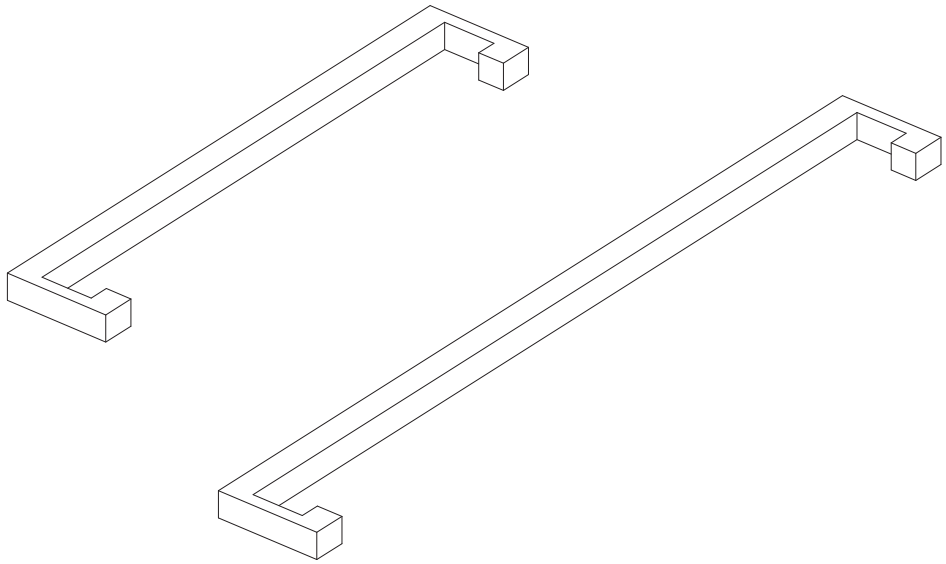
Base - Provides moment and transfers load to columns

