

The New Heroes in the Building Industry

By Dominic Gallelo & Clay Freeman

Today's newest construction industry heroes are a group of individuals that may total less than a few hundred, but their numbers will grow dramatically going forward. This is a new breed of building professional that we call the 'construction modeler'. The construction modeler fulfills an entirely new role in the construction process - creating 3D building models that are accurate for construction purposes.

So why is this important? - Money! This new profession promises to remove 2-3% from the cost of every building project and generate further savings by reducing project schedules. *How?* - The efficiencies will be gained through constructability analysis, faster and more accurate estimates, sequence and procurement optimization and improved data flow to fabrication.

A new profession

Construction modelers must consider every intended use of the model when planning the creation of each building element. Planning **constructability analysis** needs an insight into how an element is assembled, including the space requirement of the equipment needed for its assembly. **Estimating** requires knowledge of the properties of each building element on which the estimating formula relies. **Sequencing** depends on an understanding of the possible sequences involved in constructing each element. **Fabrication** requires knowledge of shop drawings and/or the CNC machinery involved in the fabrication of each element. Modeling for fabrication also requires an understanding of acceptable tolerances for each element, to reduce fabrication costs and improve the ease of assembly. Ultimately, construction modelers must also have an extensive knowledge of the technology used in Virtual Construction™.

However, the skill set of estimating, scheduling, means and methods and technology is rarely found in any single individual in the industry today. Construction modelers do not have to be experts in all of these fields, but they do have to develop a medium depth of knowledge across a broad range of specialties.

The architect's fit

Construction modelers are very different from the typical definition of an architect today. Architects also have a broad range of responsibilities. They must be able to convert a client's requirements into a safe, useable, energy efficient and aesthetically appealing design, while staying within the boundaries defined by the client's budget and local building codes. The knowledge and experience required to successfully perform the duties of an architect have prevented the profession from also adopting the construction modeler role. In addition, compensation models and liability issues in many parts of the world entirely prevent the architect from even trying to assume that construction modeler mantle.

Historically however, architects have carried out this function. Architects were previously master builders with full responsibility for the design and construction of a building. But the increased complexity of building structures due to the development of new materials, the addition of mechanical and electrical systems and other refinements, increased the complexity of the architect's role to a point that new specialists had to emerge. This fact, coupled with the architectural profession's desire to reduce exposure to the extensive liability issues surrounding construction, has resulted in the formation of general contractors and construction managers.

The construction fit

Project managers, project engineers and site managers within general contractors all have either a depth of knowledge in one subject or a broad understanding of all subjects related to construction modeling, but with the exception of modeling technology. The additional necessity of a clear grasp of modeling technology presents a barrier for existing team members to also take on the responsibility of creating construction models. So expect the emergence of a new job function and a new breed of specialist which will surface across the industry.

Who will construction modelers work for?

Today, construction modelers work primarily for construction companies and design/build companies. This allows them to work very closely with estimators, schedulers, project managers, project engineers and site managers within their firms to provide the required support that these disciplines need. *Will an architectural firm ever assume the role of construction modeler?* Maybe. Construction companies would definitely prefer that the model, along with all of its changes through the design process, comes directly from the architectural firm, as opposed to having to be recreated. However, architectural firms would have to assign specialists to develop the knowledge required to achieve this role. It should not be assumed, however, that learning construction modeling is a 3-day workshop – it is an avocation. Additionally, the architectural firm would have to make significant changes to its business model to deal with the compensation and liability issues.

The transition has already begun

For the George Lucas new corporate campus in the Presidio, at the foot of the Golden Gate Bridge, in San Francisco, a construction model was created from a set of 2D drawings to help to communicate to the general contractor and the subcontractors what needed to be built. *How successful has it been?* To quote Tom Brady, who is the construction manager and was speaking at the ASC Construction Management Conference in February of this year, "I believe that in 5 years, every major project will employ a building model". Kajima in the UK has also taken 2D drawings and turned them into a 3D construction model. *The result?* - The elimination of many coordination problems, which saved £250,000 on the project. And finally, YIT in Finland produces accurate estimates from a construction model. *The results?* – They produce estimates in half to two-thirds less time, and generate quantities accurate to within $\pm 0.5\%$.

Next steps

How the construction modeling role finally develops and flourishes is not exactly clear, but what is clear is that there is a call to action:

- For companies – whether you are an architectural firm or a construction company, you need to assess how your firm can

- play a value-added role in this important new work environment, and how you can drive additional revenue as a result.
- For individuals – this may be your opportunity to make your skills and services more valuable in the building industry.

If you are interested in learning more about how this evolution within the construction process can affect you and your company, e-mail me at dgallelo@graphisoft.com.