

## Superior Essex Cables Restore the Big Guns of Fort Mott

Since the late 1800s, Fort Mott, situated on the bluffs of the Delaware River, has stood as a testament to the strength of the U.S. Coastal Defense System. Now operated by the New Jersey parks department, Superior Essex recently engineered a cabling system that helped restore the Fort's communications equipment—more than 150 years old—to working order so future generations could experience living history lessons.



What comes to mind when you hear bells ringing? Bells alarm to warn of fire; ding to let you know the microwave has zapped your meal; ring to signal the beginning of religious services; chime to indicate the changing of classes in schools; and for Pavlov's dog – conditioned him to salivate at the sound of it. For the U.S. militia, bells have a history of helping armed forces strategically coordinate the location of enemy targets.

## The Challenge

Built in 1896, Fort Mott was constructed to protect the Delaware River, at the entrance of Delaware Bay, just prior to the Spanish-American War. It was part of a three-fort coastal defense system along with Fort Delaware on Pea Patch Island and Fort DuPont in Delaware City (Delaware).

From 1897 to 1922, troops manned Fort Mott's mortar battery stations. The stations were equipped with long-range guns that fired 1,070-pound armor-piercing shells, capable of hitting targets up to 13 miles away. In their time, the combination of guns sufficiently matched or out-ranged the guns of contemporary naval vessels. But, no matter how far the guns could shoot or how powerful the impact of the mortar, the artillery was useless if it couldn't hit the targets.

To help create accurate firing solutions, a fire control communications system consisting of both telephone and Time-Interval (TI) systems were used. The TI system utilized timing bells to signal the precise moment that military personnel were to triangulate the location of enemy ships attempting to enter the river. Key to the overall system was the synchronicity of bells. (The system provided an audible signal of three single strikes at the last three seconds of a specified interval of 10, 15, 20 or 30 seconds.) If the bells didn't fire in harmony, calculations were off and targets were missed.

As military strategies and technologies evolved through the years, Fort Mott lost its usefulness as a primary source for homeland defense of the Delaware River and was closed in the 1940s. Over time, the wiring that carried the 24-volt "pulse" on the timing circuit degraded and in more recent years, failed to support the TI system.

About the late 1980s, the Army Ground Forces Association (AGFA), an all-volunteer organization that reenacts the history of Coast Artillery installations, began rehabilitating the fort. One aspect of the restoration project included refurbishing the integrity of the timing circuit.

"It was a typical cable system of the period: lead sheath and paper wrapped " explained Shawn Welch, Member, Board of Directors, AGFA. "The last upgrades to the system were completed in the 1941 time frame. The Army disposed of the installation around 1944/45 and it sat without management and protection into the 1950s."

What was left of the fire control communications system were a few terminal boxes, three different types of telephone systems manufactured between 1914 and 1943, and deteriorating cable that had been cut at various points. To say the least - testing to isolate the problems were inconclusive.



AGFA initially used standard Category 5 Ethernet cable to power the fire control system. While this worked very well for the telephones, it did not actuate TI bells beyond about 400 feet from the time interval apparatus. (For historical accuracy, at Fort Mott, AGFA established an interpretive requirement for a minimum of two TI bells located approximately 2000 feet from the TI apparatus.) A cabling solution that supported both the fire control telephones and TI system was desperately needed.

For months, AGFA sought suitable cables that were 2000 feet in length to solve its “time interval bell” problems without success.

“We resorted to the Internet and filed several questions to cable manufacturers using their Web browser question submission pages. Only Superior Essex responded to us with initial advice, questions about what we were doing, and a point of contact to better clarify what we were doing,” said Welch. “I called (their technical marketing department) and explained what we were trying to accomplish, sent them a link to our Web site, and followed up with additional information such as a Corps. of Engineers site map of Fort Mott.”

After several rounds of discussion, Superior Essex determined that a C-Rural cable (14-AWG copper clad steel conductors, polyolefin sheathed cable) would effectively resolve the communications problems. AGFA obtained more than 4,000 feet of the cable, which is designed to carry single circuit transmissions for long distances.



## The Results

The Superior Essex cable was installed in time for AGFA to host its upcoming event, “Aiming the Guns.” The event demonstrated the use of seacoast artillery fire control systems from the early 1900s to WWII. As expected, the C-Rural cables worked perfectly, powering both the telephone and TI systems.

“Being the group of volunteers that we are, our work moves in spits and spirits; but we do have a lot of fun with our work. When a system we installed works – wow. It’s great!” said Welch.

Long term, AGFA plans to restore the fire control switchboard room and bring electric power to each of these rooms located along the battery firing line. AGFA is working with the Superior Essex technical marketing team to find cabling solutions to restore these projects as well.

