The Importance of Accurate 3D Modeling in Construction Projects

This is a guest post from Landpoint’s Dustin Price

Construction projects need to be precise, timely, and safe. But they’re also extremely complex, with many moving parts. Accurate 3D modeling can help.

Before, during, and after construction, 3D modeling solutions can improve upon cost management and projections. Here are ways in which 3D modeling can be used—and why accurate modeling is important.

Before the construction begins

At the beginning of a construction project, 3D modeling is used to simulate potential designs, estimate costs, and identify any flaws within architectural models.

Accurate 3D models of the surrounding landscape must be taken to:

- Adequately calculate costs related to ground leveling, foundation pouring, and other preparation work.
- Simulate weather effects, such as sun shining in through windows, and the potential for flooding.
- Estimate the building’s impact on the surrounding neighborhood and terrain, regarding casting shadows or environmental concerns.

A 3D model will begin with the terrain and be built up by architects and engineers, until it is a near-perfect simulation of the proposed project. This 3D model can then be accessed by all principal stakeholders, to discuss potential changes and ensure that everyone is on the same page.

In the past, it was often difficult for individuals to truly understand how a construction project would look when it was completed. The advances in 3D modeling have made it so that architects, engineers, and stakeholders can walk through a virtual model of the project before it’s even built.
This goes beyond simple aesthetics. Complex, accurate 3D modeling of construction projects helps a great deal in project costing, as it’s easier to get very accurate measurements of the materials and labor that will be needed. 3D models can have materials and engineering solutions swapped out during planning, to improve upon costs without reducing safety or stability.

The more accurate the 3D models are during the initial stages of the project, the less likely the construction project will need to experience a rework. Construction project reworks can cost a company millions of dollars, and they usually occur when errors are found in the initial data and adjustments need to be made.

As 3D models become more advanced and the data collected becomes more extensive, this need for construction project reworks will go down significantly: the projects will be done correctly the first time.

**During the construction phase**

While construction is ongoing, the 3D models can still be utilized. 3D models during construction are used to ensure that construction is both on track and on time. Comparisons can be made regarding the existing work and the projected work, and these will indicate
whether the work is consistent with the projections.

Through the use of drones, construction companies are able to review a construction site quickly, automatically matching up current scans—typically captured through lidar, though occasionally using supplementary photogrammetry for proper color and texturing—with the models of the construction project. If the current 3D scans do not match the models as they should, the construction company will be able to review any changes, and make modifications as needed.
Drones are able to perform regular lidar scans and safety checks on an ongoing construction site, and they have the benefit of being entirely noninvasive and nondisruptive. A drone can cover even a large construction site quickly, can report data back almost immediately, and will not interfere with the work that’s being completed.

Furthermore, accurate, in-progress 3D scans can be used to report back to stakeholders, assuring them that work is still on target for any relevant deadlines, and showing the construction project as is currently completed. Having these accurate 3D simulations can improve upon a construction project’s ability to meet its deadlines, as any issues will be caught quickly.

**After the construction**

Once construction has been completed, 3D models can be archived for use later—they will remain useful any time the construction project needs to be modified, retrofitted, updated, or extended. Through cloud-based data services, the construction company can retain this information, and it can be accessed from anywhere in the world.

When the construction project needs new additions, these additions can be inserted directly
into the 3D models to simulate how they would impact the project overall. This can extend to everything from updating an HVAC system to adding a new wing onto an already extensive building.

One of the benefits of accurate 3D modeling is that this data will continue to live on and to be accessible, for future use. If a construction project is likely to be an ongoing one, which will be frequently renewed, renovated, and updated, then the initial 3D models of the project will prove to be useful for some time.

Architects and engineers will be able to review a multitude of scenarios regarding potential changes in the project before they complete them, and they will already have the information stored about the surrounding terrain and improvements.

Key takeaways

Ultimately, 3D modeling is already being used extensively throughout construction projects, and it’s easy to see why. Accurate 3D modeling makes it possible for architects and engineers to look ahead into time, seeing exactly how a project would be completed, and its impact on the surrounding area.

3D modeled projects can achieve better costing, better lead times, and better safety and stability—and it’s all done through the advanced labor provided by drone technology.

Drone technology makes it possible not only to take high resolution, complex scans of a terrain, but also to regularly scan and analyze on-going construction sites. Through drone technology, companies are going to be able to reduce their own costs, while improving upon their consistency.
Author Bio
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