

EDG Helps Chevron Cut Costs on Offshore Platform Project With Cyra and Bentley® AutoPLANT®

By performing laser scanning to create a Bentley AutoPLANT as-built 3D model of an offshore oil platform, EDG reduced project costs by 15 percent.

When performing expansions or retrofits, owner/operators such as Chevron require up to date as-built models for accurate costing, scheduling, procurement, and on-time project completion. These demands are spurring the investment in laser scanning and in strategies for coordinating and integrating the resulting data with 3D design models. Without the proper as-built models, changes on a structure or process are almost impossible without experiencing huge repercussions and possible disasters. In order to reduce cost and downtime, owner operators are being forced to have better, quicker and more accurate access to engineering content. Gathering this data, organizing it, and putting it into a 3D model has not been an easy task.

Scanning For Oil

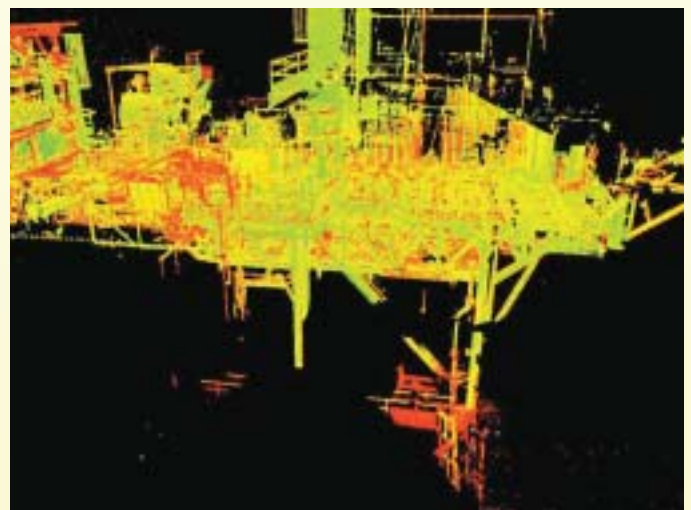
EDG, a full-service professional engineering corporation, has been helping owner/operators identify and manage plant and structure as-built engineering content through laser scanning and 3D models. EDG provides engineering design and project management services to the offshore oil and gas industry. Clientele includes both domestic and international oil and gas production companies.

Chevron contacted EDG to work on an offshore platform project involving hanging a compressor addition from an existing 8-pile structure. In order to accurately install the new compressor, Chevron required a 3D model with all the structure's correct as-built data of the structure. EDG selected Cyrax® and CloudWorx™ from Cyra to perform and capture a laser scan of the structure and AutoPLANT from Bentley to create the 3D model.

The scope of the job was to scan all areas around a proposed compressor addition to the cellar deck. EDG needed to scan all options for piping tie-points and proposed pipe routing, capture data to verify spool drawing, scan and verify the position of the

new manifold, verify and measure the location of skid addition, and scan inaccessible outboard beams.

EDG useds Cyrax to capture 3D surface geometry of complex structures and sites, resulting in an unprecedented combination of speed, accuracy and safety. With Cyrax, EDG captured and registered 65 scans that were combined into a 3D point cloud model. The model contained over 24,000,000 data points, which were each measurable within one-quarter inch of any other point in the model. Even the most skilled manual measurements could never be this accurate. Furthermore, manually capturing this data would have required at least five more trips to the structure— to not only complete the measurements, but also to capture added equipment, moved equipment, and other details that are difficult to record by hand.

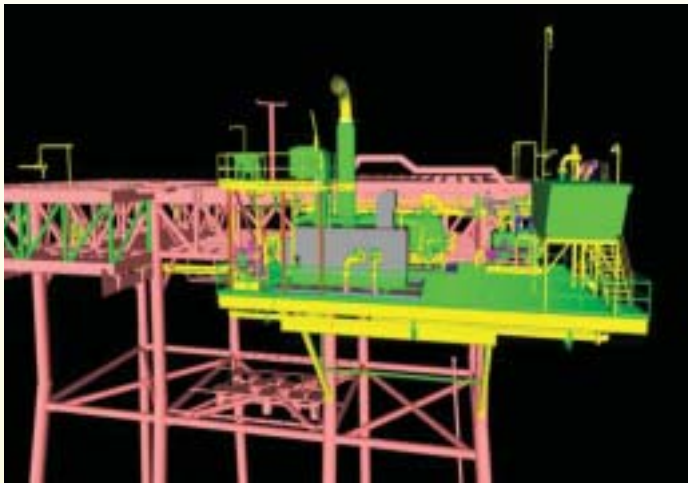


View of registered platform point clouds.

When the EDG engineering team returned to their offices, they realized they needed to expand the original scope of work to identify all beams in an un-documented skid package on the upper deck of the structure, reverse clash detection of all piping from model to point clouds, scan and document location of pipeline riser routing from boat landing to cellar deck, verify and locate existing wells in as-built documentation, and verify miscellaneous measurements for structural drafting. Fortunately the scanning had already captured the data on these areas, thus resulting in savings of both time and money by eliminating the need for additional trips to the field to capture data manually.

3D Modeling With Speed and Accuracy

After performing the laser scan, EDG used Cyra CloudWorx, a powerful application that enables users to take advantage of the rich 3D point cloud files created by 3D laser scanning, directly within AutoCAD® applications such as Bentley AutoPLANT. EDG used the 3D point cloud files directly in AutoPLANT with CloudWorx to create a 3D model of the section where the new compressor was to be located. "By using AutoPLANT with CloudWorx, we were able to gather all the point clouds into one 3D model," said Randy Tingstrom, drafting manager, EDG. "The AutoPLANT model gives Chevron an accurate as-built of the structure, which will be crucial for future upgrades or renovations on the structure."



Bentley AutoPLANT 3D model of proposed project generated using Cyra data.

While analyzing the modeling and reference drawings, EDG noted several problems. The upper deck beam package (under the generator/compressor building) was not documented as built and could not be accounted for in the AutoPLANT model. EDG was able to extract the exact location and size of beams from the laser scan data and create the detail in AutoPLANT. "The laser scanning technology gave the structural department and piping teams confidence in placing new members, equipment and piping in the AutoPLANT model," said Tingstrom.

EDG also found that a firewater pump skid was added and designed to fit in an area that had a wellhead, which had been added two years earlier and never documented. EDG was able to show the well to the client through E-mail, along with a proposal for a new area with sufficient clearance for the compressor.

Scans of the cellar deck captured several diagonals which had been welded in place to mitigate vibration. These were not documented so using the point clouds as reference, demo drawings were created in AutoPLANT, and structural members had to be added to the skid.

Project Efficiencies Lead To Increased Demand

The Cyra raw data points were registered in AutoPLANT, which modeled the platform with points overlay to verify model and dimensions. After the deck was added to the AutoPLANT model and new piping was routed, the model was then clash detected against the point cloud data as a final check. EDG was able to meet Chevron's requirements for the most accurate capture of as-built data, quicker design, less downtime, and fewer surprises. The project was flawless and resulted in more accurate and more complete spool drawings for piping, minimized clash detection of proposed piping, and less field welds and operational downtime.

EDG will continue scanning the areas of the platform where the compressor skid is hung off the cellar deck and will be able to register this to the existing database and AutoPLANT model to create an accurate archived as-built for any future work.

"The overall project was completed under budget and ahead of schedule," said Tingstrom. "We were very happy with the results of Cyra and AutoPLANT working together."

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