

## Naval Facilities Engineering Command Ergonomic Risk Assessment for

### Housekeeping Operation

#### Introduction

An ergonomic risk assessment was conducted on October 18, 2001. This assessment is based upon interviews with a supervisor, industrial hygienist, safety specialist, 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 9, on a scale of 1-9, where 9 has the greatest priority. The shoulder/neck, back/torso, and legs/feet regions were found to contain significant ergonomic risk, particularly the back/torso. Ergonomic risk is based upon ergonomic risk factors associated with the task and employee discomfort.

The housekeeping 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 equipment<sup>1</sup>. 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.

The command may request additional funds from the Chief of Naval Operations (CNO) Hazard Abatement Program to abate 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. The Hazard Abatement Request Forms are submitted directly to the command's major claimant CINCLANTFLT- Gino Myers; MyersEG@clf.navy.mil; (757.836.3680). Information about the HA program can be found on the Navy Occupational Safety and Health web site [www.navosh.net](http://www.navosh.net).

## Housekeeping

Purpose of the operation: Employees are responsible for cleaning and maintaining the housing facility shown in figure 1.



Figure 1: Transitional Housing Facility

Population: There are currently 30 employees with a maximum of 34 employees during the summer due to increased occupancy. Employees work 40 hours per week.

Injury Data: Between FY97 and FY01 there were 14 recorded ergonomic-related mishaps, all of which involved back injuries. Employees noted back and leg discomfort associated with lifting and carrying heavy items up and down the stairs.

According to Occupational Safety and Health System data from FY89 to FY98, the average cost to the Navy for a blue collar worker with a back injury, out of work less than 45 days is approximately \$4,000. Disability or surgery can keep an employee out of work for extended periods. If the employee is out of work greater than 45 days with a back injury, the average injury costs increase to \$186,000.

Housekeepers: There are 18 housekeepers and 2 leaders responsible for cleaning and providing clean linen for 321 rooms in Transitional Housing. Clean linen is supplied on each floor in a cart over 33" tall. Reaching into a deep cart to retrieve bags of linen places the employee at risk of back and shoulder injury, as shown in figure 2. Housekeepers also carry their personal caddy of cleaning supplies and a vacuum cleaner up the stairs to their designated floor. Housekeepers remove trash and dirty linens from each room and place it in a cart, as shown in figure 3, in the hall for pickup.



Figure 2: Bending into linen cart



Figure 3: Cart for dirty linen

Linen PO: There are 2 employees responsible for supplying clean linen and assisting housekeepers. Clean linen is carried up to each floor daily. Dirty linens are picked up on each floor about 3 times per day. Employees retrieve the dirty linen placed in linen carts by the housekeepers, bag it, and take it to a central location to be picked up for cleaning. There are 6 to 7 linen carts on each floor. A bag of linen, particularly wet towels, can weigh between 40 and 50 pounds. Reaching into a cart to lift heavy bags of linen places the employee at risk of developing WMSDs of the back and shoulders. Linen is carried downstairs, pulled downstairs in a cart, or thrown over the balcony. When linen is thrown over the balcony, it has to be lifted over a 43" high railing and tossed past a 53" deep ledge, as shown in figures 4 and 5. Throwing a heavy load over shoulder height for a distance places the employee at risk of injury to the upper extremities and back. Objects falling from overhead place people and property below at risk of damage or injury. Pushing or pulling a cart on stairs is dangerous for the employees and guests in the stairwell. Carts in the stairwell can inhibit emergency egress.



Figure 4: Throwing bag of linen



Figure 5: Throwing linen past ledge

Janitors: There are 4 janitors whose job responsibilities include trash removal and carrying heavy items such as cots and steam cleaners up and down stairs. There are 2 steam cleaners available for use in the building, each weighing over 100 pounds. Carrying heavy items up and down stairs places the janitors at risk of developing back-related WMSDs. Janitors collect trash up to 10 times a day from each floor. Trash is bagged by the housekeepers and placed in large carts on each floor. Janitors either throw trash over the balcony or bring the entire cart down the stairs. Bags of trash can weigh up to 30 pounds. Throwing trash over the balcony places the employee at risk of injury to shoulders and back. Pushing carts in the stairwell places the employees and guests at risk of injury.

