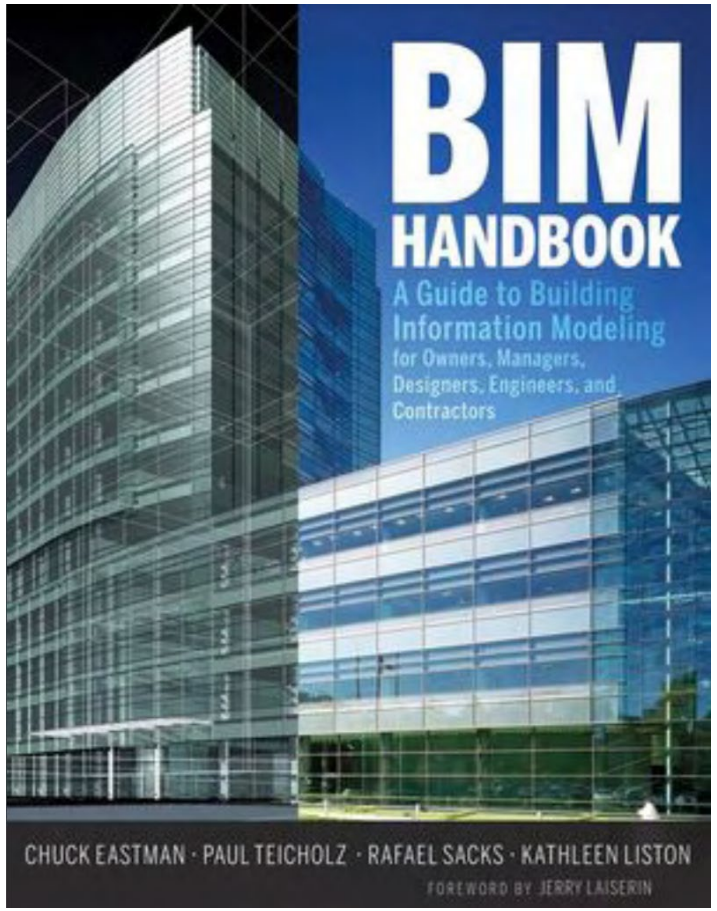


file:///C:/Users/Anna/Desktop/21_parma%20orale/BIM_handbook_A_guide_to_building_informa.pdf

