

GREATER UTILISATION OF TECHNOLOGIES AT HAND

Chasing BIM: How Surveyors Can Shape the Future



Survey and geospatial professionals can still do more to deliver value in the 3D environment. Learn how to leverage the BIM revolution for business benefits with these practical insights.

While research shows that many organizations recognize the power of building information modelling (BIM) for streamlining construction and infrastructure projects in a seamless

online environment, survey and geospatial professionals can do more to deliver value in the 3D environment. There have been countless presentations and papers on the definition of BIM. This article makes an attempt to provide some practical insights on how surveyors can leverage the BIM revolution to benefit their businesses.

The good news: there is a general consensus among geospatial thought leaders that the design and construction industry has reached a tipping point. The more that surveyors embrace BIM, the more it can positively impact their work. But for this scenario to play out to everyone's advantage, potential BIM adopters must shift their perspective and realise that BIM technology is not just intelligent 3D modelling; it also offers a centralised platform

for sharing data to help partners communicate effectively in real time. When surveyors take advantage of BIM holistically, they are not only factoring in the traditional aspects of a building's design but are also creating rich data spanning the range of properties of a structure's components, construction and maintenance.

The challenge with BIM is not merely to ask surveyors to embrace technological changes as part of the way they work, but instead to start viewing it as more of a paradigm shift in the design and build process altogether. After all, at its core, BIM is meant to transform how project teams work together on a job, from start to finish.

Tackling the Issue of Limited Awareness

In terms of a surveyor's scope, they typically measure property lines and record key assets such as utilities and topography to provide a base map of where a building will eventually be constructed. At this point, many surveyors conclude their role in the building lifecycle. However, this only provides a small sample of the information that everyone involved in a project needs in order to successfully transition from design to construction, and then to the operation stage. For example, additional data about a building's particularised components, such as specs, descriptions, sourcing, installation, maintenance and project management, are utilised by numerous parties involved in a building project.



Geospatial professionals entering the world of BIM often discover a heightened level of project complexity.

One challenge preventing widespread BIM acceptance is that some surveyors have a limited understanding of the technology's range of capabilities, and not many stakeholders are using the technology to its fullest extent. For example, this scenario is evident in areas of the industry that deal with laser scanning of the built environment. Many surveyors assume investing in a laser scanner automatically makes them 'BIM service providers'. However, a laser scanner is just another tool if it is not used properly. So, how can everyone involved in the process – and particularly surveyors – use BIM to stay relevant, enhance their business and become part of the so-called BIM revolution?

How Surveyors Can Play a Bigger Role

Surveyors worldwide are paying attention to BIM, and they see it as an opportunity to expand and enhance their operations. Their biggest obstacle is that they often mistakenly think the role of geospatial information in the context of building projects is limited to XYZ-type positioning data. Actually, surveyors should be talking more to other trades and parties working on a job site to determine how – together – their deliverables can provide exponentially more value downstream.

Over the years, surveyors have traditionally 'left the rest to the client' when it comes to transforming point clouds into building information models. Very often, architects or land developers may still be working with 2D floor plans, building sections and facade elevations, and are not demanding 3D or BIM deliverables. However, BIM technology gives surveyors the opportunity and the capability to provide higher-quality services and deliver more value by creating intelligent models that promote a richer understanding of an entire scenario.

Moving forward, surveyors must come to realise that there is a role for them in every stage of the design and construction process. With BIM technology, they need to communicate with multiple disciplines, in real time, through a single project-management environment. Moreover, many BIM tools feature controls that can render extremely complex models in the field. So instead of staking out or listing data points, surveyors should work directly off live models. For instance, and as they place foundations or put stakes in the ground, other parties can receive immediate feedback no matter where they are located.