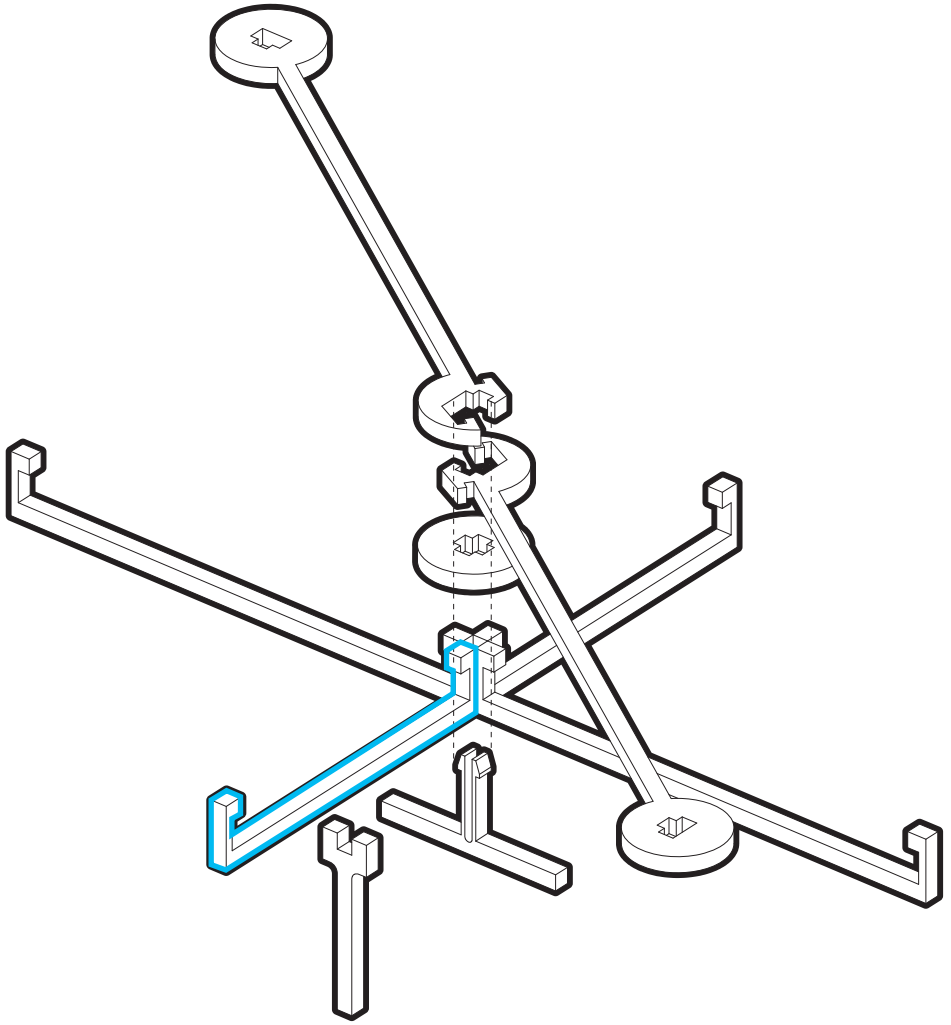


Structural Component Families

Beams

A standard set of only two variations in length for the entire structure

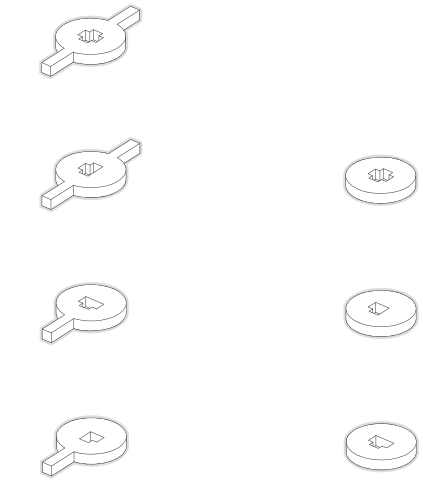


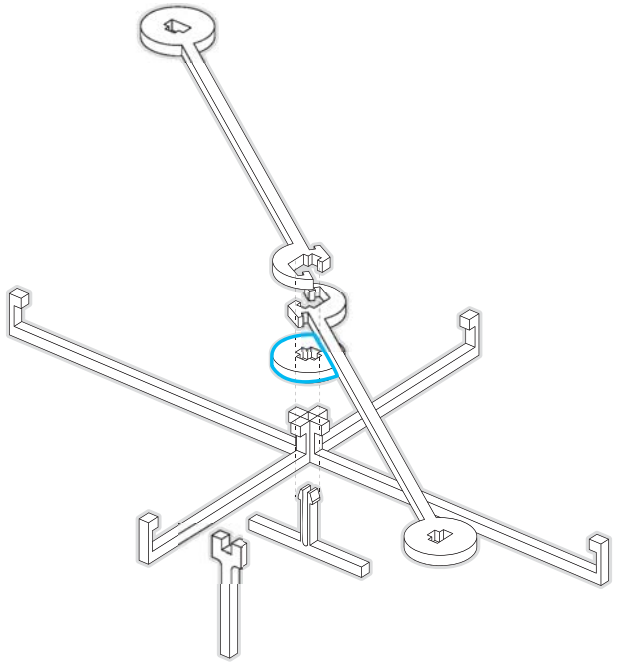


Structural Component Families

Blocking and Cross-bracing