Superintendents: There are 4 superintendents responsible for repairing items and bringing in new furniture such as televisions, mini-refrigerators, and armoires. Employees use carts designed for luggage to bring in furniture, as shown in figure 6. Luggage carts are not appropriate for moving heavy items and force the employee to bend down to a low height to pick up objects. Excessive bending increases the force placed on the spine during lifting and places the employee at risk of back injury. Superintendents often carry heavy furniture up the stairs to the second and third floors. Carrying heavy furniture items up the stairs is dangerous for the employees and the guests.



Figure 6: Luggage cart used for moving furniture

Ergonomic issue description: Employees carry clean linen, cleaning supplies, cleaning equipment, cots, and furniture up stairs on a daily basis, which places employees at risk of developing Work-Related Musculoskeletal Disorders of the back. Carrying heavy items up and down stairs contributed to the significant ergonomic risk scores in the JR/PD results for the back/torso and legs/feet regions. Throwing items over the balcony and reaching into carts to retrieve bags may also have contributed to the significant JR/PD scores.

Recommendations:

**Lift**

Installing a lift for material handling would eliminate carrying heavy items up and down stairs. Instead of throwing individual bags of linen or trash, a full cart could be lowered from each floor to the ground. Furniture and clean linen could be brought up in the lift as well. Employees should be trained in lift operation and weight limits for proper lift use. The Safety Office should be contacted for installation and operation guidelines. The lift should not be used to transport people under any circumstance. The railing system at each landing will need to be modified to allow for a locking gate. The lift platform must be within 3" of the landing or have a ramp to bridge the gap. If the gap exceeds 3", workers will need to utilize fall arrest equipment.

Deleted:

Vendors: New Dominion 800-850-8559 ext. 132 (Ernie Taylor)



New Dominion produced a price quote of \$60,400 for equipment, installation, and shipping of a 4 level lift with 2,000 lb. capacity and a 26' travel distance.

The cost of a lift is equivalent to costs associated with about 15 back injuries. During a 5 year period, 14 back injuries were recorded for Transitional Housing employees.

**Centralized Storage**

Each floor should have enough equipment in a centralized storage location to reduce the number of heavy articles, such as steam and vacuum cleaners, carried up and down stairs.

**Linen Carts**

Carts with elevating bottoms are recommended to reduce extended reaches into linen and trash carts. Carts with elevating bottoms automatically rise as the cart contents are emptied. The existing carts can be replaced or retrofitted with a spring platform.

Linen Cart Recommendations		
Vendor	Product	Price
Postal Products Unlimited 1-800-229-4500	Elevated Basket Truck	\$70-\$85
Postal Products Unlimited 1-800-229-4500	Basket Truck Elevated Spring Platform	\$129-\$218 \$36-\$61
Postal Products Unlimited 1-800-229-4500	Heavy-Duty Spring Loaded Mail Cart	\$349
Grainger	Mail Hamper Spring Platform	\$182-\$335 \$144-\$151
Datamation Systems, Inc 1-201-732-3824	Ergonomic Auto Level Cart	\$935
Charnstrom 1-800-328-2962	Mail Hamper Spring Platform	\$198-\$274 \$60-100



Cart with Spring Platform  
(Platform moves independently)



Elevated Basket Truck  
(The entire cart bottom elevates)

**Height Adjustable Carts**

Height adjustable carts will allow the janitors and maintenance employees to load and unload heavy items such as televisions and other appliances at neutral heights to reduce the risk of back injuries. There should be at least one cart per floor. Applying anti-slip matting to the top of the cart will reduce load slippage.



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

\*Price varies with platform size

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

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<sup>1</sup> 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.