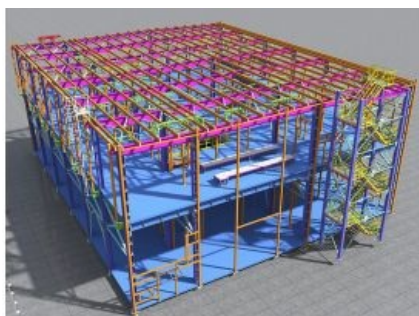


Applications of Laser Scanning, Augmented Reality and BIM in Existing Facilities



While laser scanning, augmented reality and BIM are often associated with design, they can also be powerful tools in managing existing buildings where complex systems are constantly interacting.

The benefits of BIM in facility management are well known, but many buildings don't even have a basic set of 2D drawings available. This is especially

common in facilities that were built long ago, when computer-aided design was emerging or non-existent. Creating a smart 3D model of an existing facility from zero is possible, but the number of man-hours required and their cost can be considerable.

While BIM is often associated with design, it can also be a powerful tool in facility management. This is especially true in large commercial or industrial facilities, where complex building systems are constantly interacting. Maintenance activities can be scheduled much more effectively with BIM data, and building upgrades are much simpler to design with the detailed information available.

Laser scanning technology has promising applications when modelling existing facilities, since it can accelerate the process significantly. Once a BIM database of the facility has been created, augmented reality can simplify maintenance, especially tasks in areas with many components close to each other.



Creating a model of an existing facility with BIM software represents a very different challenge than designing a new facility from zero.

Modelling Existing Facilities with Laser Scanning

Creating a model of an existing facility with BIM software represents a very different challenge than designing a new facility from zero. A new design gives flexibility when specifying components and their locations, but an existing facility model must accurately represent systems that are already in place.

Geometric modelling accounts for most of the man-hours when working with an existing facility, since the dimensions and locations of all components must be specified accurately. A manual procedure can take months for a large facility, but laser scanning technology can sweep the facility by areas in just a fraction of that time. Instead of modelling every single component manually, [BIM engineers](#) must only define adequate locations for laser scans.

Once the geometric model of the facility is completed, adding component properties becomes a much simpler task. BIM engineers can access the geometric model through a handheld device, and they can add properties and nameplate information as they inspect the facility. Some details out of the reach of laser scanners may still need to be modelled from zero, but the total workload is reduced drastically.

When BIM is implemented for an existing facility, there is an additional factor that is not present in new project designs. Since components have already been in service for a long time, they may present issues such as mechanical wear, deformation or corrosion. To be useful for the maintenance staff, the facility model should include this information. However, it can be added along with component properties during the facility modelling process.



To achieve even better results, augmented reality can be used to overlay BIM data on the field of vision through headgear.

Assisted Maintenance with BIM and Augmented Reality

[Planned maintenance](#) activities must often be carried out in areas with a large number of components, where mobility may be limited. It is also important to note that many components are at high temperature or electrically charged, adding a risk factor to maintenance tasks. BIM can be a powerful tool in this case - the technical staff can use it to pinpoint components, and check their last reported condition.

To achieve even better results, augmented reality can be used to overlay BIM data on the field of vision through headgear. For example, the headgear can display warning signs when working close to high-temperature or high-voltage components, so the maintenance staff can always be aware of their presence. Components that are hard to find or easily confused can be tagged and color-coded through augmented reality, to minimize the chance of human error.

When using BIM as a maintenance management tool, keeping updated information is very important. Otherwise, the information in the building model may no longer reflect the actual condition of components. If this is allowed to happen, augmented reality can cause confusion instead of helping the technical staff.

This article originally appeared on the website of [New York Engineers](#).

<https://www.gim-international.com/content/article/applications-of-laser-scanning-augmented-reality-and-bim-in-existing-facilities>