Cross-bracing along with blocking transfers load through the joint, and bending between beam in addition to resisting wracking





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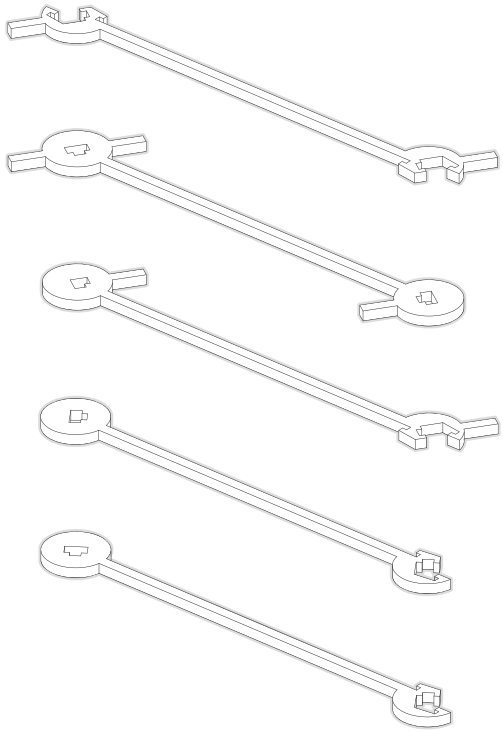
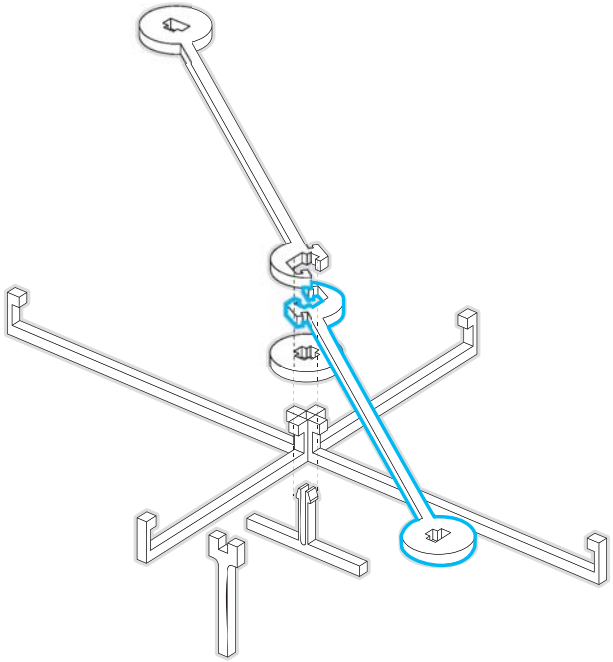
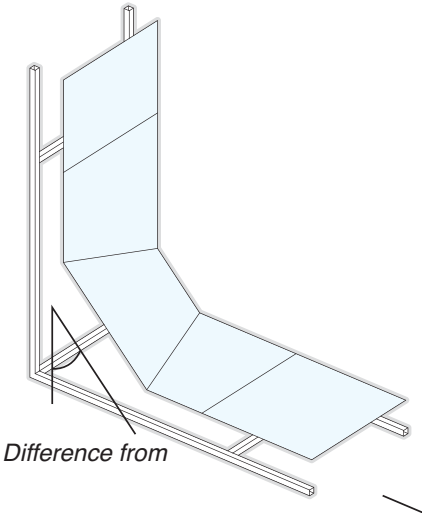


