Part 1
Getting the most out of off-site construction

Presented by Charles Walden
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Silver Creek Industries
Many terms today are used to describe a growing industry.

- Prefabricated
- Modularization
- Off-site construction
- Modern methods of construction
- Sub-assemblies
- Modular building
- Accelerated construction
- Permanent modular construction
- Volumetric modular construction
10 construction industry trends to watch in 2016

Prefab/offsite construction methods will become more popular

Offsite — also known as modular or prefabricated — construction has been gaining ground as an alternative building method that offers the benefits of reduced construction time, less waste and possible cost savings. As companies struggle to staff job sites and stick to difficult schedules, many have started to turn to prefab as an option that offers more certainty.

"A lot of use of things like prefabrication, we expect that to be an accelerating trend next year," Thasarathar said.

Ron Antevy, president and CEO of e-Builder, told Construction Dive he has seen a growing use of prefab methods, especially in the healthcare sector.

"(Prefab) is up-and-coming. That's a way to save costs and speed up the time," he said. "Some of the larger owners out there are starting to realize there are efficiencies there, but you have to be doing a certain amount of volume for these kinds of strategies to pay off."

Wider implementation of offsite construction has been somewhat hindered by the design and construction culture, according to experts at the Offsite Construction Expo in September. They also cited the change in the traditional building process that comes with offsite methods as a deterrent for implementing the approach, as contractors and owners struggle to adapt to the varied timeline of decisions and building. Still, the additional certainty that comes with prefab could catalyze the growing trend in 2016.
What is Permanent Modular Construction? (PMC)

- PMC is a specific subset of the “off-site” construction industry.
- It is a process rather than a product.
- It is a permanent, rather than a temporary building but retains the inherent ability to relocate, reuse or repurpose more readily.
- PMC companies create 3D volumetric modules for some or all of the building off-site in a controlled environment.
- May be an entire building, an addition to an existing building or a part of a building (pod).
- May be 10%, 50% or 100% of the project.
The Off-Site Construction Council (OSCC) of the National Institute of Building Sciences has this definition:

- Off-site construction is the planning, design, fabrication and assembly of building elements at a location other than their final point of assembly onsite. An integrated planning and supply chain optimization strategy characterizes off-site delivery.
Overcoming barriers also requires a change in perception.
Why…

1. Plant fabrication and site development can occur simultaneously, accelerating construction schedules.
2. Your building is constructed in a controlled plant environment where regimented QA/QC processes and Third Party Inspections occur.
3. Building off-site is an inherently greener process.
4. Site disturbance is minimized by significantly reducing on-site activity. This also improves safety.
5. Costs and schedules are more predictable.
Accelerated Scheduling

NRB’s ‘Expedited’ Permanent Modular Construction Schedule

- Design engineering
- Permits & approvals
- Site development & foundations
- Install & site restoration
- Module manufacturing at plant

50% time savings

Conventional “Progressive” Construction Schedule

- Design engineering
- Permits & approvals
- Site development & foundations
- Building construction
- Site restoration

Simultaneous site development and building construction at the plant has you open 30-50% sooner!
Is there a standardized “scope of work”? 

No – each project must be tailored to suit the team’s agreed approach, roles and responsibilities defined at the pre-bid or pre-construction stage. Three different approaches may be used and will result in varying scope delineation.

1. Modular builder as a sub-contractor turning the completed modules over to the GC at site to install and finish.
2. Modular builder as a sub-contractor self-performing building installation and finish only. All other site development by GC
3. Modular builder as GC performing all aspects of the project.

For the purpose of our sample scope delineation as well as PART II – Project execution, we will use # 2 approach.
Project Delivery
Design-Bid-Build – low cost

ADVANTAGES:
• Most widely recognized method
• Known cost of construction – competitively priced
• Simple evaluation – low bid
• Clear roles for each party

DISADVANTAGES:
• Longer linear duration and schedule
• Reduced communication between design and construction
• Can result in more “extras”
• Contractor qualifications are not known in advance
• Prescriptive design does not allow innovation in alternatives.

MODULAR FRIENDLY?
• Only if the project was designed to be built off site to begin with
LABOR FORCE

- Proper production staffing to meet the schedule
- Co-ordination hand off of the design to the manufacturing facility by engineering and project management including any sub-contractors that perform work at this stage of the project.
LABOR FORCE

- Working in a controlled environment results in predictable schedules without downtime.
- Plant environment ensures proper training and cross-training if the application of new materials or processes are involved.
Factory QA & Testing

- Manufacturers have regulated QA/QC programs in place – self regulating and third party reviewed
- Plumbing test (air and/or water)
- Electrical tests
  - Continuity
  - Dielectric
  - Polarity
  - Operational
- IECC Com-Check compliance
- Reduced CD claims
Transportation & Logistics

- Transportation regulations vary greatly from region to region and therefore module sizes must be considered at the design stage.
- Are there restricted times for moving or receiving modules?
- What is the module staging requirement? Where?
- Do limitations on staging dictate shipping schedules?

