CASE STUDY

SB SETEC successfully overcomes design challenges on a revamp of a process plant

Key facts:

Company:
SB SETEC S.p.A.

Website:
sbsetec.it

Industry: Process

Country: Italy

Octave products used:
Forte 3DWorx
(CADWorx Plant Professional)
Forte ReviewWorx
(CADWorx Design Review)
Facets P&IDWorx
(CADWorx P&ID Professional)
Aspect Pipe Stress
(CAESAR II)

Key benefits:

- Supports an entirely digital-based workflow
- Short learning curve due to solution ease of use and user friendliness
- Increased accuracy when estimating project costs and schedules
- Reliable production of isometric deliverables via Isogen
- Easily interfaced with other vendor software solutions and internal business systems
- 80% reduction in survey time

SB SETEC is an engineering and EPC service company and has been operating in industrial plants since 1970. They execute all project phases from conceptual design through to plant commissioning, within turnaround management, multidisciplinary engineering, and environmental services industries.

Identifying goals

The company is committed to a policy of continuous improvement and project execution excellence. This has pushed SB SETEC to search for and invest in new approaches, methodologies and digital technologies. Their main goal was to digitalize their workflows using user-friendly tools that integrate reality capture along with engineering and design processes. This would enable increased productivity and efficiency during all phases of the typical revamping projects they undertake, supporting more economical project execution.

SB SETEC was selected by a large Owner Operator client to revamp their Sulfolane process plant to improve performance. The highest tier of an existing steel structure had to be dismantled and redesigned in order to place new equipment and new pipelines into the facility.

After a preliminary review of archived drawings, SB SETEC determined that to capture the existing brownfield conditions accurately an as-built survey would first need to be conducted. SB SETEC decided that this project was an ideal candidate to execute with a “fully digital” approach. It was clear that using laser scanning in combination with 3D plant design was the only way they could achieve the tight project deadline in combination with the spatial design challenges.

Overcoming challenges

One of the biggest challenges faced was the tight time sensitive deadlines set by the client. SB SETEC had to find a solution that would enable the project to be completed quickly with an errorfree re-design, that once constructed would work with the existing equipment and piping in the plant. Additional interference checking needed to be performed during the design process. This was due to spatial complications which had the potential to introduce clashes. An overriding challenge was also to ensure health and safety standards were maintained, and production was unaffected whilst detailed plans supporting the refurbishment were being designed.

In addition to these challenges, SB SETEC’s client stipulated that they wanted to refurbish and reuse some of the existing equipment, and wanted materials management centralized so that procurement costs could be controlled.

"Forte 3DWorx is extremely flexible. Changes in piping routing, equipment modification, or even of piping specifications, are easy to perform and safe to recover if any errors occur."

Luca Di Gaetano
Commercial manager,
SB SETEC



After extensive evaluation of solutions SB SETEC embraced Octave's Forte 3DWorx DWG-based plant design software and Aspect Pipe Stress, pipe flexibility and stress analysis software to execute 3D design and code checks. Forte 3DWorx was selected because of its ease of use and its industry standard DWG-format, in addition to it's ability to produce Isogen isometrics. Further it can also be easily configured and customized, supports data sharing without file conversion being necessary, and produces industry standard deliverables via the integrated Isogen. Aspect Pipe Stress was chosen because it allows the checking of the piping design against the relevant codes for the replacement piping installed during the project.

Realizing results

The first part of the project involved laser scanning and surveying the structure being revamped. Black and white targets were placed at key points in the facility in order to align the point cloud into the plant co-ordinate system.

The survey included checking where the remaining structure and piping would be situated in addition to where new, refurbished and reinstalled equipment would be located. 34 scans were completed in just a few hours, in record time.

The point cloud data from the laser scanner was post-processed and optimized before being exported to LGS format. Leica CloudWorx was then used to model some of the existing pipelines so that tie-in location points and available space for installation of the new equipment and piping could be evaluated.

Forte 3DWorx's Specification Editor was then used to create client-specific catalogues and specifications, which provided greater visibility of the information and easy access for the team. These were based on ASME standards and additional information provided by the client.

Existing P&IDs were integrated with the Access database linked to Facets P&IDWorx. Using Forte 3DWorx's PID View feature, the design team were able to work directly between the P&IDs and 3D models inside the 3D design environment. This helped to improve efficiency and productivity and therefore the overall accuracy of the final design.

Equipment in Forte 3DWorx was used to model the vessels and pumps. Equipment models received from the Equipment manufacturer (in .STP format) were also integrated with the Forte 3DWorx model.

Forte StructureWorx was used to import the steel structure (in .CIS/2 format) which was produced in TEKLA by the civil department. This enabled all departments to be brought together into a single view in the 3D design environment, where they could check for interferences and adjust routes and re-locate supports in real time.

Use of an Access database also enabled material take-off extraction to be faster and more reliable whilst helping the project team to keep track of critical components.

"Even considering the durations of site surveys and post processing with point cloud, we have still estimated an 80% time savings in this as-built data acquisition and design phase."

Luca Di Gaetano
Commercial manager,
SB SETEC



Forte ReviewWorx enabled visualization of the evolving 3D design, enhancing collaboration among SB SETEC's various departments and the client, which allowed the review process to be easier, faster and more efficient.

Flexibility analysis of certain pipelines was performed using Aspect Pipe Stress. After preliminary routing definition, the pipe models were exported to .C2 file format, then transferred to Aspect Pipe Stress. Then, after the flexibility check and the pipe support definition was completed, they were reimported again into Forte 3DWorx. The ability to bi-directionally exchange piping data digitally between Forte 3DWorx and Aspect Pipe Stress not only saved time during the project, but avoided error-prone remodeling.

Isogen, which is included with Forte 3DWorx, was configured in accordance with SB SETEC and the client's standards to ensure deliverables for fabrication and construction included everything needed. This enabled efficient, error-free fabrication of the pipe spools, which was critical to avoid clashes during construction, and enabled the tight schedule to remain on track.

Adoption of the new Octave software by SB SETEC personnel was picked up quickly due to previous experience with similar solutions, and due to the excellent support provided by Octave's support team.

Moving forward

Octave's solutions were chosen due to their ease of use, adoption, accuracy and speed. The biggest benefit has been the standardization and optimization of work processes. SB SETEC can now provide better cost estimates, along with more accurate project schedules for projects.

SB SETEC initially applied Octave's solutions in only the piping department. The success of this project has lead to Forte 3DWorx, Facets P&IDWorx , Forte ReviewWorx, and Aspect Pipe Stress being implemented within all their other technical departments: civil and structure, electrical and instrumentation, process and equipment.

The information captured and deliverables created from this project has allowed SB SETEC to produce a more digital offering to their clients. SB SETEC continues to utilize Octave solutions for future projects to ensure high quality as well as efficient and economical delivery of projects for their clients. SB SETEC is also evaluating switching CAD platforms from AutoCAD to BricsCAD in order to save license costs, and to further enhance designer experience and workflows.

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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