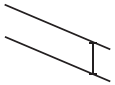


Structural Component Families

Skin Components

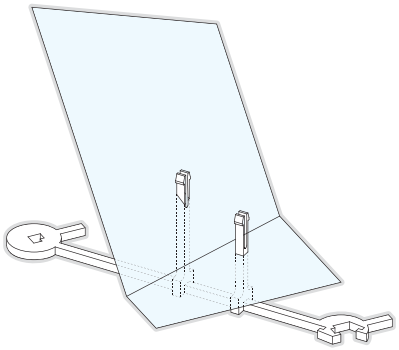


Skin Angle Difference from Structure



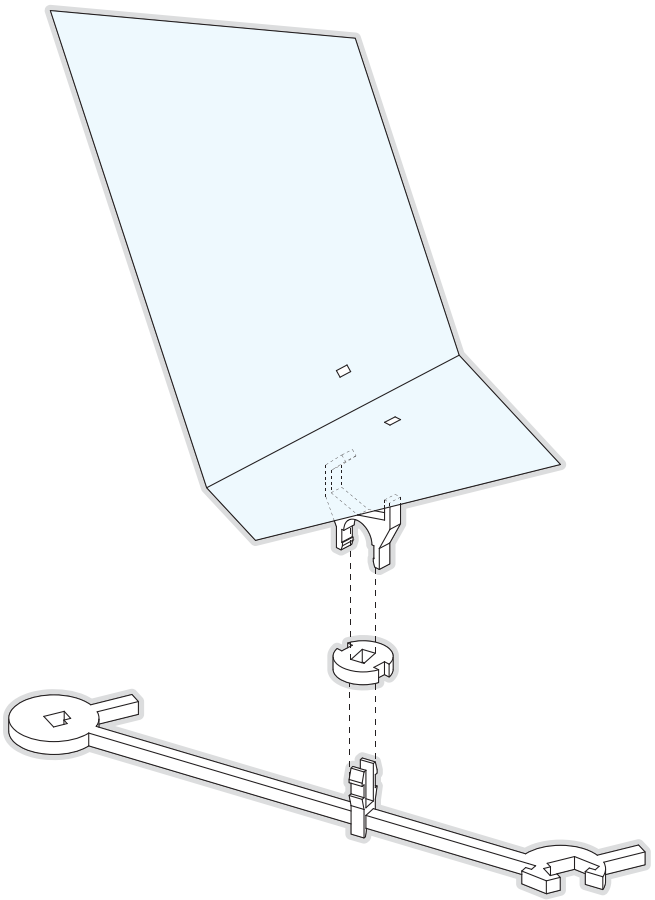
Skin Distance from Structure

Adjustable Parameters



Design Model

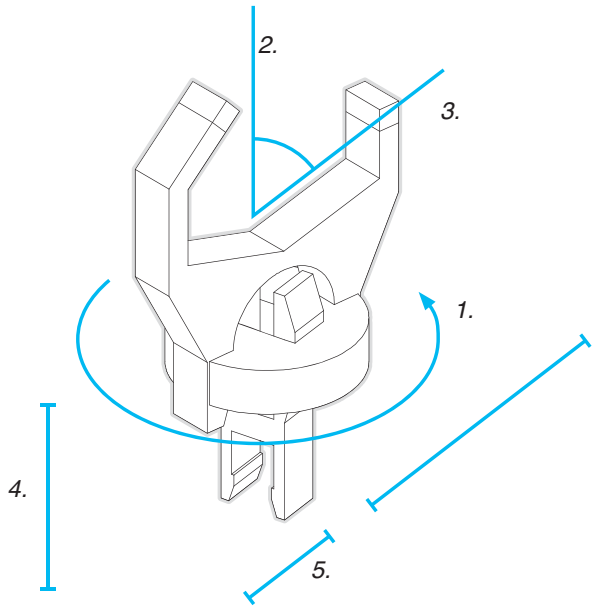
The skin to structure clip was intended to be a universal joint that could be applied to any location within the structure, provided the distance from the structre and the angle difference was minimized. Even working within this framework, the initial clip design exhibited its limited applicability and it became apparent that a more flexible system was required. The two axis system on the right works for nearly all the conditions, but a three axis system would be ideal, however such a system would require a redesign of the design model to accommodate its bulkiness.