Building shipped 2500 miles from Ontario to Edmonton Alberta in 12 pieces 12 x 60 due to Ontario transportation regulations. Once in Edmonton it was converted to four “mega modules”, each by connecting 4 modules to create 4 - 24’ x 120’ modules seen above and shipped 250 miles further north along the “super highway” to Fort McMurray.
Transportation & Logistics

- Is the site accessible for oversized loads and manoeuvring?
  - Overhead obstructions and immovable obstructions
  - Movable obstructions (who is responsible)
  - Adequate turning radius
Crane Set Installation Considerations

- Adequate manpower on hand to maximize crane efficiency and ensure safety
- Lift and place days
- Wrack, plumb and secure days
- Clear access to/from and between staging area and crane lift point.
Maximizing reach and minimizing moves. Engineered lifting eyes can become the base for a fall arrest system.
Part 2
Builders Risk Fundamentals for Modular Construction Projects

IMUA
Inland Marine Underwriters Association

Presented by
Douglas G. DePhillips – Executive Vice President
Agenda

- Property Coverage Basics
- Time Element Coverage Basics
- Problems and Disputes with Coverage
- (Abbreviated) Project Schedule Tutorial
Property Coverage Basics
Builders Risk is Unique

- Coverage is for properties in the course of construction or renovation
- Typically, Coverage Amount is based on a concept that may change during construction
- When does Coverage Start with Modular Construction? Let’s look at three scenarios discussed earlier:
  - Modular builder as a sub-contractor turning the completed modules over to the GC at site to install and finish.
  - Modular builder as a sub-contractor self-performing building installation and finish only. All other site development by GC.
  - Modular builder as GC performing all aspects of the project.
Typical Covered Property

- Property intended to become a “permanent” part of the structure
- Equipment used in the construction of the project which can not be re-used (e.g. forms), or in some cases which is not covered by other insurance

- **Property in Transit**
  - Policies often provide coverage for *code upgrades*
  - Policies will often provide extra expense and expediting expense coverage
  - Some policies may provide coverage at actual cash value
Property NOT Covered

- Generally - Temporary structures
- Contractors plant and equipment - including tools
- Existing property may be excluded
- Consequential loss
Coverage Basics

Property Coverage should be written at an amount equal to 100% of exposure for all costs that would be incurred in the event of a total loss on the date of completion, including:

- Full construction contract value including overhead & profit and/or construction management fees- **WOULD THIS INCLUDE COST OF THE MODULAR BUILDING in SCENARIO 1**
- Architectural fees representing the cost of document reproduction for the rebuild- **NEW DRAWINGS**
- Other, as may apply
Other Possible Coverages

- Extra Expense – What does it mean with Modular Construction
- Contractors expense – costs associated with the impact of a loss on the contractors non loss related (base contract) work-WHICH SCENARIO
- Expediting Expense
  - CBA to determine value
- Contractors equipment – Beware – Never, ever, EVER, include this coverage
Perils!

- Coverage is usually all risk
- The “trigger” for coverage generally requires a fortuitous event causing direct physical damage to the structure
- “Errors in design” or “defects in workmanship” are generally excluded, but “ensuing” losses are covered
Attachment & Termination

- Initial policy term may be based on the estimated period or in contract - subject to change
- Policies generally provide for extensions of time with minimal action by the insured
- Expiration is usually the earlier of: stated policy date or date of substantial completion, or when financial interest ceases
Time Element Coverage
Basics
Time Element Coverage

- Soft Cost Coverage for a “delay” caused by a covered cause of loss usually includes:
  - Interest on Construction Financing
  - Additional Real Estate Taxes
  - Additional Marketing and Leasing Expenses
  - Additional Architect and Engineering Costs
  - Additional Administrative Costs
  - Additional Legal and Accounting.

- Deductible is typically a “waiting period”

- Income and Rent Losses are usually insured subject to a separate policy form with a waiting period deductible.
Coverage Basics – Soft Costs

- To fully compensate an insured, Soft Costs should be crafted to protect the insured(s), including additional named insureds for losses for the longest period of indemnity, which typically include:
  - Additional loan interest
  - Additional design fees
  - Marketing expenses
  - Renegotiation of leases or purchase agreements
  - Legal and other expenses
  - Other

- What is missing here??
Example of Typical Soft Costs

- Additional R.E. Taxes
- Additional Ground Rent
- Construction Loan Interest
- Attorney Fees
- Architect/Engineering Fees
- Other Financing Costs
- Commissions
- Bond & Permit Costs
- Bank Fees
- Inspection Fees
- Letter of Credit Fees
- Insurance
- General Conditions
- Advertising
- Marketing Expenses
- Developer Fees
- Testing & Inspection
Coverage Basics – B.I./Rental Income

- Coverage should only be afforded for the owner/operator of the completed project
  - Contractors and sub-contractors sometimes make claim for B.I.

