

case study—sinamics dcm dc converters **30% increased propulsion efficiency** for paddlewheeler "Creole Queen"

The challenge: To upgrade the vessel's diesel-electric propulsion (DEP) system with modern, state-of-the-art drives to ensure smooth, efficient and uninterrupted operation.

For a business that requires its vessel to be operational every day, downtime is costly. Creole Queen owner and operator Craig Smith says the vessel has been fortunate to have had a highly dependable DEP system driving its 20foot diameter paddlewheel and bow thruster for the past 32 years. "At the time, the system was considered advanced technology and was especially useful to minimize engine noise and vibration," he explains. "That's important on a vessel like ours with fine dining and live jazz as one of our major attractions."

Still, there's a lot of room for improvement on a 30-year-old system, and Smith wanted to be proactive, ensuring no unscheduled downtime due to a breakdown and the subsequent time to locate a hard-to-find part. "We didn't really have an operating 'problem' per se," he says, "but we knew that, given the system's age and if it did go out, replacement drives simply weren't available, nor were the skills to install and service them." **The solution:** Install an advanced Siemens SINAMICS DC Master (DCM) DC Converter drive system for greater efficiency, responsiveness, and decades more of dependable DEP propulsion.

Smith replaced the vessel's existing DEP system's converters with the most up-to-date technology. "We wanted to prepare the Creole Queen for its next 30 years of service," he says. "And we wanted to plan the upgrade on our schedule rather than leave it up to fate."

Smith first contacted the original maker of his DEP system, as well as Siemens Solution Partner, Trident Maritime Systems division (RAACI), based near New Orleans, Louisiana. RAACI is the state's largest Siemens automation systems integrator. The firm is headed by Dennis Robichaux, President of the company, and Trudy Robichaux, Director of Engineering. Both have doctorates in electrical engineering, plus more than 50 years of combined experience in complex automation projects, especially for the marine market.

"After interviewing both companies, it was clear that RAACI was the way to go," Smith says. "Backed by Siemens, they could provide the total solution—design, engineering,

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installation, commissioning, and support—all at a good price, and all from a local firm." Because the Creole Queen operates seven days a week, year-round, RAACI's ability to provide local support was critical to his decision.

For the vessel's DEP replacement system, RAACI chose scalable DC converter drives from the Siemens SINAMICS DC Master DC Converter drive family. It designed the system so that the drives could be installed in the same cabinets as their predecessors, to save installation time and costs. New electrical wiring schematics were drawn to interface the drives with the vessel's existing wiring, also saving time and costs." The interoperability of the Siemens components with our pilot control system not only helped save us time and money, but it also saved our pilots from having to train on using a new set of controls," Smith says.

The vessel's DEP propulsion system consists of two DC motors that load share to turn the paddlewheel at the stern and one DC motor to turn the bow thruster. All three motors operate in forward or reverse directions. Each of the three SINAMICS DCM DC Converter drives can operate in an alternate mode should any of its companion drives fail. This means a drive can automatically shift to control another motor in case the other motor's primary drive would stop working. The logic for this is handled within the drives, so each drive can control one of two motors. This requires each drive to handle transfer of control between the engine room and the pilot house. No external automation system is required to operate the drives.

The result: The Creole Queen now has a DEP system for the next 30 years, with 30% more efficiency and 10% fuel savings—plus greater pilot confidence in its operation.

Smith reports that the installation of the vessel's new DEP drive system went according to plan, but once the drives were installed, the team discovered some separate issues with the controls of its three large diesel engines. Without missing a beat, RAACI resolved those problems with updated controls, using a Siemens SIMATIC S7-1215 PLC connected through PROFIBUS to communicate with third-party genset controllers, voltage regulators and engine governors.

"Although our engine issues extended our project schedule, we got the job done," Smith says. "RAACI and Siemens worked seamlessly together with our team, typically on 12hour days, seven days a week. Siemens had two people on the project, who were always available. The professionalism of everyone involved turned what could have been a fiasco into a totally successful upgrade to our entire DEP system."

After commissioning and a few months of use, Smith notes that the electrical efficiency of the upgraded DEP system has improved by 30%. He estimates that this will translate into a fuel savings of about 10%, with related savings in emissions. "Our captains like the new system, too, as it's more responsive than what we had before," he says. "But even more, they enjoy a greater sense of confidence because they can rely on the new system to operate flawlessly for years to come."

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ABOUT THE CREOLE QUEEN An authentic paddlewheeler

Visitors to New Orleans have a chance to step back in time when they board the 190-foot paddlewheeler Creole Queen, docked on the Mississippi River near the French Quarter. Built in 1983 to complement the city's 1984 Louisiana World Exposition, the vessel has since provided daily river and nightly jazz dinner cruises along the Mississippi River to hundreds of thousands of guests. Its outer decks feature an authentically patterned wrought iron trim of a bygone era. Interiors are richly appointed with plush Victorianstyle draperies, soft period lighting, wooden parquet dance floors, and Louisiana Cypress bars accented with brass railings.

The Creole Queen offers daily Historical Cruises, which cruises to the site of the 1815 Battle of New Orleans. Passengers can disembark at the National Park and learn about this decisive battle that changed American history. When the sun goes down, step back into the glamour and romance of a bygone era aboard the Creole Queen's Dinner Jazz Cruise. Enjoy a lavish Creole buffet while listening to the sounds of live jazz. After dinner, and maybe a little dancing, enjoy your favorite cocktail and the sweet Mississippi River breezes as the skyline slips by under a canopy of stars. Visit CreoleQueen.com for more information.

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