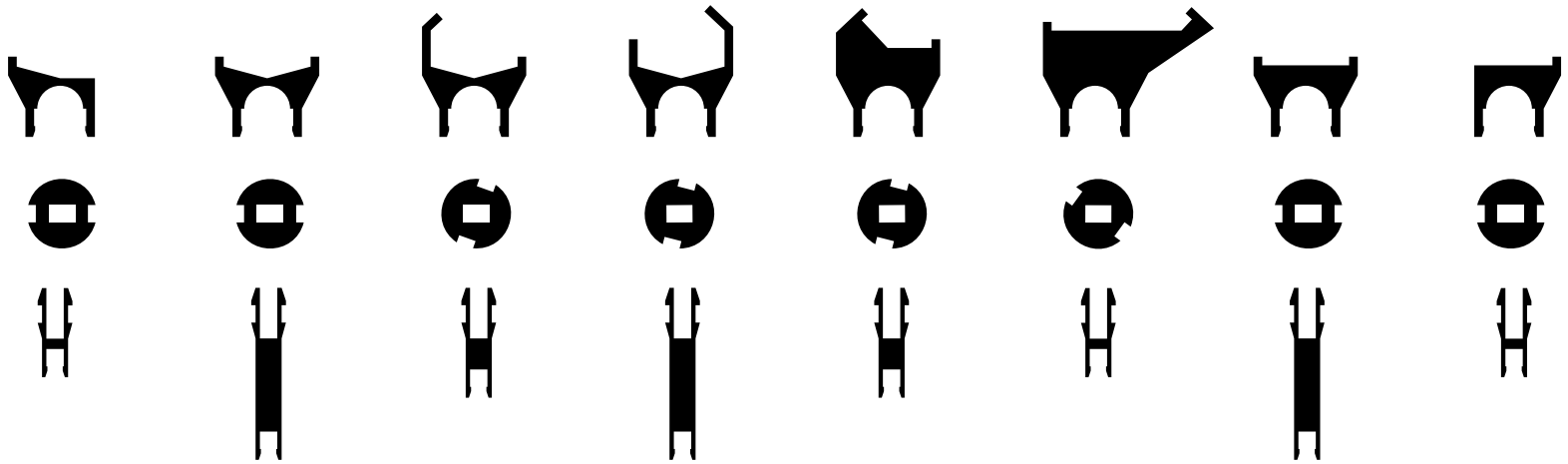


Construction Model

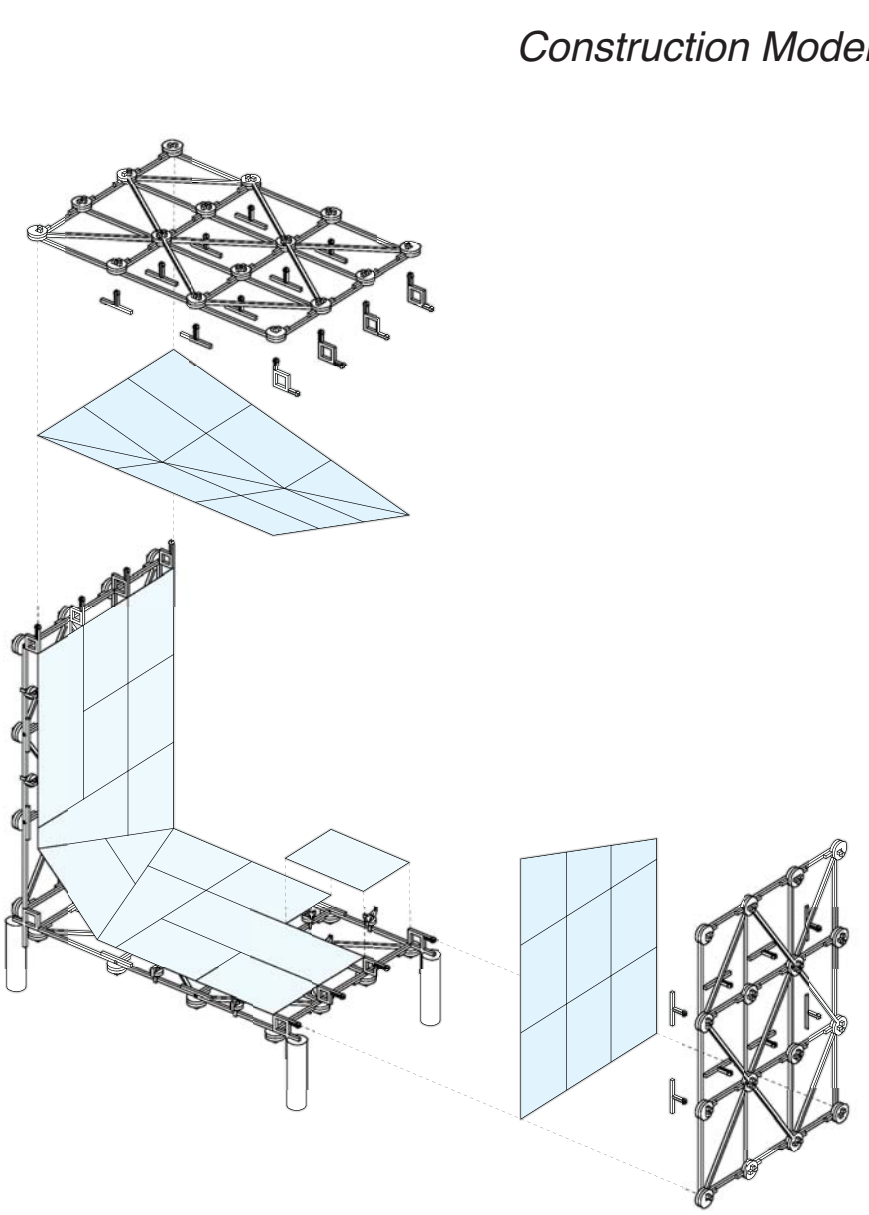
Clip Parameters

