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Technical Bulletin

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Building Information Modeling (BIM) Part 2 – Time Management & Productivity

Introduction

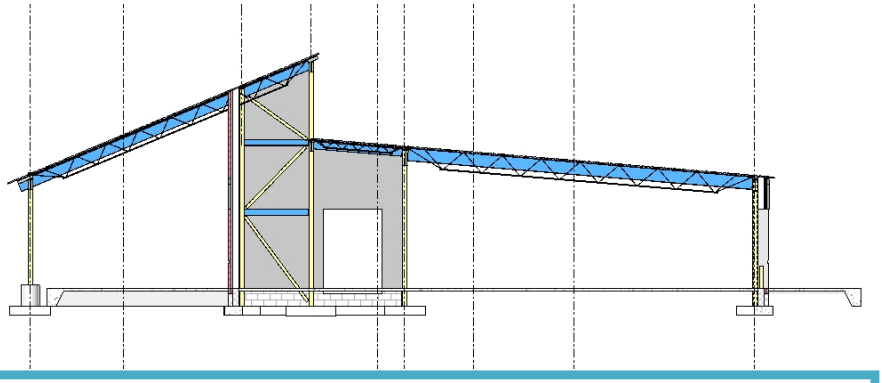
Our industry has been evolving into three dimensional (3D) modeling (or BIM) offering multiple benefits to the design and construction industry. However, with the advent of this technology we need to rethink and redefine our work and time management processes to fully utilize its strengths and provide a complete and coordinated set of construction documents meeting our clients' needs and expectations. In this bulletin we will discuss time management and productivity issues with BIM.

Discussion

As with any new technology, it is human nature to continue workflows or work processes which were used with previous technology; humans are somewhat resistant to change. In most cases this can be easily achieved with some slight modifications to current practices. With the implementation of BIM, workflows and time management processes cannot be based on traditional design and production schedules.

Current work processes were based on construction document submittal schedules. The typical submittal schedules are schematics (25% complete), design development (35% complete), construction documents (65%, 95%, and 100% complete), and final documents. These reflected the amount of work completed in a specific period of time.

For example, if the allotted time the production of construction documents is one year; 35% construction documents would be submitted in about 4 months, 65% in 7 ½ months and so on. This works well when producing two dimensional plans where building elements are represented with lines defining the design intent and methodology.



Additions & Renovations to Greer Elementary School, Albemarle County, VA

Revit® image courtesy of Rancorn, Wildman Architects, PLC

Each level of the building is an individual plan which will develop in level of detail as the project evolves. For a typical 35% structural drawing package which includes notes, foundation plans, framing plans, and typical details, this can be easily achieved with 2D drawings within a traditional schedule. In the BIM world, building elements are now represented by objects with specific properties, constraints, dimensions, and elevations in a virtual world. For example, in a structural engineering perspective, a steel beam was represented with a line on plan. Now, we have to give the beam a size, locate it geometrically both in plan and elevation. Therefore, a full building design and model must be complete in order to create a two dimensional foundation, floor, and roof framing plans. In order to produce a 35% set of structural drawings, experience shows that the structural design must be at least 50% complete. This includes finalized column grids and dimensions, floor elevations, and roof configurations. This does not infer the final submittal date needs to be extended, but that the adjustment to intermediate submittals should be reviewed to reflect the amount of work that must be completed to provide the same level of documents our clients and owners need and expect.

Summary

Based on our experience and research, the total design time between the traditional methods and BIM is relatively identical. We have seen it does take a little more time to produce a final set of construction documents using BIM, since more information is now required to be shown on the final documents. On the other hand, the amount of work performed through the different submittal stages is considerably different.

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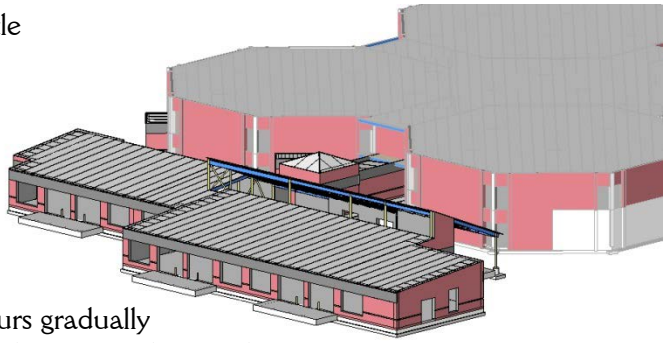

In the traditional work processes, the amount of hours gradually increased from the start of the project and significantly increased toward the end during the development of building sections. However, for BIM there is a significant increase of hours at the beginning with a decrease of hours towards the end of the project life cycle. A considerable amount of time is spent at the beginning to develop a core models, but with this core model you can develop indefinite views, sections, and details providing a multitude of benefits such as coordination between architectural and other engineering disciplines throughout the design process. This does require more up-front engineer involvement verses drafting since the engineer is responsible for creating the model from the engineers design. Therefore, we need to adapt fees and time management to adjust for this new workflow.

Coming Up...

Our next Technical Bulletin in this series we will discuss specific BIM design and coordination issues including the importance of conducting a pre-design meeting.

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