Topic: Prefabrication & Construction (Aditazz, Optima, Mosaic, Broad Group)

Take Away Points:
- Develop electronic constructability database; allow explicit and tacit knowledge to be passed on between participants and projects.
- Prefabricated components are repetitive and allow for more skilled labor to be kept in controlled conditions and less skilled labor to assemble.
- Prefabrication requires a sub-assembly site, which needs to be considered in the cost vs. benefit evaluation of prefabrication.
- Prefabrication works for larger projects because of economies of scale, it costs more and brings huge schedule reduction. [Case Study: Preassembled MEP parts cost 14% more than stick built, save 6 weeks on-site schedule or 31 filed laborers]

Industry Strength:
- Aditazz: High level of repetitiveness, restrict approach and design solutions, use common components. Define the level of prefabrication, use local material when possible.
- Broad: Fully integrated manufacturer, designer, contractor and sub-contractor. Floor/ceiling parts are identical. [30-story building in 15 days with 90% of the construction done off-site in factory; 39 * 7 ft floor & facade part]
- Optima: Clear Design Specifications. Naming system to dictate flow. Prefab provides safer working conditions on site. [7 * 7 ft floor part]
- Possible positive correlation: level of prefabrication vs. construction cost, erection time, and change orders. Possible negative correlation: # of modules vs. production time. [Qualitative results from Permanent Modular Construction report]
- Constructability scores necessary for building permits in Singapore.

Opportunity of Improvement:
- 83% of constructability knowledge is kept as tacit knowledge.
- Efficiency vs. cost analysis given specific project scenario.
- There has to be a clear agreement among the stakeholders on who bears the relevant logistical costs.
- Need more ways to quantify level of prefabrication.
- Need cost + schedule equivalent comparisons to evaluate prefabrication ROI.

Presentations
The Need for a Constructability Database —— Mark Soendjojo
Prefabrication Solution that Maintains Architectural Attractiveness —— Yuting Wang
Prefabrication Logistics —— Choon Keat Lee
Prefabrication Metric Correlations —— Ellen Tung
MEP Construction by Parts —— Geffen Oren & Anish Tilak
Topic: Modular Construction (Mosaic, Shift Modular, Shipping Containers, Zipflat)

Take Away Points:
- **Mosaic:** Perhaps a change in design type would be necessary to lower the production costs (and therefore retail price) of the Mosaic product (in relation to disaster relief). Hospitality viable (+ aesthetics & scalability), disaster relief not viable (- cost & development).
- **Intershelter:** caters to the hospitality industry.

Industry Strength:
- **Mosaic:** will likely do well in the hospitality industry if the product can meet their targeted sustainability goals.
- **Mosaic:** aesthetics, scalability, construction time, portability. **Shift Modular:** aesthetics, development; **Zipflat:** portability; **shipping Containers:** cost, construction time, portability, development. [Qualitative rating]

Opportunity of Improvement:
- **Mosaic:** Team needs to develop good data collection and analysis methods in order to continue improving project sustainability. [Target: carbon neutral, 90% waste reduction; preliminary score: LEED Gold]
- **Team should find ways, in whatever capacity, to reach into the disaster relief market as it is dominated by a few entities.**
- **Mosaic:** development, cost; **Shift Modular:** cost, construction time, portability; **Zipflat:** aesthetics, scalability, cost; **Shipping Containers:** aesthetics. [Qualitative rating]

Presentations
- **Sustainability Analysis and Disaster Relief Evaluation: Mosaic Modular — Wandipa La-Toya Mualefthe**
- **Assessment of Modular Construction in Unique Markets — Elizabethe Manzi**
Topic: Permitting (City of Los Angeles Department of Building and Safety, Singapore private industry professionals)

Take Away Points:
- Need to explore the benefit/problem and encourage the adoption of BIM permitting, evaluate employee performance with consequences.
- “One-stop shop” submission system has led to most significant public approval efficiency gains. [Avg. 26 days to permit warehouse in Singapore]

Industry Strength:
- High BIM adoption in the US construction industry.
- BIM adoption primarily driven by Singapore government, government-training programs have helped reduce friction from transition. [80% projects using BIM by 2015, all 5,000+ sq. meter projects use BIM in Arch, Structure, and MEP]

Opportunity of Improvement:
- Communication errors between departments slow down the process. [Survey: 5 out of 6 responses encounter communication errors 20%+ of the time]
- Regulators are slow in terms of technology adoption.
- Can complex building (healthcare) permitting become "one-stop shop"?

Presentations
- Permitting efficiency in southern California --- Alanna Dedek
- Public approval efficiency and BIM Adoption in Singapore --- Han Wei Chew
Topic: Project Risk

Take Away Points:
- Minimize overall risk by balancing building parts interdependencies and reducing parts types. [Major risks for parts: labor, material, and design]
- Use live data to feed supply chain, and use cost data and supply chain to drive project design. [Similarly to Aditazz (restrict approach and design solutions) to avoid extra cost]

Opportunity of Improvement:
- Too many levels of parts dependency may lead to low probability of success.
- Need fast and accurate cost database.

Presentations
Project Cost Uncertainty and Cost of Capital ---- Aaron Jabbari
Risk Control Based on Parts Design and Construction - a simulated case study ---- Xiao Chen
Risk Control Writing ---- Xiao Chen