CASE STUDY

MegChem cuts plant design timelines by 60% using Forte 3DWorx and BricsCAD®

Key facts:

Company: MegChem

Website: megchem.com

Industry: Oil & Gas, Chemicals

Country: South Africa

Partner: Chempute Software (Pty) Ltd

Octave products used: Forte 3DWorx *(CADWorx® Plant Professional),* BricsCAD®, Aspect Pipe Stress *(CAESAR II)*

MegChem is a multidisciplinary engineering firm with capabilities in piping, mechanical, electrical and civil engineering, scanning, process design, control and instrumentation and project management. The company delivers a broad range of engineering services focused on plant renewals, modifications and process improvements.

Piping engineering is one of MegChem's core areas of expertise. "We are a team of 30+ piping designers with extensive experience in 3D modeling. Collectively, we bring over 30 years of piping design expertise, gained through involvement in both national and international projects," says Gerhard Koekemoer, Section Leader for Piping Engineering.

Identifying goals

In 2011, Megchem began taking on increasingly large and complex multi-disciplinary projects that exposed the limits of its existing software.

The team began seeking project execution systems that could scale and support the demands of complex projects and identified Forte 3DWorx, Octave's plant design and automation solution, as a potential match for its needs.

After acquiring a few Forte 3DWorx licenses, the team opted for a full deployment of the solution, with the help of a local partner and chemical engineering services consultancy, Chempute. Chempute assisted with catalog creation, line class specifications, software installation, training and rebuilding the catalogs and specifications used in other software.

Within approximately two months, MegChem was ready to roll out Forte 3DWorx across its design environment.

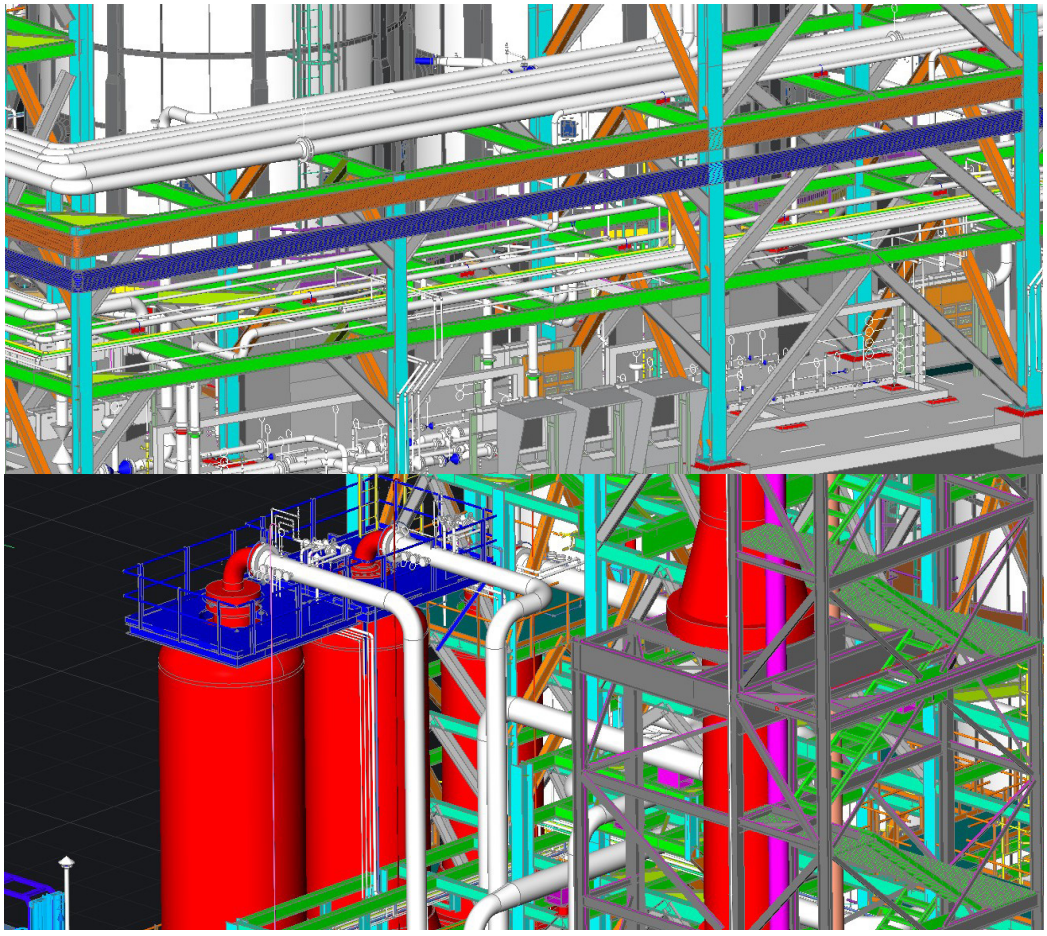
Realizing results

Gerhard Koekemoer, lists some of the key factors in this deployment "It quickly became evident that Forte 3DWorx offered significant advantages. We estimate that the ability for multiple designers to work simultaneously within the same model space and view each other's updates in real time, boosted our productivity by an estimated 60%. Forte 3DWorx also interoperates seamlessly with the Aspect Pipe Stress engineering analysis software, allowing us to export models for stress analysis and import the results back into Forte 3DWorx to reflect any changes."