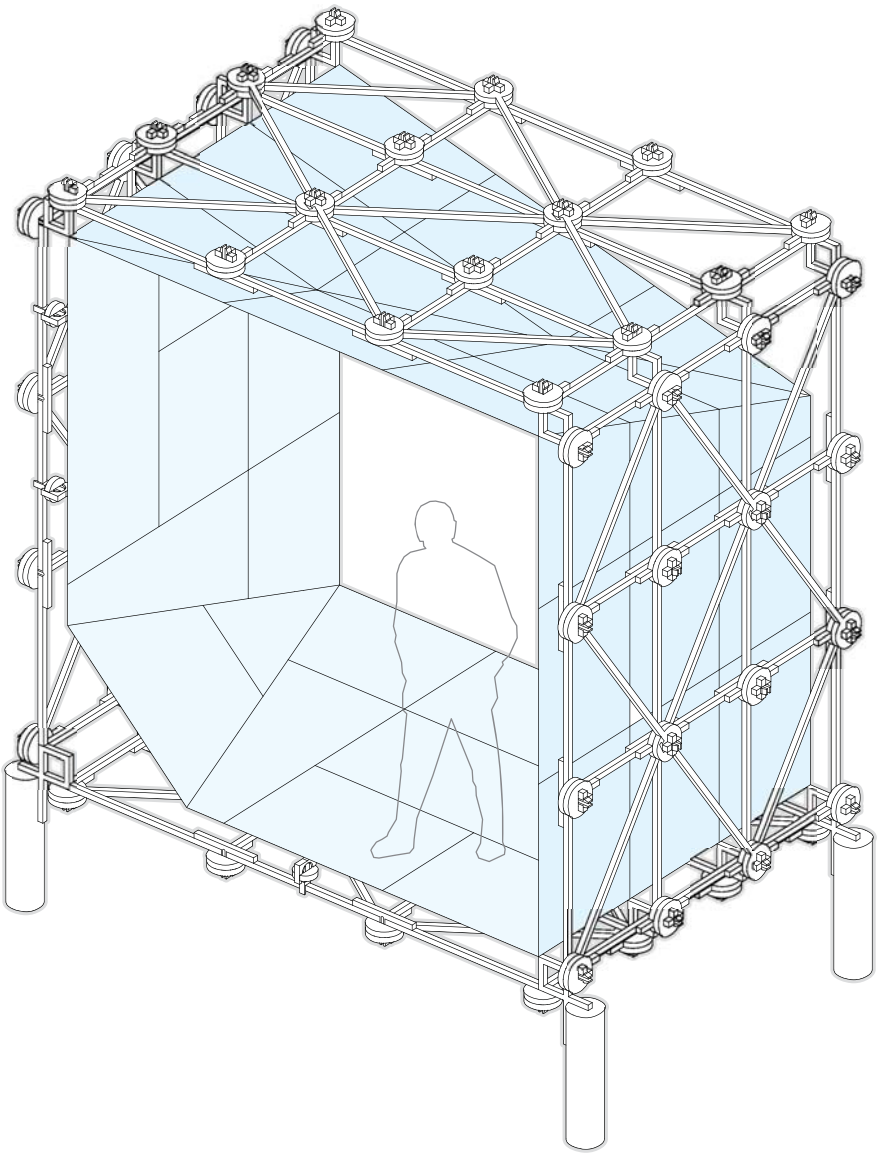
1. *Swivel Around central Axis*
2. *Arm Length*
3. *Arm Angle*
4. *Clip Length*
5. *Distance Along Beam/Cross-Brace*

