



Delta Wye Engineering builds a safer future for aging infrastructure

EasyPower® helps reconfigure a century-old paper mill's electrical system

Powering the pulp and paper sector

Whether writing a birthday card or wiping up a spill, the pulp and paper sector is still a necessity in our digital world. Delta Wye Engineering has done many projects for this industry, conducting electrical power system studies for clients that range from British Columbia, Canada all the way down to Louisiana and Georgia in the United States. The electrical engineering consulting firm was founded two and a half years ago and is now 11 people strong.

"We do power system analysis and protection relays, but we also do electrical engineering," explained Jeremie Bergeron, president and principal engineer of Delta Wye. "We also do a good amount of work in SCADA, specifically on the power system side for facilities and substations."

One specific project was for a 100-year-old paper mill. Delta Wye was tasked with replacing the entire 15-kilovolt switch gear. The mill's operating voltage was 13.8 kilovolts, and there were four high-voltage transformers that connect to the utility. There was also a lot of gear that needed to be replaced and put into new electrical rooms. "Over the course of 100 years, things keep on getting added, so it was just quite convoluted," explained Bergeron. "We had to replace unsafe, obsolete gear that had already had multiple arc flashes in it. The mill had been having equipment failures, causing downtime." According to the U.S.'s Occupational Safety and Health Administration (OSHA), an electric arc is a type of electrical explosion

that produces a bright flash of hot gas. Temperatures can exceed 35,000 degrees Fahrenheit, nearly four times the heat of the sun's surface. The energy produces an explosive arc blast that results in deafening noises, supersonic concussive forces, and super-heated shrapnel.

Designing for safety and sustainability

To both update the equipment and move them to a location that would be more environmentally sustainable, Delta Wye needed to conduct several studies and analyses. "The configuration and arrangement of the system needed to be changed quite dramatically, compared to how it used to be," said Bergeron. "In the beginning, they had a bunch of buses, sync buses, reactor ties, and different types of ties. Some are open and some are normally closed, and it was quite complex."

Completing this work would require the mill to shut down. However, the mill wanted to keep the shutdown as short as possible to limit downtime. "The whole mill would be black for the whole outage, so they would have to bring in a lot of diesel generators and other things of that nature to keep the mill running," said Bergeron. Therefore, Delta Wye had to come up with a plan that would allow them to work efficiently and safely. They sought an application where they could look at the mill's existing configuration, design and analyze a planned system, and ensure that their design would be safe and efficient for the mill.

Project summary

Organization

Delta Wye Engineering

Solution

Power Generation

Location

Washington, United States

Project playbook

EasyPower

Project overview

- Delta Wye was tasked with replacing the entire 15-kilovolt switch gear at a 100-year-old-mill, which had already seen multiple arc flash incidents.
- To both update the equipment and components and move them to a location that would be more suitable, Delta Wye needed to conduct several studies and analyses.
- Using EasyPower, the team reviewed the existing load configuration and considered new options.

ROI

- Delta Wye was able to complete the shut-down portion of the project in a little over a week, and could be quickly back in production.
- The mill can now work at peak efficiency, consuming 120 megawatts of reliable power as their baseline load.
- When the mill loses sources, such as utility ties or internal generation, they no longer lose load due to an improved 15-kilovolt configuration, resulting in capability to handle N-1 and even most N-2 losses.



Delta Wye was able to complete the outage portion of the project in a little more than a week, meaning that the mill only had to shut down for a little over a week rather than longer.



The mill can now work at peak efficiency, consuming 120 megawatts of power as their baseline load, and can survive N-1 and even most N-2 contingencies.

“All the load flows matched the EasyPower modeling pretty much exactly.”

-Jeremie Bergeron, President and Principal Engineer, Delta Wye Engineering

Collaborating through data-driven planning

Already familiar with EasyPower, and because the mill was already modeled in the application, Delta Wye chose the application for this job. Using EasyPower, the team reviewed the existing load configuration and considered new options. “There were a lot of plans, kind of migration steps and things that had to happen to go from the old configuration to the new configuration,” explained Bergeron. “We brainstormed a lot of different ways of doing it using EasyPower, looking at the mill load and how the transformers and bus ties get loaded.”

In collaboration with the mill engineer and corporate engineers, Delta Wye came up with a new design for the mill that had one new bus for each transformer. “We added new feeder cables going to all the different locations throughout the mill,” said Bergeron. “There were almost 100,000 feet of 15-kilovolt cable.” EasyPower helped the team identify situations where running a parallel cable would be helpful to avoid the system getting overloaded. The team ran load flow scenarios to ensure that even if a transformer was out for maintenance, the mill would still run properly. “All the load flows matched the EasyPower modeling pretty much exactly,” said Bergeron.

Delivering results for a safer future

Delta Wye was able to complete the outage portion of the project in a little more than a week, meaning that the mill only had to shut down for a little over a week and could be quickly back in production. “Overall, everybody was really happy that we pulled the replacement of the mill’s 15-kilovolt switchgear and 15-kilovolt cables in such a short period,” said Bergeron. “It was considered a great success.”

The mill can now work at peak efficiency, consuming 120 megawatts of reliable power as their baseline load. When they need to generate power, such as for burning waste, they can reliably generate around 40 megawatts of power without any voltage regulation issues (that were there prior to the upgrade). But more importantly, Delta Wye ensured that the mill would run safely. By ensuring that all connections are in full compliance with OSHA and NFPA 70E requirements, the mill can ensure that its workers will be out of harm’s way and that the 100-year-old mill will be around for years to come.

Bentley

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