The MegChem team runs Forte 3DWorx on BricsCAD, their preferred DWG file-based CAD platform. Today, this combination is used for all project-related design work, including day-to-day maintenance tasks. requirements by simulating various scenarios, such as project delays or when the project couldn't be undertaken.

Key benefits:

- BricsCAD and Forte 3DWorx increased design productivity by 60% and cut modeling time by up to 25%
- Time spent finalizing isometric drawings was reduced by 60%
- Complex plant design was completed in under nine months, less than half the typical 18-24-month timeline



Views of the new pipe rack with control unit skids and the structure carrying transfer lines between furnaces and reactors. Forte 3DWorx's interface simplified management of the complex 3D models.

Today, Gerhard Koekemoer credits Octave solutions with a very positive effect on collaboration and client satisfaction. "In the past, 3D models were primarily used to simplify the generation of isometric drawings. Today, they have evolved into essential communication tools. With Forte 3DWorx, I can sit in my office in Secunda and discuss pipe routing in real-time with a client located overseas. This capability allows for early identification of construction risks, enabling us to proactively plan and mitigate issues before they arise on site."

In July 2020, a large industrial company experienced a major explosion during a plant start-up that severely damaged a critical unit. The facility had already been offline since a planned shutdown in February, creating intense pressure to bring operations back online as quickly as possible.

MegChem was tasked to design and execute the rebuild under extremely compressed timelines. The scope involved designing a completely new plant section while retaining and integrating with parts of the infrastructure that had survived the blast.

Time was the most critical constraint, as traditional design timelines of 18-24 months were no longer viable. To meet the client's needs, MegChem had to leverage the full capability of its digital toolset specifically Forte 3DWorx, BricsCAD and Aspect Pipe Stress.

MegChem's measurements and scanning team was deployed to the site and used high-resolution 3D laser scanning to capture the geometry of the surviving structures. These point-cloud scans were imported into Forte 3DWorx, serving as an exact spatial reference for integrating new equipment, civil works and piping layouts with millimeter accuracy. Design files were fed into Aspect Pipe Stress for analysis. Engineering modifications were returned and seamlessly imported back into Forte

"From junior drafters to lead designers, our entire design team relies on Forte 3DWorx and BricsCAD. The benefits are substantial and measurable: their user-friendly interface has helped us reduce modeling time by up to 25%. When paired with a well-configured setup for isometric generation and users following best practices, time spent cleaning and finalizing isometric drawings can be reduced by as much as 60%"

Reginald de Koker
Manager, Drawing Office (Piping Engineering)

3DWorx, dramatically reducing manual rework and communication lag.

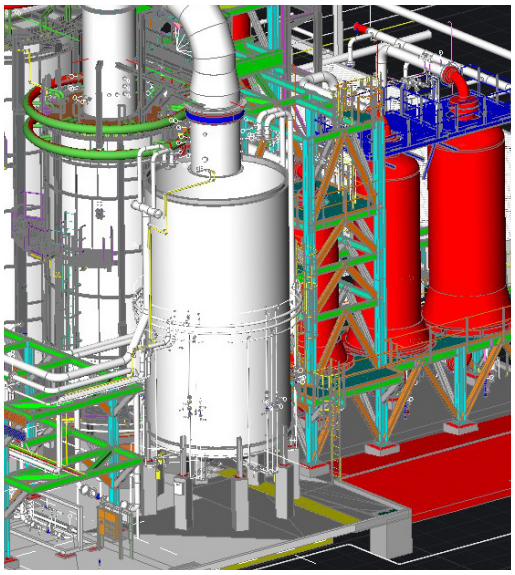
The central 3D model, hosted on MegChem's network, became the hub for real-time collaboration between stakeholders in Secunda, Cape Town, and London, allowing cross-location design reviews and decisions to happen faster than ever before.

The use of Forte 3DWorx extended beyond basic design. The 3D model was leveraged to generate bulk Bills of Materials (BOMs), isometric drawings, construction layout plans, rigging and lifting studies, scaffolding plans, construction reviews and walkthroughs.

Thanks to the streamlined workflow and the experience of the MegChem design team, the full plant redesign, which would have typically taken two years with traditional design processes, was completed in just under nine months.

Next steps

Today, MegChem sees Octave's toolset as a central component of its ability to successfully deliver large-scale projects: "Thanks to the power and efficiency of Octave's design and analysis solutions, MegChem has successfully delivered large-scale projects under extremely tight deadlines. This capability has helped position us get ahead of many of our competitors in terms of speed, flexibility and quality of deliverables." Gerhard Koekemoer explains.



Koekemoer also praises Octave's partner, Chempute, for their support and reactivity: "Working with Chempute has significantly eased the burden of software-related challenges. Their support is always just a phone call away. If they cannot resolve an issue directly, they consistently connect us with the right expertise to ensure the problem is quickly and effectively addressed."

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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