



Replacing Vintage Subsea Cable to Scenic Michigan Island

New line can handle all the growth expected on this “Gem of the Huron”

When Cloverland Electric Cooperative wanted to replace the aging subsea cable that serves Drummond Island in Michigan’s Upper Peninsula, it turned to experienced utility consultant GRP Engineering, Inc. to plan and design the tricky project. As the successful bidder to Cloverland Electric, Kerite provided the new cable and years of manufacturing and installation expertise. Running cable from the Michigan mainland out to Drummond Island under the tight timeline – dictated by permit conditions – went very smoothly, despite a few “bumps in the road.” The successful project ensures that island visitors, residents, and businesses have the electrical power they need for the foreseeable future.

Growing load from resort communities drives need to replace cables

Two subsea electrical cables serve Drummond Island, located at the end of Michigan’s eastern Upper Peninsula. Referred to as the “Gem of the Huron” and “Michigan’s Ultimate Playground,” the 87,000-acre island is the second largest freshwater island in the nation. It has 150 miles of rugged scenic shoreline, 133 square miles of forested landscape, and 34 inland lakes. The island has a large and growing number of resort communities as well as some full-time residents. It is also home to the Drummond Island Quarry, a major producer of crushed and broken dolomite, which is used in manufacturing steel, glass, and paper and as a soil neutralizer for agricultural applications.

The two subsea cables, one serving mainly residential dwellings and one serving the quarry, were installed in 1975 and 1989, respectively, and had reached the end of their useful life. When the quarry was operating at full capacity, there was insufficient capacity between the cables in the event of a failure, causing the quarry to partially shut down. While the load at the quarry is not anticipated to grow, Cloverland determined that the resort load is likely to increase as older, smaller cabins are turned into larger ones and modern amenities such as air conditioning are added. Cloverland decided to install a new cable that could handle the entire island.

Complex challenges required expert solutions

Cloverland called on GRP Engineering, a MI-based power utility consulting firm, to handle the first cable replacement project. The firm, which has more than a decade of experience with municipal and rural electricity cooperatives in Michigan, handled initial planning, cost estimates, permitting, and design, as well as installation oversight and startup.

GRP Engineering developed the bid specifications, and the project was bid out “from termination top to termination top.” Kerite was the successful bidder, offering the lowest price as well as the most experience. With more than a hundred years of know-how in providing subsea cable, Kerite is also the only U.S. manufacturer of Ethylene-Propylene-Rubber (EPR) subsea cable. Kerite’s patented EPR insulation formula enables its subsea cables to operate in direct contact with water, without the need for an impervious lead sheet or asphalt coating. The cable can be covered with individually jacketed steel armor wires for mechanical protection and ease of installation pulling. During the bidding process, Kerite responded to Cloverland’s questions about thermal issues, providing a report with engineering test data to confirm the cable’s ampacity, showing that the cable is good for 340 amps.

Coordinating closely with Cloverland on permitting and budgeting, GRP Engineering was responsible for oversight of manufacturing and installation done by Kerite and its subcontractors to ensure everything was done in accordance with the permit. For example, the island’s location in a sensitive environmental area meant a joint permit was required, incorporating separate guidelines from both the Michigan Department of Environmental Quality (MIDEQ) and

the U.S. Army Corps of Engineers. Fish spawning was an important issue at the time of the year during which the project was scheduled, and the permit schedule accommodated that concern.

The project required 7,465 feet of 28 kilovolt (kV) cable;

Kerite provided the full length in one continuous piece of cable – with no splices. The line is currently being operated at 7.2/12.5 kV, and Cloverland will potentially be switching to a 14.4/ 24.9 kV operating voltage. There are three single-phase conductors, each 350 KCM (1000 circular mils), and a full uninsulated neutral at 350 KCM. Also included is a 24-count fiber optics cable that Cloverland is using for communications with its substation and motor-operated switches on the island. Spare fibers are being leased out to the island’s high-speed Internet service.

The design called for installing the cable 20 feet below the low water datum at a depth of six feet. Once the cable is beyond 20 feet, the cable is transitioned out and then lays on the bottomland of the DeTour Passage. Typical cables are installed 15 feet below the low water datum at a depth of four feet, but with this location on the St. Mary’s River, the deeper installation protects the cable from boats, ice, or other objects that might puncture the cable.



