Editorial

The Promise of BIM

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SEI Board of Governors

The Building Information Model, or BIM, is finally coming into its own in the AEC industry. A BIM is a single, integrated three-dimensional model of a building structure. Design information related to each discipline is contained within the model. This includes architectural information, such as doors, fixtures, and finishes; structural information, such as slabs, columns, shearwalls, and foundations; and mechanical systems information, such as HVAC ducting, piping, and equipment. Accessing any of these elements in a model will give a user access to the properties of the element. This allows quantity information to be retrieved directly from the BIM. Although BIM has been used as the standard documentation method in the processing industry for many years, it has not been used in the AEC industry except in isolated situations. Three-dimensional modeling in the AEC industry has been restricted primarily to project rendering and visualization by the architectural profession and analysis modeling by the structural engineering profession.

"Will structural engineers who use BIM be at a competitive disadvantage to structural engineers who do not?"

Structural engineers interface with a BIM in three primary ways. First, the structural engineer must coordinate his work with the other disciplines. Coordination in traditionally-delivered projects is currently a time consuming and less than perfect process involving review of 2D plans, sections, and elevations of a structure. While this process may work fairly well for simple structures, the increasing complexity and shorter schedules of today's projects lead to numerous coordination errors. Developing a single 3D model of a structure that includes all discipline components allows for easy visualization and identification of coordination issues.

Second, for the vast majority of building structures, the CAD model and documentation is not linked in any way to the structural analytical model. Transfer of information from the analytical model to the CAD documentation introduces the potential for errors. With a BIM, the CAD model and the structural analysis model would be one and the same, reducing the potential for errors.

Lastly, the structural model is normally not linked to the detailing model developed by the contractor. Errors in transmission of information, as well as savings to the project schedule, could be realized with a linkage of these models.

With all these seeming advantages of BIM, are there any downsides? Three potential downsides include increased production costs for the structural engineer, increased liability due to quantity information release, and unrealistic expectations of owners. Since a BIM will contain more information than the traditional CAD documentation, that implies increased costs. Will owners pay for these increased costs? Will structural engineers who use BIM be at a competitive disadvantage to structural engineers who do not? For projects where BIM is required, increased fees may be more easily justified. Since quantity information can be extracted directly from the model, it is a certainty that contractors will want access to this information. What risks does the structural engineer incur if this information is somehow not correct? Will the structural engineer be paid additional fees to provide this information? If a building information model is used on a project, will the owner now expect a perfectly coordinated set of drawings?

The transition to the BIM process for the structural engineering profession, as well as the entire AEC industry, will occur over several years. For all practical purposes, BIM is in its infancy. The primary limiting factor in the transition to BIM has been the lack of adequate software and interoperability. With the introduction of Autodesk® REVIT® Structure and the new Industry Foundation Class (IFC) interoperability standard, comprehensive BIM technology is now widely available to the structural engineer. Structural engineering firms will need to change their production process. No longer will drawings just represent "lines on paper." The drawings produced will represent real objects with real properties. Perhaps the group most affected by this change will be the CAD technicians. They will be drafting in three-dimensional space, not on a two-dimensional surface. They will be putting a building together, not just putting on paper what the engineer tells them.

To assist the structural engineering profession with the transition to the BIM process, CASE and SEI are sponsoring a ½ day seminar entitled *Building Information Modeling – An Introduction for Practicing Structural Engineers*. It will be held at the Hyatt Regency Chicago on June 22 from 1:00 pm to 5:00 pm. (See page 79 for more information.)

The building information model paradigm represents the most significant change to the AEC industry since the introduction of computer aided drafting. With the promise of better coordinated drawings, integrated CAD and analysis models, and easier and quicker access to quantity information, structural engineering firms will incur less risk and become more productive. Though it will require an initial investment of both time and money to implement this process, those firms that choose the BIM route will be leaders in the marketplace and enjoy a competitive advantage over those firms that choose to stay in the 2D world.▪

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