



## Abstracts

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### **NIOSH Shipyard Ergonomics Project**

*S.D. Hudock, L.E. Reed*

National Institute for Occupational Safety and Health

Approximately 100,000 workers are employed in the domestic construction and repair of ships. This number has fallen dramatically over the past 20 years as military and commercial orders have decreased. Due to the downturn in employment, new hires in the shipyards are rare and an aging workforce must work harder to build a commercially-feasible final product. Cheap labor rates and subsidized industries overseas have made this task even more difficult.

The shipbuilding and ship repair industries historically have had high injury incidence rates. For the year 2001, the industry had an overall injury and illness incidence rate of 17.2 per 100 full-time employees, twice the rate of the construction industry at 7.9 and three times the rate of all private industry at 5.7 per 100 full-time employees. These high incidence rates were a concern to the industry principally because of increased worker compensation costs and decreased productivity; mitigation of these rates through analysis and modification of job tasks was thought to be a cost-effective means to address the associated costs of the injuries and illnesses. Initial interest in the project came through the Maritime Advisory Committee for Occupational Safety and Health, an OSHA advisory committee, and the National Shipbuilding Research Program, a consortium of the major domestic shipyards. Researchers at the National Institute for Occupational Safety and Health became involved, competed for, and received funding from the U.S. Navy to pursue this research.

One of the objectives of this study was to identify those job tasks within each shipyard occupation that were associated with the highest exposure to occupational risk factors. These job tasks were identified through a survey of OSHA injury logs, and discussions with labor and management safety personnel at eight participating shipyards. Over forty specific job tasks were videotaped and analyzed with respect to the presence and magnitude of the occupational risk factors, such as sustained or awkward postures, repetition, excessive force and vibration. The exposures to occupational risk factors were then quantified by the application of several different exposure assessment techniques, such as the NIOSH Revised Lifting Equation, the Rapid Upper Limb Assessment, and the 3-D Static Strength Prediction Program. Suggestions of possible ergonomic interventions to reduce the exposure to the risk factors were made to the participating shipyards. If the shipyards agreed to implement one or more interventions, funds were available to defray some of the cost of the intervention equipment.

Over the course of the project, a limited number of interventions were implemented within the shipyards, including the installation of lift tables to minimize manual material handling in shop and drydock areas. Where implemented, the interventions were extremely successful in reducing the exposure to occupational risk factors, and usually increased productivity within the workplace as well. It is thought the worker compensation costs will decrease as well over time. The focus on ergonomics within the industry brought about by this project has caused a number of shipyards, both study participants and other yards, to reevaluate their ergonomic programs. For example, the Shipbuilders Council of America, the association representing the small- to medium-size shipyards, is developing an ergonomic training video and best practices guide for their membership. Other yards are incorporating ergonomic redesign as part of their lean manufacturing programs. The results of this study will be presented to OSHA for their use in the development of an industry-specific ergonomic guideline if OSHA chooses to pursue that course. The final product for this study will be a Compendium of Shipyard Ergonomic Solutions that will compile best industry practices that address exposure to occupational risk factors and will be widely distributed within the industry.

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