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## **Building Information Modeling (BIM): Developing strategies for virtual construction**

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There is a revolutionary movement occurring in the building industry. Excitement keeps growing around the use of Building Information Modeling (BIM) on construction projects. Suffolk Construction has already leveraged the potential of this next-generation approach on several projects around the country and actively is researching more effective ways to utilize it on future projects. Suffolk formed a BIM Strategy Committee to research ways in which the company can continue to use BIM to facilitate the construction process in order to lower project costs, improve project delivery and reduce project risks—saving clients time and money on their projects. The committee is collaborating with architects, owners, engineers and subcontractors to gain insight on their use of BIM.

In the field, BIM allows for better design and trade coordination between subcontractors, engineers and construction professionals, enabling them to work collaboratively by using an integrated model created from multiple disciplines that reflect key design elements. The project is "built virtually" using 3-D digital models, allowing all team members to "see" the final building, including all of its components. The integrated BIM model is extremely useful in detecting any design conflicts well before construction begins, resulting in reductions in costly redesign and field rework, and a decrease in the risk to the client and the project team.

One of the first projects in which Suffolk successfully used 3-D modeling was the Mandarin Oriental, Boston. Owners of the Mandarin Oriental's condominiums were able to modify the layout of their units to fit their needs. As a result, no two units in the building follow a similar floor plan, and no kitchens or bathrooms are stacked. This required intense collaboration on the part of Suffolk's project team, MEP specialists and framing contractors to coordinate the mechanical and structural framing systems. The use of 3-D modeling for steel and MEP systems was essential to mapping out the specific routing of plumbing and HVAC systems in the building while maintaining the high ceiling heights and column-free spaces required for the condominiums.

Suffolk's West Coast region currently is using BIM on the \$106 million Los Angeles Unified School District (LAUSD) High School #4 project. Western Air Limbach, the project's HVAC contractor, is taking the lead by using BIM to model mechanical, electrical and plumbing systems. The project team is able to manage trade coordination by modeling system components, identifying virtual clashes, and resolving them quickly and easily before construction.

FrameMax, a leader in light-gauge steel panelization, is using Revit Structure on the Jewish Homes for the Aging's Fountainview at Eisenberg Village project to ensure that the steel frame, load-bearing structure is fabricated properly. "BIM can easily import/export in many formats allowing other trades to use the model as 'tracing paper' for their designs. This leaves no room for interpretation of the design," said Barry Kuiak, a FrameMax CAD developer. Rob Latch, Suffolk's senior project manager

on the Fountainview project, takes it one step further, "I have managed a dozen projects without BIM...after what I have seen on Fountainview, I would rather not manage another one without its utilization. BIM adds a level certainty that cannot be replicated with standard CAD applications."

Our experience using BIM on these projects has minimized delays and constructability in construction by using BIM clash detection. Error reduction is a tremendous benefit of using BIM, which leads to cost savings for all members of a project. Reduction in time required to complete construction directly contributes to the cost savings numbers as well. It is important to realize, however, that this decrease is accomplished only if the models are developed sufficiently and integrated during the design development and trade coordination phases of a project.

BIM technology is certainly taking hold. Government agencies, such as General Services Administration, the Department of Defense and the U.S. Coast Guard, are all defining their deliverable requirements in BIM. If this trend continues, BIM certainly has the potential to change the way buildings are designed and built, and Suffolk will be at the forefront in implementing its use on projects nationwide.

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