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Integrated BIM Workflows in Modular Prefabricated Construction: Concept to Fabricate - FAQ

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Q. What is Prefab?

A: *Prefabricated construction is defined in this paper as manufacture of complete modular houses, or manufacture of main components in a building in an off-site factory, prior to installation on site*

Q: What is the difference between Modular Buildings and Prefabricated Buildings?

A: *'Modular Building Construction' is a term used to describe the use of factory-produced pre-engineered building units that are delivered to site in Modules. The modular units may form complete rooms, or parts of rooms.*

Modular buildings are generally made into six sided boxes constructed in a factory, then delivered to site and using a crane, the modules are set onto the building's foundation and joined together to make a single building. The modules can be placed side-by-side, end-to-end, or stacked, allowing a wide variety of configurations and styles in the building layout.

A prefabricated building, informally a prefab, is a building that is manufactured and constructed using prefabrication. It consists of factory-made components that are transported and assembled on-site to form the complete building.

So it's quite simple Prefabricated Buildings are very different to Modular buildings.

Q. What advantages modular system has sustainability goals in architecture as far as waste reduction is concerned?

A: *Recent studies show that the manufacturing industry has 12% waste in material and labour while construction is 57%. This means that the value added activities in construction are on only 17% of that in manufacturing.*



Waste in material and labour in traditional construction is abundant. Modular can capture the efficiency and productivity of the manufacturing industry, delivering more value to clients and reducing waste in the process.

Although modular design and construction will not solve integration approach to project delivery alone, it is one of the arrows in the quiver of the integration paradigm that may be used to realize reduced duration, increased quality, controlled cost and sustainable delivery. In order to realize these benefits, it demands an early integration effort and information sharing. Altogether this potentially results in lower risk for all involved. In the end, modular design and construction is only as good as the demands placed upon it by architects – this requires deeper knowledge.

Q. How the role of off-site, factory construction changing our environment?

A: Utilizing factory construction will create better jobs for workers without constant layoffs because of inclement weather conditions. It will help conserve materials. There will be fewer disturbances to the land; with site building there are many more trees cut down and a mess created with materials and soil thrown around and piled up on the property.

Because prefabricated houses are built in a factory there are many opportunities for conserving materials. Cut-offs from one house can be used on other houses. Many factories recycle metal and drywall, sending them back to the factory to be reused.

Many of the materials used to build a house can be shipped in bulk to the factory rather than to individual job sites. This also saves fuel used for deliveries.

Q. How does BIM contribute to the modular construction design-build process in AEC industries?

A: The future of modular relies on the success and ubiquity of BIM. Linking time and three-dimensional information, simulation of construction in modular can anticipate schedules from factory Workflow to on-site job-site assembly sequencing.

BIM allows for interface of automation equipment to virtually remove the shop drawing phase and have multiple manufacturers producing modules for on-site assembly. This may take the form of a building model that is further detailed or networked with other aspects of production and construction by the modular manufacturer.

Preparing a building component or assembly for fabrication is a time consuming process that depends on numerous complex factors. BIM facilitates a variety of related design/construction activities, including digital fabrication and Shop drawings of building components

Finally, BIM allows visualizing virtual reproductions of the building or making 3D models that help to correct problems or better choose the materials and, above all, reduce execution costs.



Q. How Prefabrication Modular System helps in MEP field?

A: *Generally MEP consultants are introduced to the project when the structure of the building approaches its completion. This results in a very complicated building services design and installation process as engineers will have to use the space provided to install the MEP services. Designers will have to overcome many clashes with the structural design and also with other MEP disciplines. Since the structure of the building is already completed, building services engineers will have to avoid any changes to the structure of the building. However, in many cases where there is no alternative option, changes are made to the structure of the building in order to accommodate the MEP installations. This process can be very costly and time consuming depending on the extent of structural changes required. Construction quality of services is poor in many buildings due to the unplanned installation and space restrictions. Since all disciplines are cramped in one area and are being installed simultaneously by many workers, it will result in poor workmanship and high risk involvement at site.*

Here by the modular system employment in MEP Services, Significant time and cost savings can be achieved as clash detection can be conducted prior to construction. Many major services such as plant room, chilled water pipes, bathrooms, etc. can be prefabricated at an off-site factory and brought to site for installation. This will reduce the construction time, as most of the testing such as pressure tests and air tightness tests can be done at the factory prior to transportation. Pre-planning of services will result in excellent quality finishes as clashes and other challenges are identified prior to construction stage. Prefabrication of MEP services will reduce the risk of high workforce on site as all discipline will coordinate and produce service modules at the factory and transport it to the construction site.

Q: How long does it take to build and install a modular building?

A: *The options and complexity of a project will determine delivery time. However, many projects can be completed in two to three months. Site preparation can be a challenge. Regardless, you can expect to save over 30-50% of the time it takes to do a site-built project versus a modular building installation.*

Q. Can I expand or move a modular building?

A: *Yes. Modular buildings are re-loadable. Having an integrated floor and undercarriage will greatly facilitate relocation. If you know you want to expand the building later, that information can help in the original design of the building, particularly as it pertains to future structural and system modification of the building.*