

## **ERGONOMIC IMPROVEMENT FOR CABLE REEL HANDLING**

Naval Undersea Warfare Center Division Newport (NUWCDIVNPT) houses a land-based Towed Array Test Facility that is used to study towed array systems for the 688 Class and Trident submarines and the new Virginia Class of submarines. A towed array is a series of hydrophones in a hose that may be towed behind submarines or surface ships. Arrays are passive devices that detect sound signals that are generated by their targets. The arrays vary in length from 300 to several thousand feet and are attached to the submarine or surface ship by a tow cable.

One of Newport's Towed Array Test Facility's more sophisticated equipment areas is its Tension Test Facility (TTF). Here, new cables and array designs are evaluated along with arrays that are already used by the Navy. The TTF, which is computer-driven, tests the strength of the cables that support arrays by applying different degrees of tension, up to 30,000 pounds, to the cables. The arrays and cables to be tested are shipped into the facility on cable reels that vary from four to eight feet in diameter and weigh between 150 and 7,000 pounds.



**Stored reels of cable awaiting testing**

In the past, workers were required to transfer heavy cable reels manually from their facility storage site to the TTF and back again. Four to six people were needed to move each reel. These workers were at risk for shoulder, arm, leg, and back strain injuries. During a recent safety inspection, two safety professionals monitored a manual cable reel transfer, noting the potential for injuries. Subsequently, the Occupational Safety and Health Division's ergonomic assessment identified the cable reel transfer task as high risk for back and other musculoskeletal injuries.



**Cable Reel Handler**

Research was then undertaken to find a commercial product that would improve the cable reel handling process and prevent injuries.

The mechanical *cable reel handler* was identified. The supplier visited the Towed Array Test Facility to confirm that the equipment was suitable for handling the cable reels used there. When it was determined that the equipment would function satisfactorily with the existing cable reels, a request for hazard abatement funds was submitted and approved, and the *cable reel handlers* were purchased and put into service.

Now, one person can move cable reels, using a mechanical cable reel handler, which is powered by a rechargeable battery. Controls on the reel handler lift its two rear “feet” to allow the operator to reposition the reel handler. Two mechanical arms on the reel handler grasp the reels using hydraulic lifts that move the arms up and down and in and out.



**One worker can operate the cable reel handler**

operator raises the arms of the cable reel handler at the same time in order to lift the cable reel to a height that is comfortable for him or her. The cable reel handler and the attached reel can now be moved as one unit. The motorized cable reel handler is steered from one location to another by one operator.

After a reel has been moved to the TTF, the cable is unwound onto another reel using a *cable spooler*, a motorized cable reel. When testing of a cable or an array has been completed, the process of moving the cable reel is then reversed.



**Mechanical arms hold reel in place**



There are many advantages to using the new cable reel handler. It is more efficient, because one person can move a cable reel instead of the five or six people previously needed to move a cable reel manually. Workers who use the mechanical *cable reel handler* have better control when moving reels, making their

job safer and greatly reducing the risk of shoulder, arm, leg, foot, and hand injuries. The biggest advantage of the cable reel handler is that it eliminates risk of repetitive motion injuries, such as back strain. Employees like the mechanical *cable reel handler* because it is easy to use and decreases strain on their bodies.

The activity using the cable reel handler expects an annual cost avoidance of \$67,500.00 based on an average of 225 cable reel moves a year.

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