SATRIA Technologies Uses Intelligent Design Process to Deliver Control Relay Panels for Malaysian Substation

Promis.e Reduced Design Time by 50 Percent, Saving SATRIA MYR 20,000

Project Summary

Organization:
SATRIA Technologies Sdn. Bhd.

Solution:
Manufacturing

Location:
Klang, Selangor, Malaysia

Project Objective:

- Design and deliver 33-kilovolt/11-kilovolt control protection systems for Tenaga Nasional Berhad's (TNB) Substation in Pandamaran, Malaysia.
- Implement Promis.e to execute engineering processes for more efficient designs.
- Ensure timely delivery of multiple panel types in compliance with specific TNB requirements.

Products used:
Bentley Navigator, MicroStation®, Promis.e®

Fast Facts

- TNB retained SATRIA to design six different types of control relay panels for the new Pandamaran substation.
- SATRIA utilized an intelligent electrical design process to deliver the completed drawings to the client within 20 days.
- Using Promis.e, engineers created a database, parts library, and templates, and automated cross-referencing, calculations, and design tasks.

ROI

- Using Promis.e to establish an intelligent design process reduced delivery time by 50 percent, saving MYR 20,000.
- Automated cross-referencing took seconds instead of days and schematic drawings for each panel took one day rather than two.
- SATRIA now has a database of electrical components, which will assist in meeting future client requirements.

Meeting Newly Imposed Deadlines

A small start-up company in Selangor, Malaysia, SATRIA Technologies provides engineering solutions for power utilities, industries, and infrastructure. Malaysia's largest electricity utility, Tenaga Nasional Berhad (TNB) contracted SATRIA to design and supply control relay panels for its new substation in Pandamaran, Klang, a vibrant city hub where residential, commercial, and industrial infrastructure works are occurring. The MYR 500,000 project required SATRIA to design six different protection and control schemes for 19 33 kilovolt/11-kilovolt units to fit in a compact space within the substation.

For prior TNB projects, SATRIA engineers were allotted one month's time to deliver conceptual drawings and schematic designs. However, for this project, TNB mandated that SATRIA complete initial and detailed electrical design and panel arrangement drawings within a 20-day time frame. "We keep our promises to always deliver on time. It is one of our core factors," stated Gottfried Zeller, director at SATRIA Technologies. In order to design a variety of panel types to fit a narrow space on a constricted time schedule, SATRIA required collaborative intelligent modeling technology to meet TNB's demands.

Creating a Central Database

As part of its efforts to consistently exceed customer expectations and ensure timely delivery on every project, SATRIA made a company decision in 2015 to move from AutoCAD to Bentley's Promis.e and standardize its electrical design process. To do this, a team of engineers spent three months transferring data and libraries of information to Promis.e to build a central database with intelligent properties. The team created the catalog, title block, symbols, standard parts library, and report templates that could be tailored to the specific needs of individual clients and used to support all electrical engineering projects.

With the central database complete and stored on SATRIA's server, the company arranged a network configuration so that all engineers and draftsmen could simultaneously access a particular project or library in the system, facilitating collaboration and ensuring consistency across all designs and drawings. The flexibility of Promis.e enabled the project team to configure the information in the database to design the different types of control relay panels in accordance with TNB's specifications.

Fully interactive LiveCubes were created in Bentley LumenRT based on actual design models from a single data source.

Standardized Design Process Facilitates Engineering Efficiencies

With intelligent automated functions in place within Promis.e, SATRIA now has a reliable, organized design process to accelerate information sharing and project delivery times while minimizing the risk of errors. "When we used AutoCAD, we had hundreds of pages of designs that had to be printed and all the cross references checked manually by engineers who would then go back to the workstation to make the corrections in the system. Maybe they corrected 80 percent," Zeller explained. Promis.e allows SATRIA engineers to develop an intelligent model that links, cross-references, and checks errors on all project drawings and documents. Using the parts database to build the model, the engineers pick and place the symbols required, and assign the specific device details by selection. The software then automatically generates bills of materials and reports that otherwise would be done manually.

Finally, the ability to export designs and drawings to multiple file formats simplifies communication with the client and stakeholders for a more efficient review and revision process.

"As the project requires to supply six different types of panels with a quantity total of 19 units of control relay panels, a lot of time is spent in the design and drafting works using AutoCAD. To overcome this challenge, the engineering team is now equipped with Promis.e to produce electrical drawings autonomously by developing their own standard libraries and templates that meet TNB requirements."

— Mohd Farid Ramli, Systems Engineer, SATRIA Technologies

Using Bentley's flexible, interoperable technology to automate tedious tasks and streamline design workflows reduces errors and enhances engineering efficiencies, enabling SATRIA to remain competitive and reliable within the industry.

Pioneering Promis.e Delivers Savings

The Pandamaran substation project was SATRIA's first project completed 100 percent with Promis.e. Previously, designing 19 panels of six different types would have taken five to six weeks to prepare the drawings, complete the designs, and submit to the customer for review and approval before manufacturing. With Promis.e, the design engineering process was reduced by 50 percent and SATRIA submitted drawings for all the control panels on time and in compliance with TNB standards.

The automated cross-referencing functions in Promis.e reduced resource hours for terminal function report generation from days to seconds. Using the templates and macros created in the database enabled engineers to produce schematic drawings for the panels in one day instead of two. Having a collaborative, standardized design process reduced design mistakes, drafting errors, and preparation of bills of materials by 20 to 25 percent and resulted in minimal waste.

Overall, SATRIA reduced submission time by 50 percent to deliver the drawings to TNB within the required 20 days compared to the estimated 40 days, for a cost savings totaling MYR 20,000.

A Sustainable Solution for Future Projects

"A transformation from manual to automation during the design stage provides a different way of working," explained Mohd Farid Ramli, systems engineer at SATRIA. Using Promis.e to automate tedious tasks in traditional electrical design significantly reduced design time and cost of errors on the Pandamaran substation project. With an accessible database and templates developed, SATRIA can customize designs specific to individual client requirements. The cross-referencing capabilities, advanced copy/paste functions, and the ability to export drawings to different file formats in Promis.e enables a streamlined approach to electrical design and provides SATRIA a design advantage that can be applied to all types of electrical system designs. Based upon its initial implementation resulting in the successful submission of the control relay panels to TNB, SATRIA's intelligent design solution lays a solid foundation for efficient electrical engineering processes to meet demands on future projects and remain competitive within the industry amid larger organizations.