- WHEN SHOULD BR CEASE AND GL ENGAGE
Measuring Time Element Claims

- Measurement Requires Determining two important dates:
  - The date the project would have completed had the loss not occurred.
  - The amount of delay caused by the loss.
- Losses are typically measured by measuring the period of delay, less any waiting period.
- Can the project continue without the modular piece?
  Generally the site development work is split into two phases:
  - Pre Modular
  - Post Modular Installation
Time Element Coverage Trigger

- Coverage is only afforded if a covered loss results in a delay (must have physical damage).
- The “delay” is not measured by the time it would take to make repairs. Delay is the time the project completion is extended beyond the date it would have completed had the loss not occurred.
- The period of indemnity commences on the date that the project would have completed had no loss occurred - therefore the “period of restoration” for physical damage and period of delay for time element losses “rarely” run concurrently.
- WHAT IF THERE WAS A MAJOR DELAY IN THE PRODUCTION OF THE UNIT IN THE FACTORY?
Problems & Coverage
Disputes
The Broker/Insured Disconnect
“Where Problems Begin”

- Insurance policy definitions and real estate development definitions are different.
  - Real estate developers use two terms to describe the costs of improvements made to raw land … Hard Costs and Soft Costs.
    - Hard Costs generally refers to the cost of construction (i.e. – the contract value for the general contractor or construction manager).
    - Soft Costs – Everything else
  - Insurers and brokers use different definitions
    - Property Coverage
    - Time Element (DSU) Coverage
  - Modular Manufacturers Agreement-When does BR begin?
Typical Disputes

- Cost of repair – labor, material, productivity, overhead, profit, and other fees
- What is P.D. versus non-P.D. expense?
- Date the project would have completed had no loss occurred
- The period of loss related delay
- Delay period when loss is caused by defect in design or workmanship and the policy includes an ensuing loss exception
- What triggers loss and when is the loss incurred? (B.I. or rental income can often be incurred prior to policy expiration of date the project would have completed absent the loss)
- WHY IS MODULAR A CLEANER SOLUTION?
Time Element Coverage Problems

- A smart underwriter will generally provide time element coverage for the benefit of the owner only, and not afford coverage for the additional insureds.
- Consequential losses may not always be limited if there are numerous insureds.
- When loss is caused by a non-covered peril, the period of delay issue becomes “murky.”
Project Schedule Tutorial
Project Schedule Basics

Project Schedule:
- The plan for construction of the project which is typically created by the construction manager or general contractor, and which depicts the sequence and duration of construction activities, typically in a Gantt chart format.

Critical Path
- The longest continuous chain of activities which establishes the minimum overall project duration.

Modular Building Schedule
- Two distinct schedules: Shop and Jobsite.
Basics of Scheduling

- A project schedule should represent the contractors plan to successfully achieve the project goals, i.e. complete the project “on time and on budget”
- Contractors typically produce schedules in Primavera or other software within 90 days of Notice to Proceed with a project;
- Contractors will typically update the schedule at least monthly;
- Contractors will revise the schedule “logic” as necessary to reflect actual conditions
Basics of Scheduling

Contractors are expected to re-sequence activities to overcome or at least minimize delays from events such as losses that can arise on any construction project.

BUT… Stuff Happens… So…

Contractors are expected to re-sequence activities to overcome or at least minimize delays from events such as losses that can arise on any construction project.

WHY CAN’T THE GC RE-SEQUENCE IN MODULAR PROJECT WHEN DELAY OCCURS IN SHOP?
Activities

Each activity in the schedule is connected by logic ties called Predecessors and Successors.
Project Example

- 30 Unit Modular School Building
- Pre-Modular activity:
  - Site Development i.e. Land development, Utilities, Roadways
  - Foundations
- Modular Installation
- Post Installation Site work
Areas of Construction For Sample 30 Story Residential Project
Critical Path & its Flow Through the Project
Critical Path & its Flow Through the Project

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Critical Path & its Flow Through the Project
Critical Path

In the 30 Story Building Example, notice how the “critical path” moved from earthwork to structure to curtain wall, but did not go through all of structure or all of curtain wall before moving on. This is because once the next critical activity begins, that activity takes over the “critical” path.

In The Modular Example, you can see the entire project is on the critical path. There are only Three phases: Pre, Install, Post. You can see how each phase drives the other.
Analyzing a Schedule

Reasonableness of schedules and updates prior to “loss”

- Are activities on the critical path reasonable?
- Have the previous updates been accurately maintained?
- How has the project tracked on a month to month review previous to the loss?
- How has the Modular Schedule effected the project schedule
- Are ALL activities on the schedule? Are they tied correctly and does the logic make sense?
- Are change orders accurately reflected in the schedule?