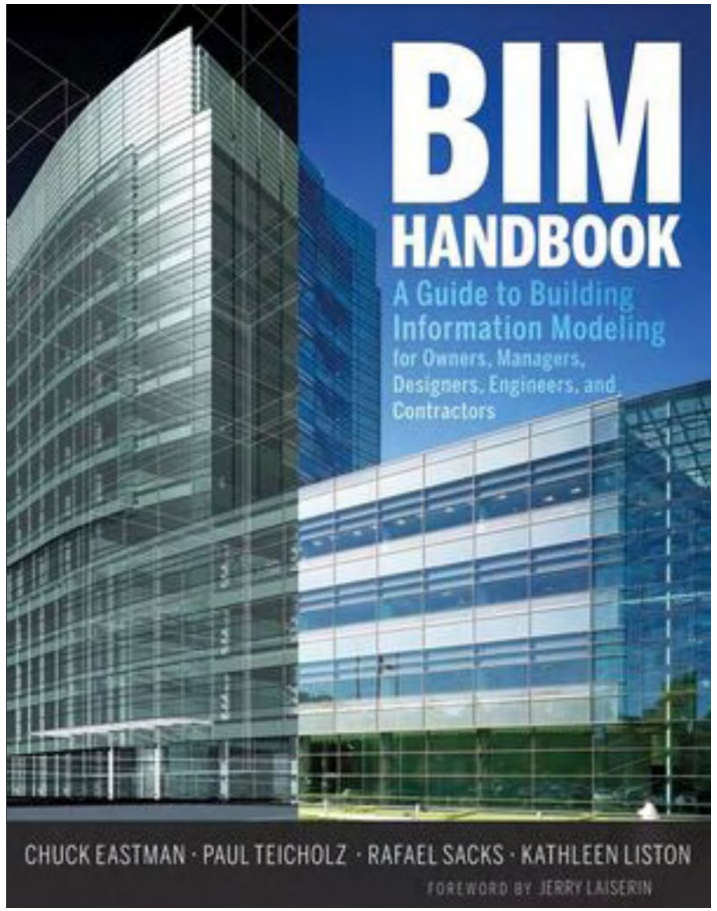
Pag 20

1.0 EXECUTIVE SUMMARY

Building Information Modeling (BIM) is one of the most promising developments in the architecture, engineering and construction (AEC) industries. With BIM technology, an accurate virtual model of a building is constructed digitally. When completed, the computer-generated model contains precise geometry and relevant data needed to support the construction, fabrication, and procurement activities needed to realize the building.

BIM also accommodates many of the functions needed to model the lifecycle of a building, providing the basis for new construction capabilities and changes in the roles and relationships among a project team. When implemented appropriately, BIM facilitates a more integrated design and construction process that results in better quality buildings at lower cost and reduced project duration.

This chapter begins with a description of existing construction practices, and it documents the inefficiencies inherent in these methods. It then explains both the technology behind BIM and recommends ways to best take advantage of the new business processes it enables for the entire lifecycle of a building. It concludes with an appraisal of various problems one might encounter when converting to BIM technology.

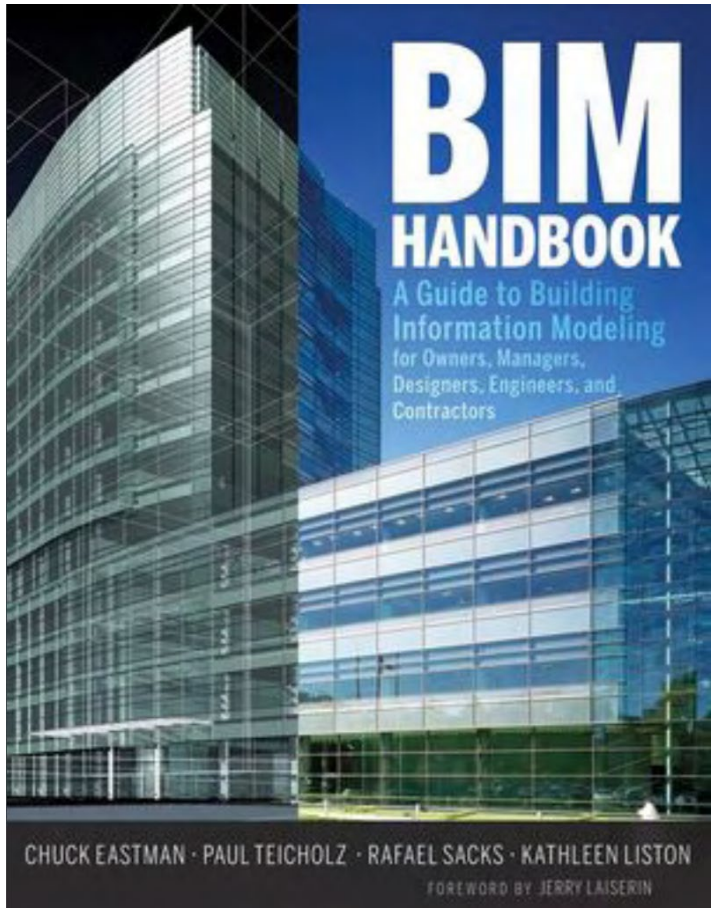


file:///C:/Users/Anna/Desktop/21_parma%20orale/BIM_handbook_A_guide_to_building_informa.pdf