Building Lifecycle Process

Surveyors have opportunities to interface with BIM throughout all project stages, from pre-construction and design to construction, maintenance and operation. There are many ways surveyors can supplement their traditional offerings at various stages of the building lifecycle, including:

Pre-construction and design. The project lifecycle begins way before the construction starts and the first machines (or shovels) hit the ground. The processes in the pre-construction stage include planning, concept development, design and engineering, and bidding before the project is awarded to a general contractor. In each of these stages, surveyors are the key contributor. During the project planning, surveyors may be responsible for aerial photogrammetry or satellite imagery as well as building topographic maps and scanning to capture existing site conditions. Surveyors can provide more value with 3D visuals so they can illustrate the entire location in great detail, providing spatial awareness for a project including existing topography, precise documentation of as-built assets and historical records. Having feature-rich site documentation with existing site conditions in the proposal stage allows for more efficient architectural designs, compliance with legal controls and more accurate estimates and feasibility studies. In the design and engineering stage, the rich geospatial data generated by surveyors contributes to a more streamlined civil design process, enabling easier transition from a concept stage to a constructible model. Providing imaging panoramas, meshes, terrain models, utility (underground and above ground) locations and corresponding metadata ensures quality project design, minimising any potential rework and future requests for information (RFIs) in the construction stage, should discrepancies over pre-construction conditions arise or if damage to surrounding assets occurs. As the data collection is becoming more efficient and sensors more powerful, the emphasis is on the office software and feature extraction and modelling automation. A well-designed 3D model with the right initial information provided by a surveyor can speed up the construction process, save time and reduce waste on a job site.

- Surveyors play a critical role during construction in setting up the control network for the site, staking out the construction elements and performing the quality control, such as inspecting positional accuracies, performing verticality checks and doing real-time or campaign-based deformation monitoring. Using BIM models in the field can be an ideal source for extracting detailed prefabrication and work drawings. In fact, there are many ways in which data from the 3D model can be accessed to provide additional insights on a job site, using site workstations, tablets and mixed-reality devices. Surveyors can play a major role in improving and implementing virtual and augmented reality. Mixed reality combined with laser scanners or imaging instruments can make it possible to adjust a BIM or 3D model to just-taken scans in the field. Field connectivity and the concept of the 'connected site' can play a major role in getting the most up-to-date designs to the field, as well as closing the loop once an element has been properly placed and verification becomes standard practice.



Survey and geospatial professionals are major stakeholders and often gatekeepers in the BIM value chain.

- **Operation/maintenance.** In this phase, stakeholders can use BIM to manage and maintain a building efficiently. For example, a 3D model can be used to develop an annual maintenance plan or to locate parts that require repairs quickly. Any changes to installations in the 3D model can also be simulated and calculated before they are applied. Besides that, BIM allows surveyors to identify what should have been on a job site from the start and to better define a problem. For example, if a wall cracks, a surveyor might use the technology to precisely measure the point of the crack so team members can determine potential solutions. If an old building needs to be removed, the surveyor can measure the structural elements in order to enable the explosives placement study. Surveyors have the opportunity to be exceptional by providing additional as-built scan and imaging documentation services or by creating virtual tours – a collection of additional metadata that can be published and shared on a local intranet or web, providing additional value for facility managers, site occupants or potential buyers.

Gatekeepers in the BIM Value Chain

There is no denying that advances in technology influence how we use and interact with the built environment. We are living in an era of greater connectivity, especially among surveyors, designers, contractors and construction companies, and new tools are constantly emerging to support a shift towards widespread BIM adoption. Geospatial professionals must embrace technologies like BIM, not only to help with daily tasks but also to use it as a stepping stone to generate foresight and to gain a deeper understanding of design and construction as a whole.

BIM is already a clear winner – it delivers projects on schedule and under budget. It also enhances cooperation across a project team, improving both teamwork and communication. Survey and geospatial professionals are major stakeholders and often gatekeepers in the BIM value chain. They have the ability to move the industry forward, providing more rich and insightful information and deliverables to civil

engineers, architects, land developers, owners and any other stakeholders. This not only ensures projects are delivered on time and under budget but, also and more importantly, allows survey and geospatial professionals to stand out in the sea of competition.

<https://www.gim-international.com/content/article/chasing-bim-how-surveyors-can-shape-the-future>
