Design cost awareness

By Dominic Gallello, Graphisoft CEO

Today, it seems as if every building project comes in over budget and run 20-50% longer than planned. Design cost awareness promises to change all this.

Building owners like the General Services Administration (GSA) in the US, one of the largest building owners in the world, are becoming more and more frustrated that when project costs spiral out of control, they find out too late in the cycle. The result - a value engineering process that strips out all of the things that were going to make buildings less expensive to operate over the next 30 or so years. To remedy this, there is a new process which is being adopted by some of the most leading-edge owners, architects and contractors which aims to take the blindfold off when it comes to getting the combination of design, cost, and schedule right.

Traditional process

Ultimately, cost drives design, however, traditional design tools do not provide accurate and sufficiently frequent cost information from which to make good decisions. Construction companies and/or owners can only start providing cost-related feedback to the design when a design phase has been completed - this results in large amounts of rework per design phase.
**Future parallel process**

The process is set to change dramatically. The time is upon us where architects will work collaboratively with estimators from construction companies in a new workflow that will provide architects, construction companies and most importantly building owners with much more real-time information on cost as the design is progressing through its various phases. This new process is being enabled by Graphisoft's industry-first 5D system. By collaborating in 5D, estimators work on cost Recipe definitions and architects design in parallel processes.

By using a data publishing mechanism, cost can be determined based on the information in the 5D model at any moment, immediately informing the design team about cost consequences of design decisions. Costly rework can be avoided and improved support for an iterative design process will be realized. "By providing early, frequent, rapid and reliable cost analysis, 5D collaboration promises to help the design team focus on what is possible within budgetary and performance constraints, ultimately ensuring design intent can be fully realized in the completed project," according to Tony Rinella, CIO at Anshen & Allen.

In the early project phases, cost information is assigned to the 5D model based on historical data for various building systems. This data is made available by means of Recipes that store this information. Using this approach, costs can be evaluated by the team on a building system-by-building system basis. (If the cost of one system increases, other systems can be reviewed to explore potential savings, keeping the total project within the design "target cost").

Cost ranges, reflecting the expected maximum and minimum price values for building components, can be assigned to Recipes. The cost ranges - variances - can be used to create a variance report, which enables the identification of the highest price uncertainties (price risk) in the project.
During the design process, more specific Recipes replace the variance Recipes that are used in the early phases, reflecting the decreased price-variance risk as the design work progresses. The more specific recipes do not include price variances anymore - unit price variance equals zero (see report view image above).

**In-budget project feasibility**

The 5D model, resulting from converting the early phase design documents into an accurate 3D model linked to the Recipes, enables the performance of "what if?" scenarios on the design. Changes, made in either the design (3D model) or specifications (Recipes) can directly be analyzed. Design changes proposed by the architect and engineers, can quickly be analyzed based on the "target cost" goals of the project and thus ensure project feasibility. The 5D model evolves during the design phases, including more specific data, as the design progresses resulting in cost estimates of increasing accuracy. The iterative design process, the success of which traditionally depends on the willingness of the parties involved to compromise on very diverse and inconsistent motivations, can now be transformed into a cost-driven design process, coordinated by means of a 5D data model.

"Target costing is a critical component to ensuring that our clients and our designers understand that the final design must meet and hopefully exceed the project goals while staying within budget," according to Daniel Gonzales, Director of Design and Construction Technology Rogers Quinn Construction. "Cost and time are design criteria in our world, so to make design decisions without knowing the cost impact is like going to the airport not knowing when your flight leaves."

As the building industry moves more toward "design cost awareness", the benefit to the owner will be shorter design times, shorter overall project schedules and a design which finds the best balance between what Vitruvius described as "commodity, firmness and delight."

*For more information visit: [www.graphisoft.com/products/construction/](http://www.graphisoft.com/products/construction/), or contact Dominic Gallello.*