Pag 44

2.0 EXECUTIVE SUMMARY

This chapter provides an overview of the primary technology that distinguishes BIM design applications from other CAD systems. Object-based parametric modeling was originally developed in the 1980s. It does not represent objects with fixed geometry and properties. Rather, it represents objects by parameters and rules that determine the geometry as well as some non-geometric properties and features. The parameters and rules allow the objects to automatically update according to user control or changing contexts. In other industries, companies use parametric modeling to develop their own object representations and to reflect corporate knowledge and best practices. In architecture, BIM software companies have pre-defined a set of base building object families for users, which may be extended, modified, or added to. An object family allows for the creation of any number of object instances, with forms that are dependent on parameters and relationships with other objects. Companies should have the capability of developing user-defined parametric objects and corporate object libraries for customized quality control and to establish their own best practices. Custom parametric objects allow for the modeling of complex geometries, which were previously not possible or simply impractical. Object attributes are needed to interface with analyses, cost estimations, and other applications, but these attributes must first be defined by the firm or user.



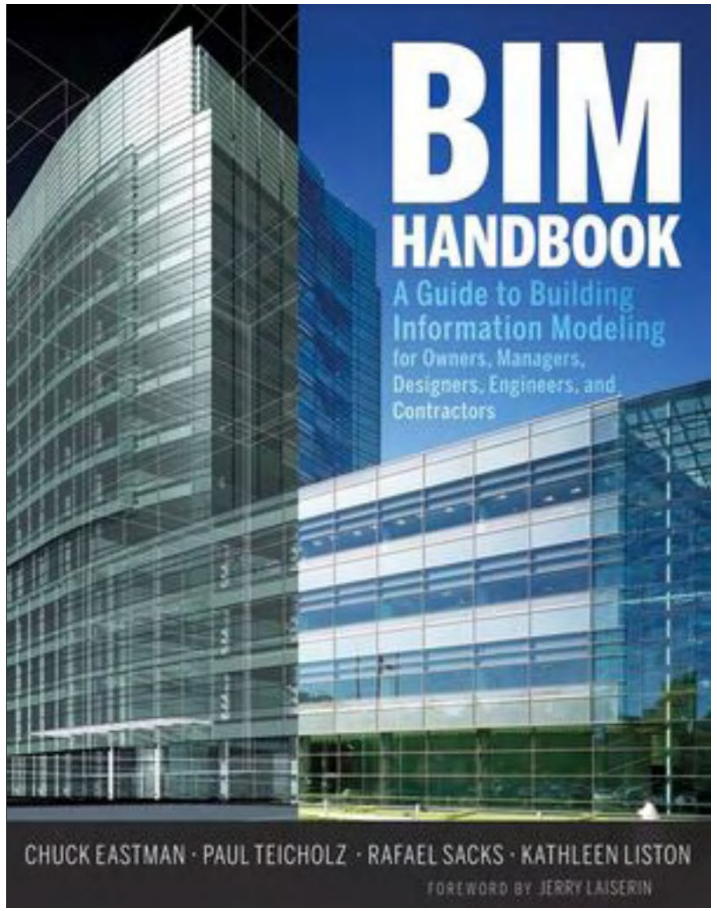
file:///C:/Users/Anna/Desktop/21_parma%20orale/BIM_handbook_A_guide_to_building_informa.pdf

Pag 112

4.0 EXECUTIVE SUMMARY

Owners can realize significant benefits on projects by using BIM processes and tools to streamline the delivery of higher quality and better performing buildings. BIM facilitates collaboration between project participants, reducing errors and field changes and leading to a more efficient and reliable delivery process that reduces project time and cost. There are many potential areas for BIM contributions. Owners can use a building information model to:

- **Increase building value** through BIM-based energy design and analysis to improve overall building performance
- **Shorten project schedule** from approval to completion by using building models to coordinate and prefabricate design with reduced field labor time
- **Obtain reliable and accurate cost estimates** through automatic quantity take-off from the building model, providing feedback earlier in a project when decisions will have the greatest impact
- **Assure program compliance** through ongoing analysis of the building model against owner and local code requirements
- **Produce market-ready facilities** by reducing time between procurement decisions and actual construction, allowing for the selection of the latest technologies or trend finishes



file:///C:/Users/Anna/Desktop/21_parma%20orale/BIM_handbook_A_guide_to_building_informa.pdf