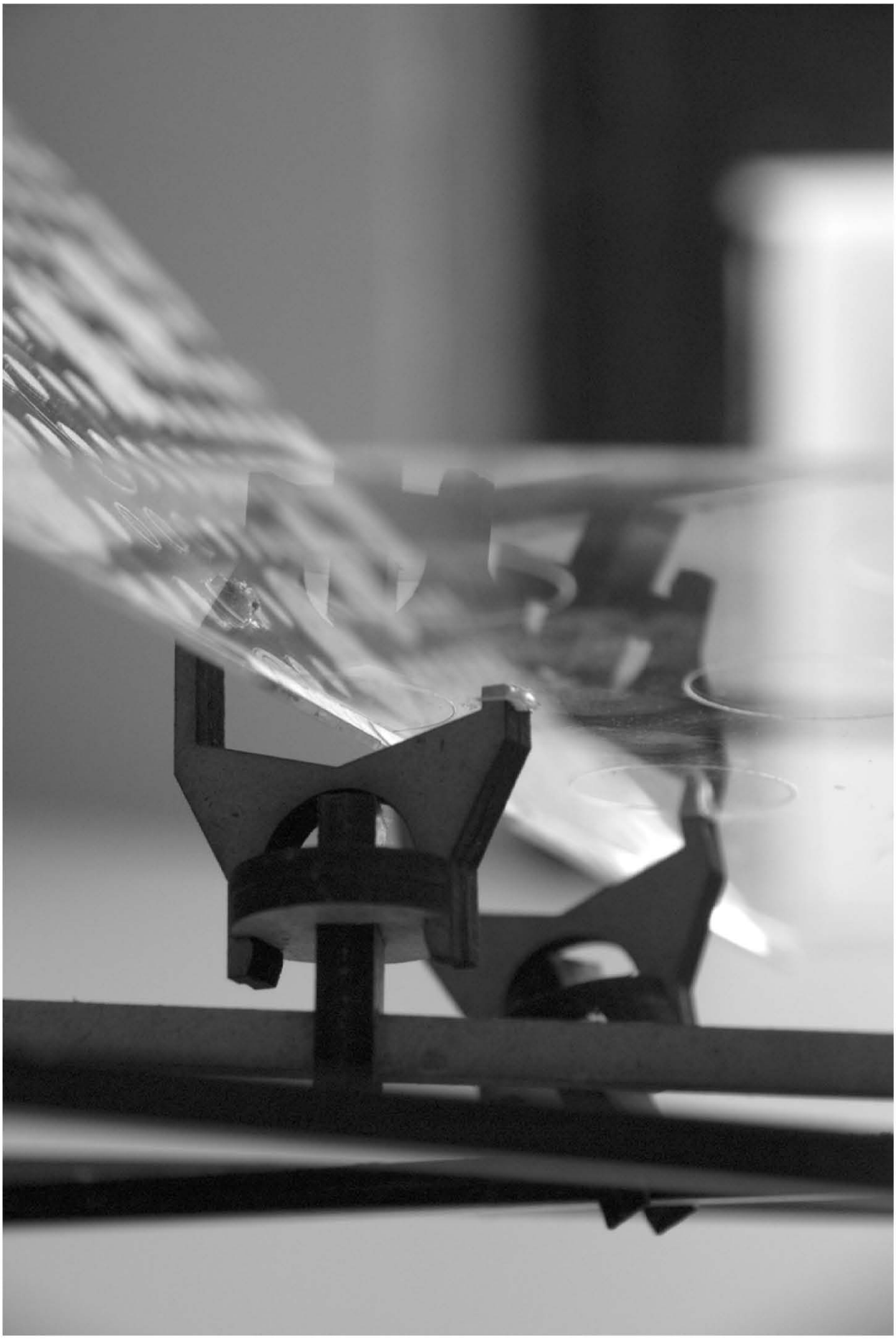


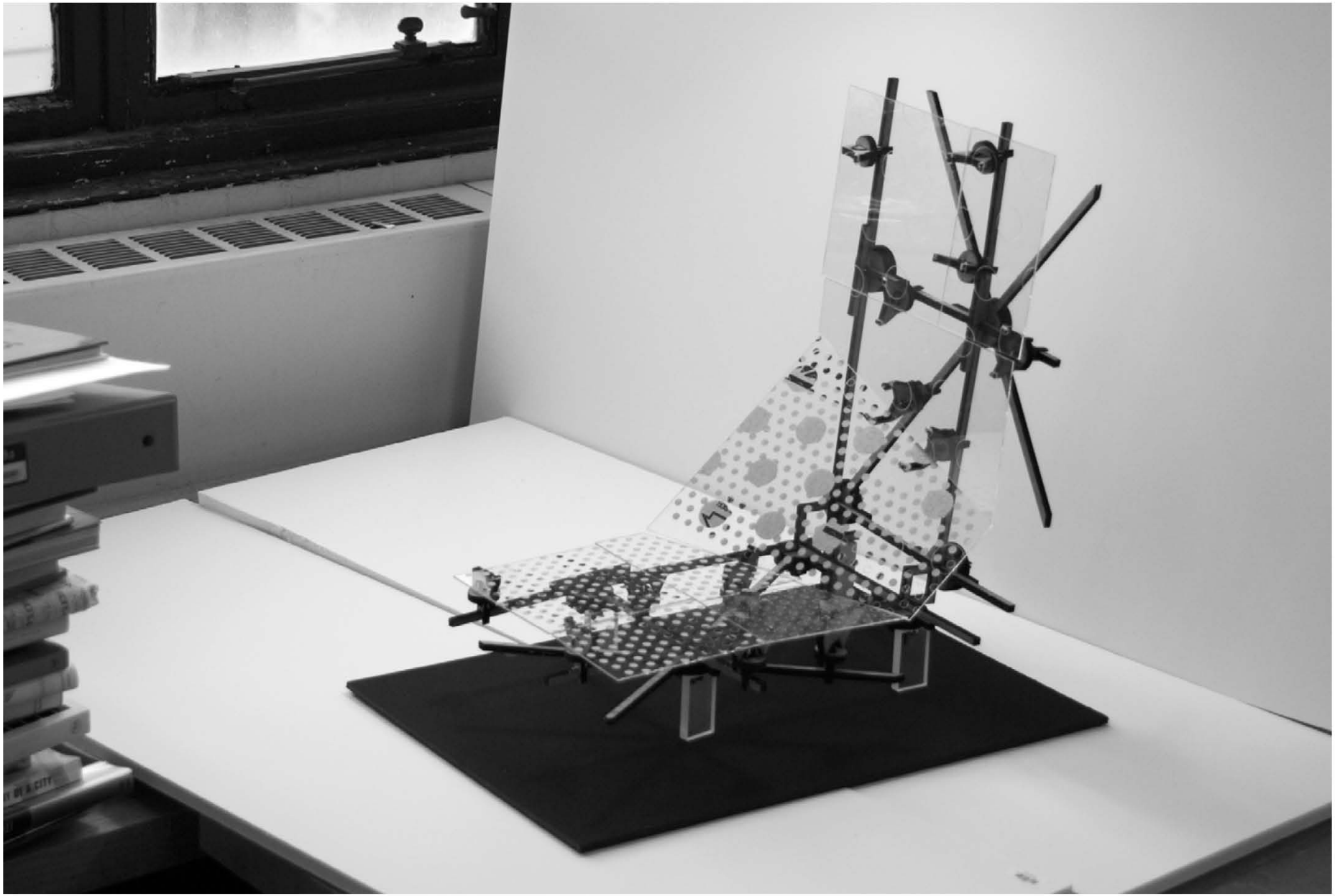


