

COMPANY

**WY ENGINEERING & CONSULTING
(WYEC)**

LOCATION

Malaysia

SOFTWARE

**Autodesk® AutoCAD Plant 3D®
Autodesk® Navisworks®**

Intelligent Plant Design Solutions like Plant 3D are the Lifeline for this Malaysia-Based Engineering Firm

How WY Engineering Leverages Plant 3D to Re-Create a Power Plant Environment



Image courtesy of WY Engineering

“The good thing about Autodesk is that their product is always robust.

Good engineering tools such as the ones available from Autodesk are essential in the energy and utility industry,”

– **Ng Woon Yen**
WYEC
Founder and Principal Engineer

Electricity generation takes on a variety of different forms - change to - Electricity generation takes on different forms, and no single power source is better than another. It all just depends on the industry. Nevertheless, there’s one thing that’s certain across the board—there’s no such thing as maintenance-free power. Even lightbulbs need to be changed from time to time. And, when it comes to power plant maintenance, using the right tools makes all the difference.

Plant 3D for Stakeholder Collaboration

Cogeneration has been around since the late 1800s and has historically been employed in large commercial, industrial, and institutional applications. It’s the

sequential use of a primary energy source (e.g., natural gas) to produce two or three useful forms of energy: heat and power. Gas turbine generators coupled with heat recovery steam generators (HRSGs) are what make up a cogeneration system.

Onsite production of energy for cogeneration systems is economically feasible and highly efficient in comparison to other power sources, but it still requires periodic maintenance. This is where intelligent solutions such as Autodesk AutoCAD Plant 3D come in by providing the ideal environment for stakeholders to collaborate. It’s also the plant maintenance software of choice for Malaysia-based engineering firm, WY Engineering and Consulting (WYEC).

Covering all Stages of Plant Engineering and Construction

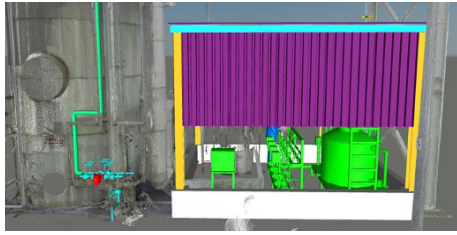


Image courtesy of WY Engineering

Established in 2013 by Founder and Principal Engineer, Ng Woon Yen, WYEC specializes in power generation, cogeneration, district energy, and utility services. As a consultancy and engineering services company, the firm covers all stages of engineering, from the initial FEED (Front-End Engineering Design) stage to the construction stage. Its areas of focus include 3D plant design, terrestrial laser scanning (TLS), piping engineering, hydraulics, and thermal analysis.

Before founding the company, Ng was perplexed by how archaic the workflows were in the region's engineering industry. "Plant design was literally being done manually, and piping isometrics were drawn individually by drafters," says Ng. "This prompted me to set up my own firm. Working in partnership with Reliant Design Solutions Sdn Bhd enabled me to launch a business that uses software with higher engineering performance and significant reductions in man hours."

Navigating HRSG Replacement with Outdated Engineering Specs



Image courtesy of WY Engineering

In 2020, WYEC was awarded a project that involved replacing two HRSG units in a cogeneration plant belonging to an airport operator in Malaysia. It was fabricated, installed, and commissioned by boiler manufacturer, Boilermech Sendirian Berhad, and WYEC took the engineering lead. This included preparation of the entire layout, 3D plant development, organization

of 3D review and walkthrough, pipe stress analyses, and preparation of drawing productions.

While HRSG units are an efficient form of energy supply, they're still capable of being exposed to the same type of degradation as conventional fossil-fuel-fired boilers. Moreover, certain design aspects along with HRSG-specific operating conditions can make them susceptible to a faster rate of corrosion and failure. They must be properly maintained and replacement needs to be timely to avoid reduced power generation and a loss in production, both of which can be costly.

Piecing Things Together using 3D Terrestrial Laser Scanning

"Similar to any brownfield project, collecting the necessary information for modification work is a challenge because it's simply not always available," says Ng. "Furthermore, there's minimal room for error since we work on a tight schedule. This is where 3D terrestrial laser scanning (TLS) comes in."

Using 3D TLS enabled the team to virtually capture the existing facility despite not having access to current engineering specs. It also enabled them to regenerate the plant in a DWG format using Autodesk Recap. "This format allowed us to sufficiently determine the accurate critical positioning of things like the equipment plinth in addition to locating all of the tie-in points," says Ng. "Autodesk Navisworks Manage and Freedom were utilized between the designers, the EPC team, the owners, and the operators for the duration of the project. This enabled input from all stakeholders during the engineering phase."

Challenges Surrounding Plant Design

One of the hurdles surrounding general plant design is a lack of interoperability between different platforms. For example, if a firm uses a non-Autodesk platform in their deliverables, they may be presented with the challenge of figuring out how to incorporate non-Autodesk models into an Autodesk environment.

"Autodesk products are always robust," says Ng. "With the AEC subscription, we can easily import different types of 3D formats and bring them into a DWG format. With Navisworks, we can also incorporate multiple types of platforms into one project, thus enabling all stakeholders a complete and seamless review of the project. The PCF (piping component file) import and

export function in Plant 3D also allows us to incorporate 3D piping with a non-Autodesk product."

Saving Big on Manhours with Plant 3D

The overall value that WYEC gains by using Autodesk products is undeniable in terms of manhours saved. Piping isometrics and orthographic drawings are all generated instantaneously from the same model, so consistency is ensured in all deliverables. Moreover, design modifications are accomplished significantly faster with the Plant 3D toolset.

Additionally, the team can generate over 100 pages of isometrics if needed, and it can all be done in a matter of minutes. "Being able to regenerate revised isometric drawings instantaneously represents several hundred percent in man hours saved when compared with manual generation of piping isometrics," says Ng. "In terms of interoperability with other software, the PCF export function allows us to export the piping models to other 3rd party platforms for pipe stress analysis. The average man hours saved with this feature I would estimate the average number of man hours saved with this feature to be around 60%."

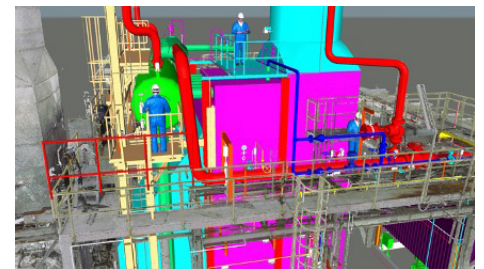


Image courtesy of WY Engineering

Keep Business Lean and Use the Right Tools

For Ng, leveraging the right tools is one of the key drivers in company innovation and growth. Not only does this boost productivity in a plant environment, but it keeps the business lean—a trend that was inspired by the pandemic and one that WYEC plans to continue embracing.

"Good engineering tools such as the ones available from Autodesk are essential in the energy and utility industry," says Ng. "Fully explore the various software capabilities and make full use of available features to minimize hiring and improve productivity. We're glad that Autodesk has such a wide range of solutions with robust features. These solutions are the lifeline of our organization."