Industrialization of Construction – a Lean Modular Approach

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Research method

The conventional D&B construction process is used as base of discussions.

- Program phase
- Schematic design
- Design development
- Production phase

- Modularity
- Lean construction
- Buildability

Summary

- Industrialisation framework
- Exploration
- Case study
Industrialisation principles

- **Modularity** is both a process and product discipline offering a wide variety of advantages in the whole construction process. Modularity is applied at the product level and realised in design development and production.

- **Lean construction** is a process management discipline offering management in the whole construction process, aimed at streamlined production.

- **Buildability** is a process and product based discipline. In contrary to modularity; buildability is more of a goal than a means for product and process efficiency.
Case study – assembly process

Sequential assembly process

- 4 weeks until finished structural assembly
- General assembly activities; sub-assembly, placement, and final assembly
- Resources used; up to a 3 men workforce, 2 tower-cranes, and 2 sky-lifts
Modularity simulations

What is the usefulness of thinking in modularity during assembly?

“Thinking” modularity offers:

- Increased self-control
- Improved quality
- Opportunity for out-sourcing
- Guidance for pre-assembly
- Guidance for prefabrication
- Reallocation of resources

Product buildability
Process buildability
Lean thinking
Discussion and conclusions

- **Modularity** has been one of the driving forces in the evolution of the manufacturing industry
- In construction, the product is usually not unique, the *setting* is!
- Modularity confers both product and process *buildability*
- Modularity aids in the implementation of *lean thinking* in construction
- The Swedish construction industry is *not mature enough* to handle the direct implementation of lean practices as is…
- …the construction industry should initially focus on product modularity – a “*bottom-up*” *product focused* view…