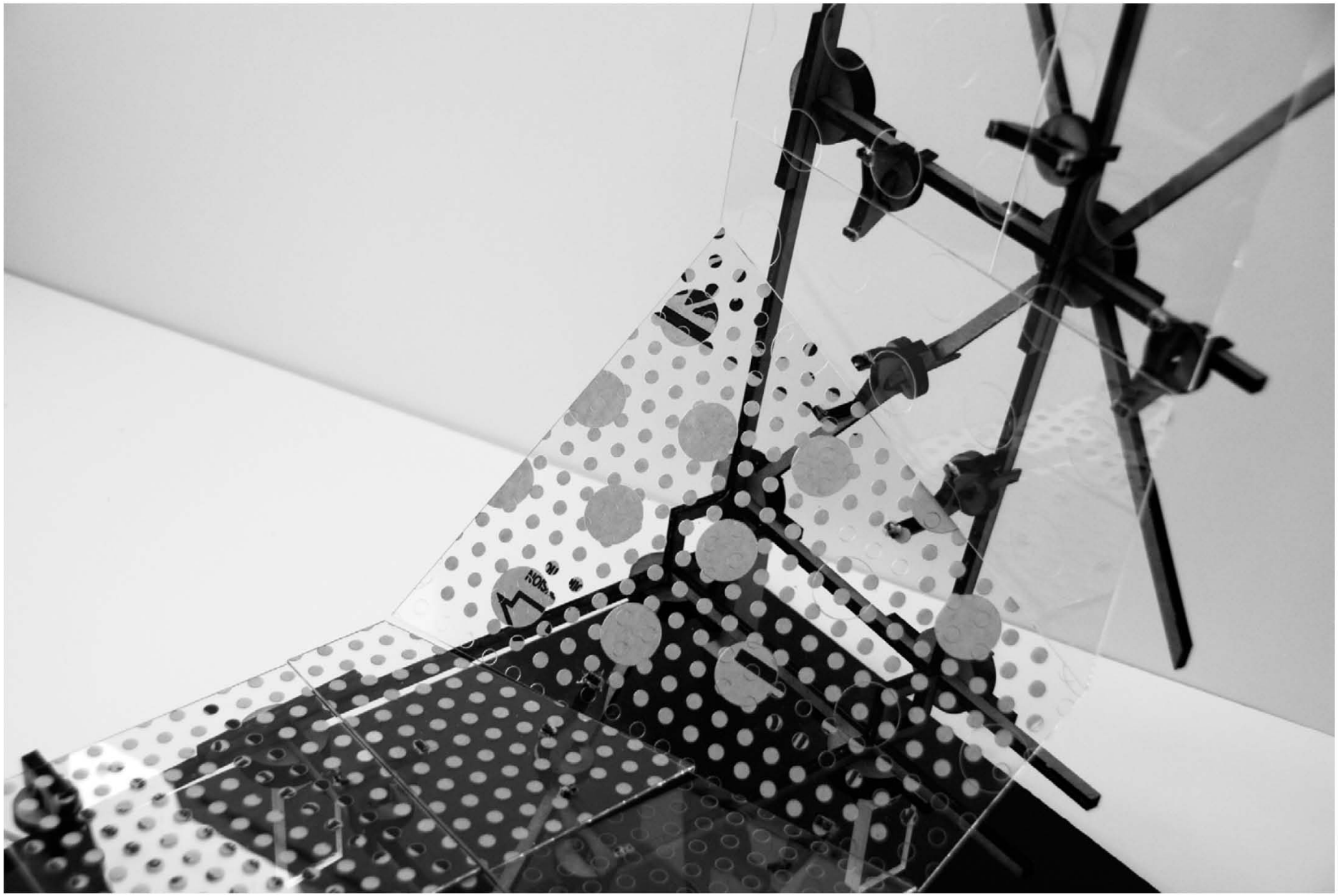
Construction Model











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