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Erdman Anthony is on the Forefront of Innovative Building Technology

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Using innovative design technology, Erdman Anthony produces BIM-based design documents

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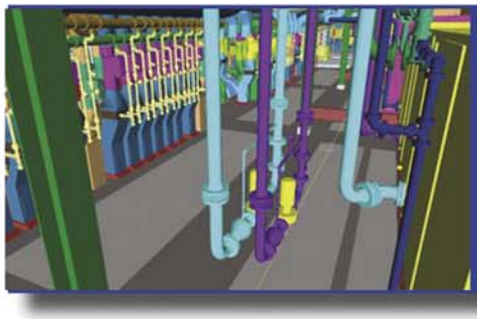


Erdman Anthony is on the Forefront of Innovative Building Technology

Erdman Anthony is employing innovative 3-D laser scanning technology that revolutionizes the building restoration process by speeding up existing conditions surveys from weeks to hours. Laser scanning allows the accurate and safe capture of field data without the use of ladders and/or man lifts. This process can also eliminate shut down requirements of equipment so measurements can be taken. On renovation projects, the firm uses 3-D scan to Building Information Modeling (BIM) technology to reduce conflicts and have accurate data. This data is used to ensure proper space requirements and provide accurate design documents that help speed projects in construction.

Laser Scanning

A 3-D laser scan produces a precise record document of a physical space or object. Initially, the operator of the system takes a photo-mosaic image with a camera and then marks the area to be scanned. The laser scanner then rotates robotically to capture data at a high speed of up to 4,000 points per second. This reduces data collection time and increases the level of data detail. The result is a raw image that is then loaded into 3-D visualization software and modeling tools to produce accurate existing condition drawings.

An example of how this technology was successfully implemented comes from the historic tower that serves as the world headquarters of the Eastman Kodak Company (Kodak) in Rochester, NY. Kodak made a decision to restore the building's façade, particularly the terra-cotta tile section on the upper four floors of the 19-story tower, which showed signs of cracking and deterioration.

The team of architectural specialists charged with exterior repair and restoration made a decision to use the 3-D laser scanning technology to speed up the process. Erdman Anthony performed the scans and prepared detailed and accurate elevation drawings to guide restoration work. Using this technology, the entire exterior scan was completed in less than two weeks from 32 adjacent rooftops or ground-level positions. During this time, approximately 84,000 square feet of 3-D façade data was collected and entered.

The laser scanner works by emitting laser pulses in a predefined array pattern. When a pulse reaches a solid object, it reflects off that object back to the scanner. By applying the speed of light to the time traveled by the laser pulse and the direction of that pulse, coordinate values are calculated for the point struck by the laser. In addition, coordinate points are assigned an "intensity value." By recognizing changes in intensity value between points, different building materials can be identified–such as tile grout versus adjoining terra-cotta tiles.

These individual scans were then "registered" together to form one overall "point cloud" of the tower. The point cloud–made up of more than 60 million points–yielded a level of detail down to ¼ inch.

After the elevation drawings were completed, they provided the restoration architect with cost-effective, accurate, to-scale drawings showing parts of the tower's façade in intricate detail. The project's architectural restoration specialists then

Field survey technician sets up the laser scanner on a lower rooftop adjoining the tower and prepares to collect 3D scan data.

Architectural specialists, utilizing elevation drawings that were prepared from laser scans as a reference, rappel down the tower to assess the conditions of façade features.

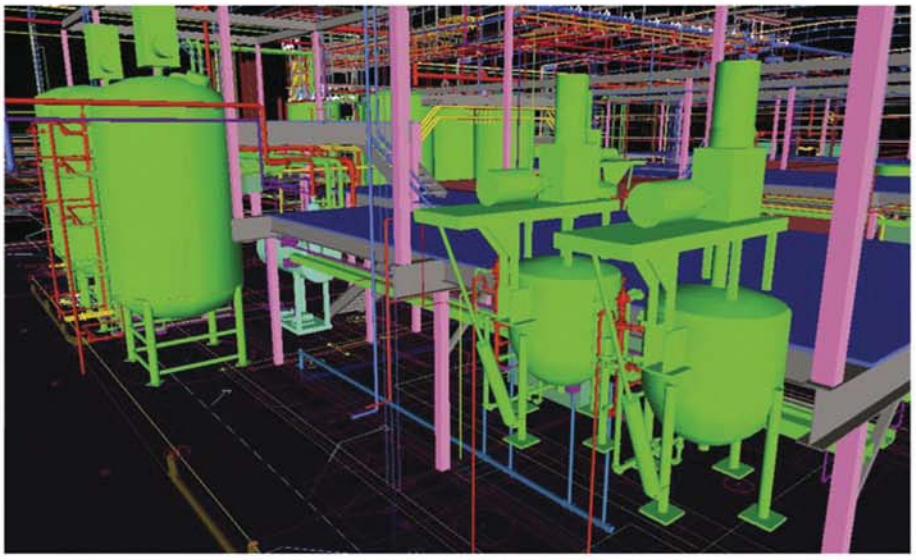
used these elevation drawings to record the condition of the building tile-by-tile. Without these drawings, the architect would have had to either rely on a much more laborious and error-prone method of hand-measuring and sketching façade components while rappelling down each side of the tower hanging on ropes or relying on non-scalable photographs. Both of these methods would not have produced the level of detail or accuracy needed.

3-D Scans and BIM

The industry is increasingly using Building Information Modeling (BIM) as a design tool to produce highly accurate computer models to help eliminate system conflicts. Erdman Anthony has combined its 3-D laser scanning capability with its BIM capabilities to produce highly accurate drawings. This combination of tools is particularly valuable when applied to buildings or complex sites–such as highly technical process/industrial and laboratory facilities–where as-built drawings are long out of date. All the data collected, whether scanned or designed into a scan, can be enhanced to help perform accurate stress analysis calculations, fabrication drawings, bill of materials, and accurate visual aids for the owner, design team, and construction team. This ability has proven helpful in the bidding and construction process, and has helped to ensure the owner gets what is designed from the project's start to it's finish.

The firm used this combination on the relocation of major utility piping through Kodak Park in Rochester, NY and the fit up of new steel within existing structures more than 60 feet overhead. This process allows more pre fabrication possibilities and a better understanding of a project's scope and complexity. As the result of positive client and employee feedback Erdman Anthony also used the laser scanning/BIM combination in the renovation of the J.P. Morgan Chase Tower in downtown Rochester and a science building addition at SUNY Binghamton. Erdman Anthony further advanced this technology during a University at Buffalo laboratory renovation project, where the company developed BIM-based bid documents.

Additionally, Erdman Anthony is using 3-D models to analyze the energy performance of various possible systems and lifecycle costs for different design alternatives. This is very helpful to architects who are looking to achieve a balance between a building's aesthetics and the increasing focus on efficiency in building operations. Using 3-D technology, lifecycle costs can be quickly modeled for numerous alternatives. With every change in a building's design (for example: changing amounts of building glazing), energy performance and lifecycle costs can be developed for the architect.



Building Information Modeling is a valuable tool for visualizing high-tech industrial and laboratory facilities before construction.