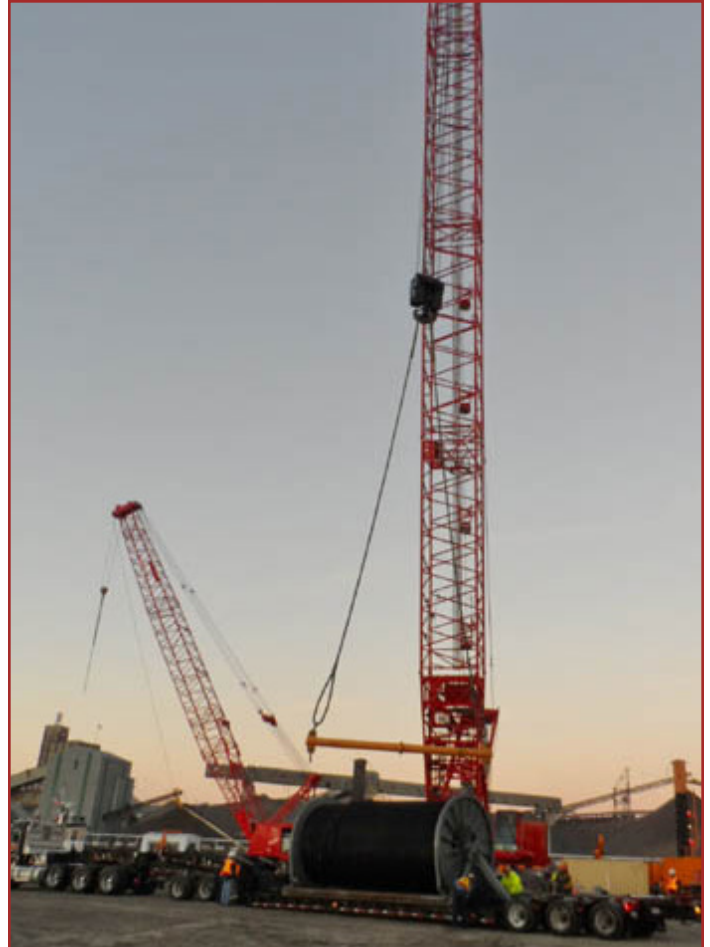
Kerite used a local subcontractor to dig trenches and install the cable

After tricky shipping, installation goes smoothly

The reel holding the continuous piece of cable weighed 171,000 pounds. Kerite used its onsite rail siding and special lifting equipment at its Seymour, CT, manufacturing plant to place the reel onto a freight truck specially equipped to handle the extra weight. The truck had a larger than standard number of axles and a trailer that sits very low to the ground so it could clear most bridges and underpasses. The vehicle was subject to special permitting throughout the route from Connecticut to Michigan, and there was a delay for a few days when New York State did not have troopers available to escort the truck in accordance with that state's requirements. Once in Michigan the truck, at over 200,000 pounds, was not permitted to go over the Mackinaw Bridge – the typical route taken to Drummond. As a result, when it arrived at Rogers City, MI, the reel was then loaded onto a barge for the final part of the journey.

The cable arrived safe and sound, and the installation then went forward. The original plan was to pull the cable from the mainland side at DeTour village to the Drummond side. However, due to a rather strong southwest wind, GRP Engineering made the decision to pull from the Drummond side to the DeTour side.

To protect the aforementioned fish spawning, the project was originally scheduled for completion by October 1. Due to shipping issues encountered, GRP Engineering worked with the MIDEQ to get a brief extension. Weather is a main concern for a project like this, but all went smoothly and the entire project was completed in eight days. The cable is now energized and carrying the quarry load on the cable.



The cable reel is being loaded onto the barge in Rogers City



The reel is ready for the installation process

Michael McGeehan, President of GRP Engineering, says he was extremely satisfied with the project, which was the company's first subsea cable assignment. "Kerite did a great job. They were concerned about getting it done properly and on time, and keeping to the schedule to ensure compliance with the permit conditions required by fish spawning concerns." He added, "Everyone involved made sure the cable would be a success. We were very happy when it was completed and installed."



Cable payout from Drummond



Cable floating to DeTour