Leveraging BIM through Integrated Project Delivery

By Navigant Consulting, Inc.

Introduction

The Denver Art Museum, an architectural icon, was delivered ahead of schedule with minimal rework and 15% under budget as a result of BIM utilization. While that is a great story, if an integrated project delivery (IPD) approach had been used, project performance could have been even more impressive. The time has arrived for companies currently utilizing BIM tools to look beyond their individual BIM successes and begin to take advantage of the synergistic value of incorporating BIM-enabled IPD into their organizations. This article will look at various BIM tools and their benefits, describe the advantages of BIM enabled IPD, and explain two approaches to becoming a truly integrated firm.

To date, most design and construction firms using BIM have taken a piecemeal approach to BIM implementation, viewing BIM as a technological initiative requiring only minimal changes in organization. The vast majority of project teams utilize BIM only as a visualization and communication tool when, in actuality, the largest returns on investment occur when firms integrate the complete process of design, estimating, planning and scheduling, and virtual design for construction and facilities management. This holistic approach to integrating a BIM and IPD platform is viewed as a major differentiator in the marketplace. It enables firms to compete on value rather than price.

Benefits of BIM

We see design and construction firms utilizing current BIM tools from preconstruction through facilities management realizing returns on investment of 300% to 500%. With the decrease in development opportunities, users have found BIM to be the meaningful differentiator helping them win more projects by providing superior value to the owner and, at the same time, improving their bottom line.

BIM enables a collaborative design process, which improves constructability while maintaining budget and schedule. Contractors are using BIM tools to identify errors in design, and utilizing systems models to coordinate work resulting in fewer requests for information and change orders. The systems models enable pre-fabrication resulting in schedule reductions and improved on and off-site productivity. Virtual mock-ups are used for visualization and constructability review. "Lift drawings" consolidate information from numerous 2D drawings into a single model used by craft workers for construction, resulting in a reduction of rework and improved productivity. 4D schedules, often linked to traditional critical path method scheduling tools, provide a clear medium for all project participants (including the owner) to participate in schedule development and refinement resulting in buy-in and exposing scheduling errors thus improving the overall project plan. The value of improved communication is enormous. Alone, it is sufficient reason to begin or advance the utilization of BIM tools in an A/E/C organization.

Model based 5D estimating has extensive potential to improve estimator productivity and accuracy of estimates. It is on the verge of becoming a mainstream reality among current BIM users. Contractors have found that model-based quantity take offs are exposing significant errors in manual quantities. Another value proposition for owners is the production of model-based operations and maintenance manuals and as built models. 5D estimating and as-built O&M models are additional meaningful differentiators.

Leveraging BIM through IPD

Integrated project delivery is the next iteration of project delivery using BIM as a platform. Early integrated projects have found improvements in collaboration and communication even beyond what has been realized through the use of BIM tools alone ("lonely BIM"). Subcontractors working on integrated projects are realizing cost, schedule, and quality improvements so significant that they are pledging estimate reductions for future integrated projects. For companies currently utilizing BIM, organization and project integration (IPD) is the next big step toward realizing the full potential of current and future BIM tools. IPD will provide additional meaningful differentiation for those willing to implement.

BIM/IPD Implementation Models

Two models for BIM/IPD implementation have been utilized by pioneering organizations. Both methods require third-party assistance in development and implementation. The first includes finding and recruiting the talent necessary for the new or changed roles created by the BIM/IPD initiative. This process is slow and often overwhelming for those involved. The timeline is significantly reduced with third-party

assistance. The advantages of this model include existing knowledge of the company culture and existing relationships with fellow employees. Risk for this model is relatively low (unless the consequences of the lack of BIM capabilities are factored in). Subsequently, the reward is long term.

Another model for integration is the acquisition and integration of truly integrated design-build firms with in-house expertise in architecture, engineering, and construction. These organizations have likely established many of the processes necessary for integration and may even have some expertise with BIM tools. With the current market, companies not presently structured in this manner have the opportunity to establish a BIM-enabled IPD firm through acquisitions and mergers at a relatively reasonable cost. This model involves significant investment and requires clearly defined positions, roles and responsibilities, and a clear strategic plan for company direction. The advantage of this model is a fast track to functional BIM and IPD, thus improving market position. Other advantages of an acquisition strategy are the reduction of competition and increased barriers to entry.

Conclusion

BIM and IPD are currently transforming the industry. The days of traditional project delivery methods with all of the associated waste in the process are numbered. Through BIM and IPD, firms are able to win and deliver more projects at a decreased cost and increased profit. The old saying comes to mind: "There are those who make things happen, those who watch things happen, and those who wonder what just happened." In order to survive in these troubled times, it is imperative that design and construction firms decide to "make things happen" through BIM and IPD implementation.

AGC Bolsters BIM with BIMForum, BIMEducation

Building Information Modeling is both a technology and a methodology. It delivers the promise that we have come to expect from new technology by increasing productivity and efficiency. However, it has the potential to go even further by improving traditional workflow processes and demanding closer collaboration from all project stakeholders.

These are changes that can transform the industry. The new tools and the new processes they enable will power builders to lead integrated project delivery teams that can eliminate waste and error while dramatically improving the task of delivering better products to the owners.

AGC has developed a two-pronged approach to BIM. The first, through the AGC BIMForum, is AEC industry-wide and intended to develop the new broad industry practices that are necessary to enable full BIM implementation. The second is to educate the workforce that can carry out these changes and allow contractors to productively and confidently incorporate BIM into their companies.

BIMForum: BIM is unique among most industry topics in that, to be successful, it requires full participation from every sector. The BIMForum's open membership structure is designed to bring BIM experts from across the industry together to collectively find practical solutions to the barriers that prevent full BIM adoption.

The BIMForum has seven sub-forums that represent the primary stakeholders. The existing sub-forums are: contractors, designers, legal and insurance, academic, emerging leaders, owners and software.

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BIM Education: AGC of America is in the process of developing a BIM education curriculum to be administered through the chapters. This curriculum will educate construction professionals on all relevant aspects of BIM. Although this curriculum is still in development, and may still be changed, it is expected that it will be comprised of six courses. Together these courses are intended to give the student a broad understanding of new workflow processes, a basic grasp of the technology, as well as an overview of the legal and insurance issues that are relevant to BIM.

The anticipated courses are:

- BIM 101: An Introduction to Building Information Modeling
- BIM Legal Issues and Risk Management
- BIM Case Studies and Lessons Learned
- Introduction to BIM Technology
- BIM Process and Integration
- Emerging Trends in BIM

AGC of America expects to complete the curriculum development by fall of 2008 and begin offering courses through chapters late 2008/early 2009.