

## Success Stories

Public Works Center (PWC) San Diego prevents WMSD'S increase productivity and reduces costs with automated cleaning and lubrication system.



**Land crane on pier**



**Floating Crane**



**Manually cleaning and lubricating wire rope from a spool required riggers to stand and use repetitive motions for long periods**

At Public Works Center (PWC) San Diego, land and floating cranes are used to lift equipment and materials onto and off of ships. Land cranes move to various shore sites, while floating cranes are permanently mounted on barges to service parts of ships outboard of piers to which the ships are tied. Hooks on the cranes are used to secure loads for raising and lowering equipment and materials. Crane hooks are attached to wire rope, controlled by winches, which let out or take in the wire rope. The wire rope on cranes must be kept clean and well lubricated to prevent rust accumulation and wearing of the wire rope.

In the past, crane riggers in the PWC San Diego Crane and Rigging Department manually cleaned and lubricated wire ropes on storage spools in the workshop or on the crane winches, themselves. Crane riggers unwound the wire rope from the spool or winch, cleaned it with a wire brush, then lubricated the wire rope and rewound it onto the storage spool or crane winch. Riggers treated approximately 2,650 feet of wire rope per crane. This work task required PWC crane riggers to maintain awkward postures for long periods - climbing, standing, squatting, and crouching on the cranes. Riggers also had to bend and twist their torsos, wrists, arms, and necks while using repetitive motions to clean and lubricate the wire ropes.

Manually cleaning and lubricating wire ropes put crane riggers at risk for work-related musculoskeletal disorders, or WMSDs. Work tasks that require repetitive motions, awkward postures and/or using one group of muscles for long periods during each day's work shift tend to fatigue those muscles. This overburdening may lead to a work-related WMSD, a disability that usually involves weakness and discomfort. WMSDs commonly involve the wrists, arms, shoulders, neck, legs, or back. The discomfort often improves after discontinuing activities that weaken the affected muscles and getting medical treatment for the WMSD.

PWC San Diego sought an ergonomic solution that would minimize the risk of WMSDs to crane riggers who routinely cleaned and lubricated wire ropes. Ergonomics is the science of fitting the work to the worker, instead of requiring the worker to adapt to existing working conditions. The goal of an ergonomics program is to reduce the frequency and severity of WMSDs by redesigning work tasks or workstations using procedures and tools that minimize the risk of WMSDs. Work tasks, equipment, and tools that are ergonomically designed help to reduce the risk of work-related injuries and WMSDs by making it easier for the worker to avoid repetitive motions, awkward positions, and unnatural postures.

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**Inside view of lubrication collar, the point where wire rope runs through the automated wire rope lubrication system**



**Crane riggers place the end of a wire rope into the automatic cleaning and lubrication system**



**While comfortably seated, a rigger mans a winch to ensure wire rope winds evenly onto storage spool**

Robert Kuhn, a wire rope inspector in the PWC Crane and Rigging Department, and Arthur Duby, a PWC crane inspector, read about a new automated wire rope lubrication system. They brought the system to the attention of co-worker, Ron MacKowiak, a member of the PWC Employee Driven Cultural Safety Forum (EDCSF). The EDCSF is a group of safety representatives from each San Diego PWC workshop who meet once a month to discuss safety challenges within the workshops and to brainstorm solutions.

Mr. MacKowiak asked Safety Forum Leader, Mr. "T" Gogue, and an ergonomic representative from Commander, Navy Region Southwest to evaluate the automated wire rope lubrication system. Upon their recommendation, the EDCSF presented a brief to the PWC Executive Steering Committee (ESC), proposing purchase of the system. The ESC approved purchase of the new system using command ergonomic funds.

The automated wire rope lubrication system is capable of cleaning wire ropes that are between 1/8 and 1 5/8 inches in diameter. The system feeds lubricant at the rate of 60 ounces per minute to the lubrication collar, the device that the wire rope passes through in order to be rapidly and efficiently cleaned and lubricated. The automated wire rope lubrication system is now used on all wire rope installed on PWC cranes.

While comfortably seated, a rigger mans a winch to ensure wire rope winds evenly onto storage spool

The automated lubrication system extends the life span of wire rope, reducing the costs of removing and disposing of worn out wire rope and the purchase and installation of replacement rope. Operating costs are also reduced, because cranes are less frequently taken out of service to be refitted with new wire rope. The automated system cleans and lubricates wire rope at a rate of 100 feet per minute as compared to the manual rate of approximately one foot per minute. Cleaning and lubricating wire ropes on cranes using the old manual method took approximately five eight-hour workdays per crane. Using the automated system, wire rope on a crane can now be cleaned and lubricated in one eight-hour day. This represents significant savings in labor costs. The automated lubrication system has reduced PWC San Diego's annual cost of cleaning cables from about \$320,000.00 a year to approximately \$34,000.00, a yearly savings of approximately \$286,000.00.

PWC San Diego crane riggers now perform their wire rope cleaning and lubricating tasks without the need to assume awkward postures, stand for long periods of time or use repetitive motions while risking back, wrist, shoulder, and leg muscle strain. Since installation of the automated wire rope lubrication system, PWC crane riggers have not reported any lost time mishaps or WMSDs related to wire rope cleaning and lubrication.

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