

Many preconstruction estimating departments have identified Building Information Modeling (BIM) as an area of competency. As with any emerging technology, the initial period is clouded by many definitions (often contradicting), confusion, and false expectations. Many pioneers have been using BIM in various ways for years and the evidence shows that “the view is worth the climb.” This paper offers guidance to AEC companies interested in learning more about BIM and related preconstruction cost estimating issues.

Process vs. Technology

Contrary to popular belief, BIM is not just a software application. BIM is a business process which drives a project delivery method, albeit a highly integrated one. BIM requires participants to develop closer relationships with key team members, foster the open exchange of electronic information, and encourage closer collaboration than ever. BIM introduces new team dynamics, accelerated decision making, and complexities that demand a strong working relationship. It pushes the boundaries of the project lifecycle information exchange, from preconstruction to facility maintenance. BIM projects introduce new risks and responsibilities, new forms of contract documents and, in some cases, new business models.

Eos recommends that companies develop a short list of partners – those companies with whom they can build upon an already good working relationship and extend them through the BIM process. *It will take longer to build these relationships than it will take to implement BIM software solutions.* This effort will raise the preconstruction staff’s knowledge of which trusted partners are BIM adopters and how they might work with them in the future. In essence, companies should leverage their BIM research and experience and become better prepared for upcoming BIM opportunities with the right partners. In return, companies can share their BIM findings with other team members to foster the team’s ability to deliver future projects using BIM.

Supporting Processes

BIM projects will add new complexities to the preconstruction estimating process, such as the need to:

- Manage, manipulate, and navigate complex, 3-D models.
- Identify and collect building components that are linked to estimating data.
- Provide quick response to design alternatives as the model changes.

The more confident that estimators or preconstruction team leaders are in the performance of the estimating system, the more they can concentrate on leveraging BIM design tools to evaluate alternatives. BIM won’t add value in quantifying building components if the user doesn’t trust the estimating system that’s pricing those components. It may even magnify estimating process inefficiencies.

In addition, BIM doesn't eliminate the need for an effective estimating system; rather, it enhances it. At its most rudimentary level (one that directly impacts the cost estimator), BIM provides a way to visualize a virtual facility and extract dimensional information (lengths, areas, counts) through automation. In this context, BIM is an evolutionary step – from the ruler to the wheel to the digitizer to on-screen takeoff, the tools of the trade have improved estimators' productivity in measuring quantities. However, there's much more to BIM than 3-D dimensional information.

Like the tools before BIM, *the need for a good estimating system is still essential*. For instance, BIM designers do not model all the building components. The cost/benefit analysis doesn't support this effort. Thus, building component details such as excavation, rebar, formwork, and backfill won't appear in most BIM documents. Typically, the estimating system introduces those components and related costs. BIM documents don't include intangibles, such as site conditions, general requirements, and indirect costs, and they don't include means and methods of construction. *BIM alone will not produce a comprehensive project estimate.*

We recommend you formalize, stabilize, and automate your estimating system so that the estimating staff, processes, and technologies work in a streamlined, efficient manner.

Software Alternatives

BIM "software" is not a single software application. Rather, it is a collection of software products and training. We see clients attempting to look for that "one" BIM solution that will "do it all." Stop looking because it's not out there. BIM software applications come in many flavors and provide different value to construction team members. Some BIM tools are oriented towards the design community, while others are a great fit for the preconstruction professional. Still others fit the owner or engineer best.

Which tool is best? Our recommendation: Determine your BIM strategy, develop a tactical plan to get to the end result, and then select the BIM software tools that supports the operational aspects of delivering on the BIM promise.

Goals

If a company hasn't started down the BIM road, we recommend they conduct an internal dialog about their corporate BIM goals:

- Will BIM simply support sales and marketing efforts? Will a well-prepared presentation that includes BIM be enough? Because BIM is one of the hottest topics in construction, just mentioning it can improve your company's public perception. Today, BIM can be used as a means to differentiate a company from its competition. But not for long, as BIM capabilities will become mandatory over the next few years. In some cases, they already are.
- Is design visualization an important goal? Is it important to communicate general design ideas and provide team members with a 3-D model? Visualization is BIM's obvious, early benefit and a natural by-product of any BIM design tool. It's the low-hanging fruit and any BIM design tool can deliver this capability. Some are even free.
- Will you craft your own models or work with the designer's models? There are many levels or stages of BIM documents, each designed to solve a specific need. They offer different levels of detail and intent. The BIM documents that a designer creates may not be useful to the contractor or engineer. Thus, many companies hire modelers to craft BIM documents that suit their purposes. A single company resource may need to learn, operate, and integrate many different technologies that support the BIM process. Plan ahead.

- Will you apply BIM in a detailed design environment to aid in design synchronization, conflict management (often referred to as clash-detection or interference checking), energy analysis, and constructability? This application of BIM can improve designs and reduce change orders and RFIs during the execution phase, especially on complex projects. Many of the BIM design tools support these requirements, while others specialize in it.
- Is BIM intended to assist preconstruction and execution teams in planning and logistics? Will you use 4-D models (3-D models linked to construction schedules) to review construction sequencing, collaborate with major trades, and stage a complex construction project? 4-D BIM can especially benefit projects where the client's operations must continue during the construction phase. Here you have lots of options when it comes to BIM tools.
- Is BIM intended to provide quicker, more accurate responses to design alternatives through 5-D (3-D models linked to construction cost estimates)? Shorter, in some cases real-time, responses and streamlined costing of alternatives can reduce preconstruction costs and improve project schedules. That's right: Your cost data integrated with a BIM document. Specific BIM tools that address this very issue are changing the preconstruction landscape.

Summary

BIM process complexities and the time required to integrate BIM technologies should not be underestimated. Comprehensive BIM projects involve planning, design, cost estimating, and project scheduling domain knowledge that force decisions much earlier in the delivery process. BIM processes change team dynamics and introduce new client expectations, project risks, authorship rights issues, and liabilities not found in traditional delivery methods. Those companies with a team-based culture will adapt BIM processes and tools much better than the rest.

Eos Group recommends that any company interested in the BIM delivery method begin its efforts with planning, team building, and piloting before attempting to integrate BIM into mainstream project delivery processes. Getting your estimating house in order is a critical part of that process.