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Collaborative Construction: Making BIM Work for Builders

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Introduction

In the value chain of the construction industry, builders are downstream from designers, and therefore receive plans either as blueprints or digital files, and have to quickly turn around accurate cost estimates based on these plans. With an increasing number of architects and design firms using BIM (Building Information Modeling) technology, builders must be equipped to utilize BIM processes and tools. For many builders, adopting BIM is a fundamental requirement from a technological standpoint; however it is also one that brings significant advantages from a growth perspective.

The Value of "Virtual Construction"

The essential value that BIM as a technology brings to the industry is in the way it enables "Virtual Design and Construction." By incorporating data that better models construction and post-construction realities, the worlds of the contractor, developer, and property manager are brought closer to the world of the designer. Together, all parties can enjoy the benefits of "building twice" that are provided by BIM-enabled Virtual Design and Construction (VDC). The benefits are many. Here are a few of the most important:

1) **Constructability:** Identifying potential issues with the constructability of a project before you break ground increases productivity and saves everyone time and money. Working with BIM data that includes sequencing and scheduling information allows designers and builders to ensure that plans are not just architecturally sound but that they can be built as designed.

2) **Maintainability:** Dealing with changes during construction costs time and money. But once built, designs that have not taken into consideration post-construction maintenance will continue to cost even more through the lifetime of the building. Something as simple as easy access to lighting fixtures to change bulbs can be overlooked in the best of designs. The ability to construct a building in a virtual sense with BIM-based models allows those who will own and maintain a property to protect their interests and investments by participating actively in the pre-construction phase of a project.

3) **Liability:** Everyone involved with a construction project wants it to succeed, but the traditional design-bid-build process places the owner, designer, and builder into somewhat different interest groups. The design that reflects the wishes of the owner may not reflect the needs of the contractor with respect to building means and methods, compliance issues, and phasing considerations—all things which impact the contractor's liability exposure. VDC technology allows for contractor participation in pre-construction beyond just the bidding process and helps them to manage the risk and liability that are inherent in every construction project.

Builders and property developers equipped to interpret the BIM data that enables VDC will be able to "measure twice then cut once" in the pre-construction phase. This will reduce time and money spent on changes during construction and on ongoing building maintenance.

Cost Estimate Accuracy

A number of factors are contributing to tighter margins for builders in all segments of the construction industry. Competition is increasing, costs of materials are rising, and the current economic conditions are less than favorable. In this environment, it becomes even more important to ensure the accuracy of cost estimates. The closer the margin of estimating error approaches the profit margin on a job, the closer a builder comes to potentially losing money.

The traditional estimating process consists of design review, quantity takeoff, and input of quantity values into an estimating program to perform construction material breakdown and pricing. This process typically involves several different applications or workstations and a lot of manual data manipulation, so it can be prone to inefficiency and error. Receiving designs in BIM format then processing them with BIM-estimating applications revolutionizes cost estimating in several ways.

Kevin Yu, President of Innovaya, LLC, characterizes this type of new approach to cost estimating. Innovaya provides 4D and 5D BIM construction solutions that enable total integration of design, estimating and scheduling (see www.innovaya.com for more information). “A BIM-based estimating solution should provide a unified platform for the estimators to easily review a BIM model in both 2D and 3D, while at the same time, producing the quantity takeoff automatically based on the calculation criteria set by the estimator,” according to Yu. He goes on to say, “BIM estimating is not only about quantity takeoff. It is important that the same application is able to further take off the quantities into estimating assemblies and items, with a breakdown of construction materials, equipment, and subcontractor costs.”

BIM-enabled estimating solutions permit the contractor to do all this by intelligently connecting design quantity information and item cost databases. As Yu explains, “True BIM estimating software has the potential to retain the connections between design, quantity, cost items, and scheduling activities so that any design or resource change can be reflected in the estimate and schedule. When such a BIM system is used in pre-construction, it helps all project stakeholders increase productivity, perform constructability analysis, improve budgetary decision making, and accelerate construction planning.”

Builders who decide to move toward BIM will not only be able to respond effectively to designs modeled with this technology, they will be able to initiate productive, informed communications with the designers regarding the constructability and maintainability of projects. And they will be able to anticipate construction problems in the pre-construction phase before they become costly mistakes or change orders.

BIM technologies enable a fundamental change in the relationship between the owner, architect, and contractor. Instead of the contractor simply reacting to the architectural design, these tools enable a much closer collaborative relationship between all three, with cost more integral to the design process. For the contractor, cost estimates can be justified through design visualization and assumption validation. And the ability to show owners and developers, in real time, the cost and constructability impact of design changes puts the builder in a position where conceptual estimates can be quickly produced and lead to a negotiated bid.

BIM as a technology improves the direct relationship between builder and designer. But when embraced by the builder, BIM becomes the catalyst for better collaboration throughout the entire value chain, from pre-construction through to post-construction by empowering the builder to play a role in all phases of a project. This potential lies in the ability of BIM to bring about enhanced collaboration and new processes built around the idea of “Virtual Design and Construction.”

Sage Construction and Real Estate (CRE) has been a leading provider of business management solutions for the Construction and Real Estate industries for nearly 30 years. Offering a variety of fully integrated product suites as well as stand-alone solutions such as Accounting, Estimating, Project Management and more, Sage CRE has a solution that’s right for you. For more information on BIM, VDC, Cost Estimating or any other Sage solution, contact Sage Construction and Real Estate at productinfo.cre@sage.com.

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