

**Naval Facilities Engineering Command
Ergonomic Risk Assessment
Warehouse operation**

Introduction

An ergonomic risk assessment was conducted on February 13, 2002. This assessment is based upon interviews with supervisors, industrial hygienists, and employees as well as an evaluation by the Naval Facilities Engineering Command (NAVFACENGCOM) Hazard Abatement Ergonomist. The Job Requirements Physical Demands Survey (JR/PD), an ergonomic survey, was also administered to the employees. The results of the JR/PD indicate that this is an Ergonomic Problem Area (EPRA) with an overall priority score of 5, on a scale of 1-9, where 9 has the greatest priority. The back/torso and leg/foot regions were found to contain significant ergonomic risk. Ergonomic risk is based upon ergonomic risk factors associated with the task and employee discomfort.

The warehouse operation was observed in order to determine sources of ergonomics stress and make recommendations to reduce the risk of work-related musculoskeletal disorders (WMSDs) and improve safety, health and productivity. Musculoskeletal Disorders (MSDs) are injuries and illnesses that affect muscles, nerves, tendons, ligaments, joints, spinal discs, skin, subcutaneous tissues, blood vessels, and bones. Work-Related Musculoskeletal Disorders (WMSDs) are:

- Musculoskeletal disorders to which the work environment and the performance of work contribute significantly or
- Musculoskeletal disorders that are aggravated or prolonged by work conditions.

Recommendations to the command to further reduce the probability of injury include new equipment¹. Recommendations are included with as much vendor information as possible to assist in the evaluation of products and services. Input gathered from the workers, safety specialists, and other personnel to evaluate equipment before purchasing is recommended. This process will increase product acceptance, test product usability and durability, and take advantage of employee experience.

A project for the warehouse operation was submitted for FY03 funding to the Chief of Naval Operations (CNO) Hazard Abatement Program (HA) to reduce the risk of injury. NAVFACENGCOM administers the CNO Hazard Abatement Program, which is a centrally managed fund to correct safety and health deficiencies beyond the funding capabilities of the activity. Information about the HA program can be found on the NAVFAC command web site: /safety/webha/Documents/ha_help.doc

Purpose of the operation: Employees in the warehouse are responsible for the storage, inventory, and distribution of consumable assets for ships.

Population: There are currently 150 employees in the warehouse- 88 military, 2 civil servants, and 60 contractors.

Injury Data: There have been two recorded injuries involving falls from height.

Process: The Building contains three primary warehouses. Most of the military personnel work in the two major warehouse stocking inventory. Employees currently use forklifts, rolling ladders, and forklifts with man-baskets to stock shelves and retrieve stored items.

Process Hazards: The rolling stairs used in stocking, as shown in figure 1, present a possible fall hazard. Employees using rolling stairs to stock shelves often twist at the torso to retrieve items off the side of the ladder, which increases risk of back injury, figure 2. Employees also risk falls from heights and are unable to use safety handrails while descending the ladders carrying boxes.



Figure 1: Rolling Stairs



Figure 2: Stocking Shelves
(Photo from NADEPJAX)

Consumable assets are also stored in storage cabinets. Accessing the bottom drawers in the storage cabinets requires repetitive bending, as shown in figure 3. Employees are also repeatedly bending over to pull items from dollies in order to stock the storage cabinets, as shown in figure 4. Repetitive bending and lifting objects over 10 pounds more than twice per minute or for more than 2 hours total per day places employees at risk of back injury.



Figure 3: Stocking cabinets



Figure 4: Stocking cabinets

Employees stand on locking step stools, figure 5, to retrieve items from heights. Step stools can be a trip and fall hazard, especially when the employee is carrying a box and can't use a hand for stabilization.



Figure 5: Step Stool

Recommendations:

Rolling mobile lifts are recommended to reduce the use of rolling stairs. Mobile lifts raise the employees to the desired pallet rack height and provide a ledge for boxes to be placed on. The mobile lift is then automatically lowered and the employee can retrieve the box from the mobile lift.

