Digitally Fabricated Building Delivery through Kits

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Building Production

“Any building can be produced from digital data with computer controlled machinery”

Examples: Structural Models
Digitize Building Production

Lower the complexity of design and production

- International manufacturing
- More participants in design
- Higher quality through precision
- Programmable Components
Conventional Construction

The Limits - Why is house production complex?

Error prone production

a) Construction workers interpret drawings (errors when interpreting drawings)

b) Transfer measurements to material (errors in measuring)

c) Manufacture components by hand (errors in manufacturing)

d) Non-Formal assembly (no assurance of quality)
Building with Logic
(error-corrected additive assembly of digital materials), and "programming with math"

Error Reduction
non-intersecting path to fold an arbitrary structure [Saul Griffith]
Conventional Construction
High energy delivery

Prefabrication in Factories

- Century old system - Method was invented by Sears & Roebuck in 1920s
- Limited designs - Finished product must be rectangular
- High energy - Requires an indoor environment to build large products
- Western environments only - Requires finished roads for delivery
Digitally Fabricated Buildings

Low energy production

(100 Houses per Day)
The Instant Cabin
Press fit building kit

CBA Research
Summer 2005


Low energy assembly
Digital Fabrication
A digitally fabricated
House for New Orleans
Modern Museum of Art
Summer/Fall 2008
Initial Design Shape

Step 1

Designing the Building
Materializing
Step 2

Prototyping and Mockups
Materializing
Step 2

Computer Modeling
Manufacturing

Step 3
Assembly
Step 4
Assembly

Step 4

• Certified for a 75mph
• Can withstand a 140mph

Daniel Bonardi PE, Cambridge, MA
Second Skin - Ornamentation

Step 5

Plywood 3/4” (.75 cm)
Plywood 1/2” (.5 cm)
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A digitally fabricated
Fab Lab – Building Kit

Summer 2012
A digitally fabricated
Fab Lab – Building Kit

Summer 2012

Integrated Systems – Programming Surfaces

a) Exterior - Water capture
b) Interior - Lighting
c) Interior – Electrical
d) Interior – Heating and Cooling