International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 Impact Factor: 8.176 ISSN: 2582-3930

# Scan to BIM Technologies for Construction

**Sanket Pawar, Kalpesh Methekar**

*Department of civil Engineering MIT college of Management Pune.*
*Department of civil Engineering MIT college of Management Pune.*

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**Abstract -**Building information modelling has been greatly facilitated by the recent development of technology that supports the use of data-rich models in architecture. Parallel to this, 3D high definition laser scanning technology's capabilities have rapidly increased and it is now widely used.The potential to record the current built environment is obvious, even if laser scanning has frequently been linked to fields other than architecture and construction (such as heavy engineering and oil and gas projects). In fact, well-established ideas in architecture and materials conservation about how crucial it is to precisely monitor and detect the significance of surface characteristics are ideally suited to the use of scanning to record geometrical quirks as well as planned detail. The workflow processes needed to incorporate the output of laser scan data into a BIM environment are covered in this study. Although point clouds can be imported into industry-standard BIM software, some post-processing and modelling are still necessary to get the most out of the highly accurate and frequently massive data files. We outline a method for transforming cloud data into realistic surface meshes and investigate how the resulting models might be connected to meta data in a BIM environment.

***Key Words*:** Keywords: building information modelling; 3D point clouds; LiDAR; registration; semantic segmentation; interoperability

## 1.INTRODUCTION

By using 3D laser scanning technology, the process known as "scan to BIM" can be used to digitally transform real building or structure attributes and dimensions into a format that can be used for Building Information Modeling (BIM).

Millions of data points that precisely depict the geometry, structure, and characteristics of the building are collected using a 3D laser scanner during the procedure. Following processing, the data is transformed into a 3D point cloud that can be imported into BIM software programmers like Revit or ArchiCAD.

Once the point cloud data is in the BIM software, it can be used to produce precise 3D models of the building or structure that include exact measurements and descriptions of the building's features. The development of intricate construction plans, the production of cost projections, and the promotion of collaboration among project stakeholders can all be done using this information.

The architectural, engineering, and construction (AEC) business has undergone a transformation because to scan to BIM technology, which offers a faster and more precise means of data collection and modeling. It has sped up project completion times, decreased costs, and eliminated errors while facilitating the design and building of intricate structures.

## 2. Body of Paper

In the process known as "scan to BIM," precise measurements of an existing building or structure are taken using 3D laser scanning technology, and the data is then converted into a 3D model using BIM software.

Utilizing 3D laser scanners, the building is first scanned to begin the process. Millions of data points are collected by these scanners, yielding a highly precise point cloud of the building's dimensions and features.

In BIM software like Revit, the point cloud data is processed and turned into a 3D model. The model can be used to produce precise sections, elevations, and floor layouts. Additionally, it can be used to generate construction documents, compute quantities, and spot conflicts between various project components.

The development of scan to BIM technology has revolutionized the building sector. By giving highly accurate information on the building or structure that is currently in pla ce, it saves time and lowers errors. The efficiency of the building project can be increased by using this data to optimize the construction operations. Retrofitting, renovating, or modernizing older buildings or structures is one of its most advantageous uses.

## 3. Advantages of using scan to BIM technology in construction projects

1. Accurate and thorough data: The technology of scan to BIM offers incredibly thorough and accurate data of the existing building or structure. Millions of data points are collected during the 3D scanning process, producing a precise point cloud that can be modelled in BIM software.

2. Better project visualisation thanks to the creation of 3D models using scan-to-BIM technology, which enables a more thorough comprehension of the building or structure.

3. Faster and more efficient workflows: Scan to BIM technology saves time by reducing the need for manual measurements and drawings. This technology is also more efficient, allowing for faster collaboration between team members.

4. Cost-saving: Scan to BIM technology can save construction companies money by reducing errors and rework. Accurate data ensures that the project is done right the first time.

5. Greater safety: By minimizing the need for workers to enter potentially dangerous areas on the job site, 3D laser scanning technology makes data collecting safer.

Scan to BIM technology improves workflow accuracy, precision, and efficiency, which streamlines the construction process overall.

## 4. Conclusion

By offering a more precise, effective, and reasonably priced method of capturing data and producing 3D models of buildings and structures, scan to BIM technology has completely transformed the design, engineering, and construction sector. The technology makes it possible to take exact measurements, to see things more clearly, and to optimise workflows, which ultimately lowers project management costs and boosts worker safety.

Even so, despite the technology's many advantages, there are also possible drawbacks, such as large upfront expenses, poor teamwork, and restricted application. When considering whether to use this technology for a specific project, these drawbacks should be evaluated against the positives.

In conclusion, scan to BIM technology is a highly beneficial tool in contemporary construction projects that offers a number of benefits while also having some potential drawbacks that must be acknowledged. This technology leads to more successful construction projects, increased accuracy in the assessment of the existing environment, more thorough documentation of as-built work, and improved workflow efficiency.

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