

A BIM TRANSFORMATION

AS WE ENTER THE NEXT PHASE OF BUILDING INFORMATION MODELING, WHICH TOOLS AND TACTICS WILL TAKE THIS PROCESS EVEN FURTHER?



Sam Arabia is manager of BIM services at Torcon Inc., www.torcon.com, Red Bank, N.J. He can be reached at vip@torcon.com



Much has been written about the role of BIM (building information modeling) in the AEC industry. Industry professionals have spoken at length as to why BIM is good for your projects. We all know what we can gain by incorporating a BIM-based workflow into our construction practices. We are at the point now where we are placing BIM in action and are returning the evidence to support all that we have written about what we can do with BIM.

When considering BIM, most of us think of that large new project. It brings to mind new steel and concrete that comprises a new hospital or superstructure. It begs the question, are we to think the benefits of BIM only extend as far as the word “new” reaches? What is to be made of an existing renovation? It is important to remember that BIM is a process, and not a program, a person, or a thing. Perhaps, we can say it is a new way of looking at old things. In that light, it is a perfect fit for an existing building.

The basis of a project is always its background or the architectural and structural elements that comprise its footprint. In a new project, that has always been easy as it is expected

that the tolerance required in a BIM effort will be applied by the nature of starting at ground zero. A renovation project is a challenge as some facilities are 25-50-years-old and in the most challenging projects, greater than 50-years-old. Often times, these facilities have undergone small renovations by internal staff and the as-built drawings are practically useless. Prior to any new efforts, owners must spend thousands of dollars to have as-built verification studies completed to even begin a preliminary design. The as-built print rooms we are all too familiar with are dusty rooms containing drawings that haven't been touched for years, simply because they have become outdated and thus rendered useless.

We have successfully applied BIM concepts and received benefits during renovation projects with the use of a laser scan. Laser scanning is a process where a laser emits a pulse of light that bounces off anything in its path; this is called a point. In a laser scan, a device spins in a 360 degree radius collecting points of the area to be scanned. Hundreds of thousands of points comprise a point cloud. In essence, a point cloud is a static digital picture of

anything dimensionally accurate to one-eighth inch in the X, Y, and Z locations. The process is surprisingly quick to accomplish, even with a seemingly insurmountable task. For example, a mechanical room in a hospital of about 16,000 sq.ft., would take approximately two, eight-hour days to capture as a point cloud.

The point cloud is used to generate a Revit or AutoCAD model to use as the project backgrounds. A laser scan does so much more than capture the backgrounds. Everything in the path of the laser becomes part of the point cloud, so what we deliver to the owner is a true as-built of their facility with all MEP (mechanical, electrical, plumbing) systems in place. One of the staggering benefits of the advanced laser scans is tagging appears in the point cloud. As an accurate MEP model is created, systems and labeling is being automatically applied. At this point, you have a facility model that is accurate to one-eighth inch.

Pausing for a moment to truly understand what benefit this brings is invaluable. Think of how much time it would take to obtain accurate measurements in the field of every architectural and structural element, especially when you add in the existing MEP, even conduit down to one-eighth inch. All of us with any field measuring experience understand the task at hand is impossible. The time it would take to get even half of the elements as accurate as a laser scan is simply too cost prohibitive. This is why, until now, BIM has been largely relegated to the new construction realm.

A laser scan of an existing facility is what will take you from a classic renovation—complete with project

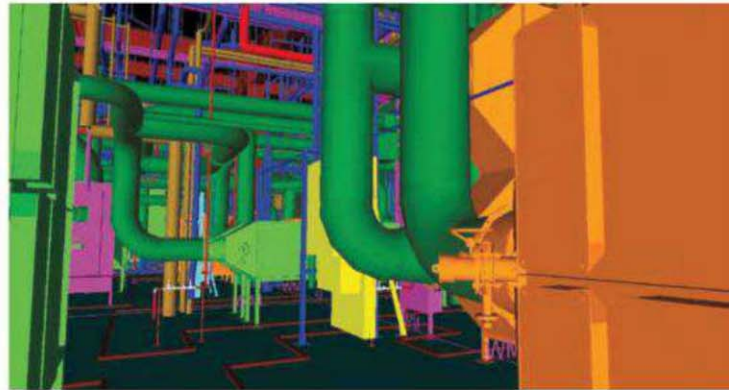
delays and unforeseen coordination issues—to a BIM project that captures all the efficiency and accuracy of new construction. Subs that were once relegated to hours of field measure verifications, now have at their fingertips the BIM model. Aspects of BIM, such as 3D MEP coordination and prefabrication, have found their place in renovations as well as in new construction.

Our experience with existing clients using the laser-scan facet of BIM has proven that the efficiency begins immediately. As we said before, a laser scan provides us with a dimensionally accurate model in location and elevation. Owners have taken the laser scan and begun working with it immediately even before the renovation is complete. Accurate measurements can be taken of any object or space providing facility managers enhanced visualization of their facility from the planning room. Time that was previously spent in research with a tape measure in a mechanical room is regained with the capabilities held within the laser scan.

Larger facilities are ever evolving and hold a cyclical pattern of renovations and expansions. Cost is often a factor in laser scanning and modeling entire facilities. However, a common project base point or GIS (geographical information system) locating coordinates embedded within the model solves this issue. With each completed project and evolution to design, the completed section snaps

into a full model the same as a puzzle piece in a jigsaw puzzle. An older facility will build an as-built model throughout time.

These facility models have varied uses that prove their benefits across the lifecycle of any building. We have discussed the use of maintaining an as-built model, which eliminates the need for pre-construction verification studies, but perhaps the greatest benefit gained is at turnover.



BIM coordination in a major mechanical room.

Clients can now link the BIM model created from a simple laser scan with their existing facility maintenance programs. A facility maintenance manager can now come to work in the morning, open his iPad or computer, and see all the equipment scheduled for maintenance. Parts, filters, and belts can be ordered directly from the model. Task hazard analysis can be applied with the advanced visualization within the model prior to setting foot in the work area. The simple laser scan applied prior to construction finds its use in the lifecycle of a facility.

As we have seen BIM evolve, it is a new way of looking at an old task. And, now with the advent of affordable laser scans, we can take an older facility and look at it a new way. •