

## **Ergonomic Risk Assessment NAVFAC East Division**

An ergonomic survey was conducted at on April 3, 2000. The rigging shop and provisions warehouse were evaluated. This assessment is based upon interviews with employees, supervisors, and safety personnel as well as evaluation by the ergonomist. An ergonomic survey was also administered to the employees. Recommendations are included with as much vendor information as possible.

### **Rigging Shop**

It was not possible to view this operation during the ergonomist's visit since there were no submarines in dry dock. When a sub comes in, components are removed for repair. 86 riggers and painters are responsible for manual loading and positioning of components. Components such as grates can weigh up to 400 lbs. Grates are manually placed on wire pallet like that shown in figure 1. The grates are then manually flipped up to 10 times, to blast, prime, and paint each side, as shown in figures 2, 3, and 4. Two employees are needed to handle only the heaviest grates. Many of the grates are still handled by one person. The extreme weight of the parts and awkwardness of handling places the back and upper extremities at high risk of ergonomic injury.

There are three shifts performing this operation. Each employee works 40 hours a week when there are subs in dry dock. There is a two-week break between each submarine. A sub usually spends 25 days in dry dock. The average age of the workforce is 42. There have been 330 cases of sprains or strains at this operation, resulting in 842 lost workdays.

### **Recommendation:**

The activity has received an estimate of \$143K to design and install a monorail to raise, lower, and transport submarine components during preparation and finishing operations. The monorail will eliminate most material handling; thereby reducing the ergonomic hazard associated with lifting heavy loads.

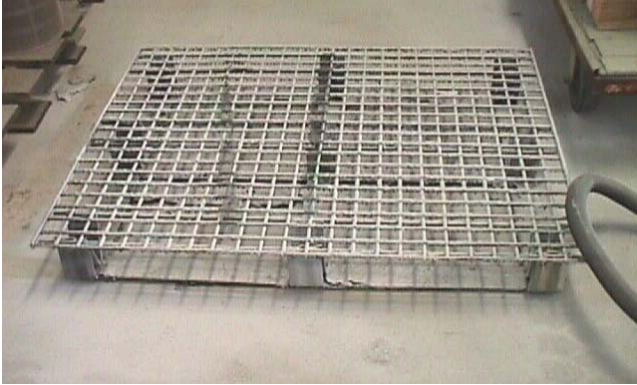


Figure 1: Wire pallet that grates are placed on



Figure 2: Employee flipping grate. Grates shown weigh 186 and 256 lbs.



Figure 3: Employee flipping grate



Figure 4: Grates weighing 186, 256, and 326 lbs. in upright position

## Provisions Warehouse

The provisions warehouse receives food for storage and distribution. Five employees work five days a week in the provisions warehouse. Food arrives by delivery truck in pallets, as shown in figure 1. Ten to twelve trucks arrive each day at one of four docks. The docks are manual and tend to get stuck, requiring the employee to use a crow bar to manipulate the dock. Incoming food is sorted and stored until sailors come to fill orders for outgoing ships. Storage consists of pallet shelving. Employees place pallets on shelving with a forklift. Unused food is then returned to the provisions warehouse when ships return to shore. Returned food is also sorted and stored by hand as shown in figure 2. Boxes weight between 40 and 45 lbs. Lifting boxes to and from pallets puts employees at risk of back injury.



Figure 1: Foot in pallets



Figure 2: Employee moving food from pallet to shelves

**Recommendations:**

**Dock Leveler**

Automatic Dock Levelers are available from McMaster-Carr for \$646-\$719 (quote provided by the activity). A new dock leveler will eliminate the use of crow bars to place the dock.

**Stockpicker**

A DC-powered moving shelf ladder allows the employee to place a load on the shelf instead of carrying it. With the moving shelf ladder, the shelf safely lowers and raises the load. The order picker allows for a greater range of working heights than the moving shelf ladder, since the operator and the shelf are raised and lowered. Price depends on ladder height. The ladder height should be determined by the height required to reach loads on the top shelf.

Vendor	Product	Price
C&H 1-800-336-1331	Moving Shelf Ladder	\$3148-\$3811
Global Industrial 1-800-645-2986	Powered Shelf Ladder	\$2148-\$3186
Lab Safety 1-800-356-0783	One-Step Entry Order Picker	\$4031.25



Moving Shelf Ladder



Order Picker

\*Some information has been removed from this report that is specific to the activity.