

MORE BANG FOR THE BUCK: AN ERGONOMICS IMPROVEMENT ALSO PROVIDES IMPROVED FALL PROTECTION

Naval Submarine Base Kings Bay is located adjacent to the town of St. Marys in Camden County, Georgia, in southeastern Georgia, and not far from Jacksonville, Florida. Kings Bay's Trident Refit Facility (TRIREFFAC) is the largest tenant command at the submarine base and has quietly and efficiently kept a significant portion of the United States Fleet Ballistic Missile submarines at sea since 1985. TRIREFFAC provides quality industrial-level and logistics support for the incremental overhaul, modernization, and repair of Trident submarines. It also furnishes global submarine supplies and spare parts support. In addition, TRIREFFAC provides maintenance and support services to other submarines, regional maintenance customers, and other activities as requested. TRIREFFAC Building 4026 houses the facility's industrial shops and is the location of large pump test stands.

TRIREFFAC machinists working in Building 4026 were at risk for potential injuries due to [ergonomics](#) hazards while operationally testing and repairing pumps that circulate water on the Trident Submarines. These pumps support diving and surfacing operations. While being inspected and/or repaired, the pumps are placed on the test stand by a crane. The workers are required to access the entire pump (top, bottom, and sides) and were required to stand on temporary staging that was not conducive to performing work in optimal ergonomic postures.



Pump shown in test fixture with temporary staging surrounding it.



Side view of test stand.

Machinists reached and extended their bodies at times as much as four feet, to access bolt threads, wiring, seals, and other components of the pumps. They also were required to twist and bend their bodies into awkward postures for extended periods of time to perform repairs and tests. Pump maintenance and repair tasks are performed by three to five machinists at a time, and the same employees work the tasks until the entire pump repair is complete. The task

duration is normally 3 days and performed 30 to 40 times per year. The awkward postures the machinists assumed while performing maintenance and repair tasks resulted in a higher potential for an ergonomics injury.

The shapes of the pumps are similar to a tower and pot belly that require the necessity for a versatile staging configuration. Workers had been observed standing on rails of the temporary staging as well as piping to access components of pumps as they disassembled/reassembled them. This not only was an ergonomics issue, but a fall protection issue as well.

A Mishap Prevention and Hazard Abatement (MP/HA) project was developed to provide an ergonomics solution to the staging issue. Naval Facilities Engineering Command (NAVFAC) manages the Chief of Naval Operations (CNO) Mishap Prevention and Hazard Abatement (MP/HA) program. Among the services provided is the technical assessment of work processes in order to reduce the risk of ergonomics injuries.

The project was submitted through NAVFAC for ergonomics funding in March 2008 in the amount of \$31,000 to design and purchase customized



Workers who helped install staging: Dan Menard, J.D. Noyes, and Adam Pepper.



New customized staging promotes access to pumps

staging for permanent access to the pumps. Permanent access would eliminate the stressors created by overexertion on the workers.

The Navy's MP/HA Program Team assessed the pump test stand, and the potential solution to the ergonomics issues was identified. TRIREFFAC developed a proposed design for permanent staging for the pump stand area. The design was reviewed and

approved by the TRIREFFAC Building 4026 Safety Committee and Facilities Representative. Meetings were held with the potential vendor of the permanent staging, and the Navy MP/HA Team reviewed the final design of the staging. The newly acquired staging was installed by TRIREFFAC personnel.

The completed project allows machinists to work in ergonomically neutral postures while providing access to the entire pump, provides access to pumps in a manner that reduces the potential for injury, and eliminates the need to stand on rails, reducing the potential for a life threatening fall.

More information on ergonomics and the technical support available through the MP/HA Program can be found on the NAVFAC's Ergonomics website - select the ergonomics tab at www.navfac.navy.mil/safety.

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