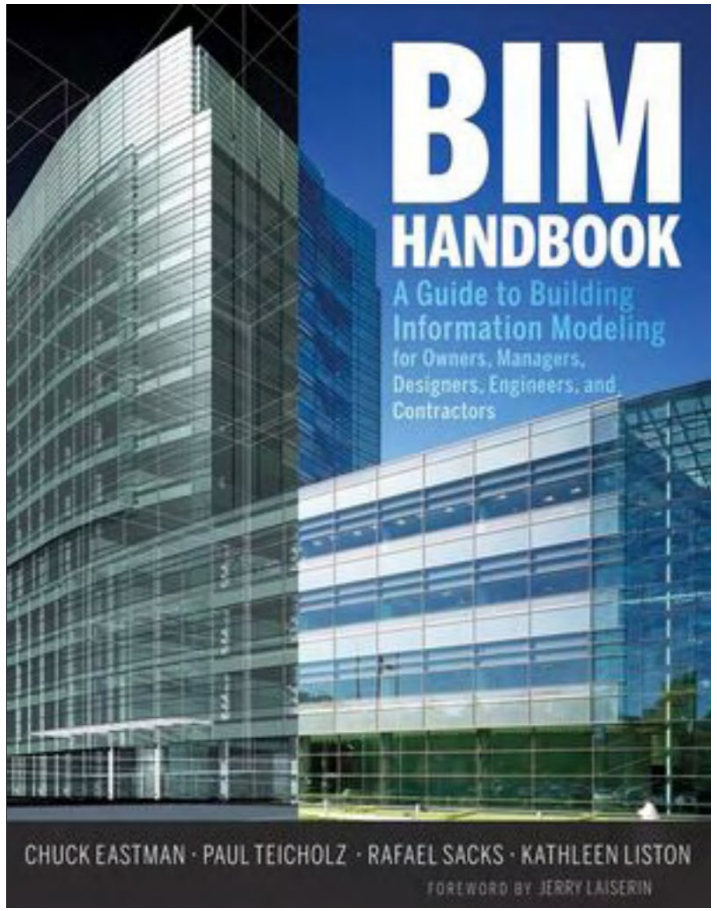
Pag 225

6.0 EXECUTIVE SUMMARY

Utilizing BIM technology has major advantages for construction that save time and money. An accurate building model benefits all members of the project team. It allows for a smoother and better planned construction process that saves time and money and reduces the potential for errors and conflicts. This chapter explains how a contractor can obtain these benefits and what changes to construction processes are desirable.

Perhaps the most important point is that contractors must push for early involvement in construction projects, or seek out owners that require early participation. Contractors and owners should also include subcontractors and fabricators in their BIM efforts. The traditional design-bid-build approach limits the contractor's ability to contribute their knowledge to the project during the design phase, when they can add significant value.

While some of the potential value of a contractor's knowledge is lost after the design phase is complete, significant benefits to the contractor and the project team can still be realized by using a building model to support a variety of construction work processes. These benefits can ideally be achieved by developing a model in-house with the collaboration of subcontractors and fabricators; having a consultant develop a model is also possible.



file:///C:/Users/Anna/Desktop/21_parma%20orale/BIM_handbook_A_guide_to_building_informa.pdf

Pag 302

8.0 EXECUTIVE SUMMARY

BIM is not a thing or a type of software but a human activity that ultimately involves broad process changes in construction.

Already, a wide variety of owners are demanding BIM and changing contract terms to enable it. New skills and roles are developing. Successful pilot implementations in construction are leading to corporate-wide uptake by pioneering contractors; and construction contractors are implementing sophisticated ERP systems. A survey conducted in early 2007 found that 74% of US architectural firms are already using 3D modeling and BIM tools, although only 34% of those use it for *intelligent modeling*. BIM-standard efforts—such as the National BIM Standards in the US—are gathering steam; and the public is increasingly demanding greener buildings. BIM and 4D CAD tools are becoming common in construction site offices. The lack of appropriately trained professional staff, rather than the technology itself, is the current bottleneck to widespread implementation.