Mobile Lift Recommendations			
<p>Lab Safety 1-800-356-0783</p>	<p>Order Picker Item #35623</p> <p>Platform Ht. 10'6"</p>	<p>\$4289.00</p>	
<p>Ballymore (610] 696-3250</p>	<p>Orderpicker</p> <p>Model OP-11 Capacity 300 lbs. Platform Ht. 10'6"</p>	<p>\$3354</p>	
<p>Grainger 757-855-3153</p>	<p>JLG Aerial Work Platforms/Personnel Lifts</p> <p>Capacity 300-350 lbs. Platform Ht. 21' to 47'</p>	<p>\$4200-\$7200</p>	

<p>C&H 1-800-558-9966</p>	<p>High Lift Maintenance Platform Platform Ht. 21'-34'</p>	<p>\$5,000-\$9,000</p>	
<p>Cotterman 1-800-552-3337</p>	<p>Pusharound Lift Platform Ht- 25' Capacity- 300lbs.</p>	<p>\$4471.6</p>	
<p>Cotterman 1-800-552-3337</p>	<p>Outriggerless Pusharound Lift Platform Ht. 17' Capacity 400lbs.</p>	<p>\$3738</p>	

Height adjustable carts and pallet jacks encourage neutral work heights and reduce bending and excessive lifting. The cart can be adjusted to the height of the storage drawer so items are pushed and pulled instead of lifted. Carts and pallet jacks should be placed as close to the work area as possible to reduce carrying objects and twisting the back.



Height Adjustable Cart

Height Adjustable Cart Recommendations*		
Vendor	Product	Price
Lab Safety 1-800-356-0783	Bishamon Mobile Scissor Lift Tables 330 lb. Capacity #18771	\$560
Grainger 757-855-3153	Manual Hydraulic Elevating Scissor Cart 400 lb. Capacity #3KR46	\$377.50
Global Equipment 1-800-645-1232	Scissor Lift Table 660 lb. Capacity #GK954850	\$367
C&H 1-800-558-9966	Mobile Scissor Lift Truck 330 lb. Capacity 71-525A	\$568


*prices vary with platform size




Pallet Lifter

Pallet Lifter Recommendations		
C&H 1-800-558-9966	WESCO High Lift Pallet Positioner 2200 lb. capacity Fork height 3.6"-31.5"	\$710
Global 1-800-645-1232	Hi-Lift Skid Truck 2200 lb. capacity Fork height 3.6" to 31.5"	\$675
Lab Safety 1-800-356-0783	WESCO High Lift Pallet Truck 2200 lb. capacity Fork height 3.6" to 31.5"	\$677


Use of the rolling step stools should be discouraged, particularly when an employee is retrieving a box. A taller step stool with a rail can provide additional support while stocking tall shelves.

Step Stool Recommendations			
C&H 1-800-558-9966	Mobile Office Stands 2 Steps with handrails 73-736DA	\$144	

Box cutters are recommended for opening boxes. Box cutters encourage neutral wrist postures and reduce the risk of lacerations while opening boxes.

Box Cutter Recommendations			
Alimed 1-800-225-2610	Carton Cutter #JA72912	\$22.95	

Shoe inserts are recommended to reduce fatigue and discomfort associated with standing for extended periods and walking throughout the warehouse.

Shoe Inserts Recommendations			
Alimed 1-800-225-2610	Poron 4000 Plastazote Insoles	\$17.95 a pair	
Alimed 1-800-225-2610	Viscolas Orthex Relievers	\$15.95 each	

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

¹ Equipment purchase without proper and repeated training will not mitigate risk and may in fact increase hazards. This report does not constitute an endorsement of any particular product. Rather, it is a recitation of how Navy personnel have addressed a particular work place safety issue. Neither the Navy nor its employees and agents, warrant any product described in this report for any use, either general or particular.