

# Ergonomic Risk Assessment

## NAVFAC East Division

An ergonomic survey of Shipping and Receiving and Computer Redistribution at was conducted on February 2, 2000. This assessment is based upon interviews with employees, supervisors, and safety personnel as well as evaluation by the ergonomist. Recommendations are included with as much vendor information as possible.

### I. Shipping and Receiving

Two employees in shipping and receiving are responsible for cataloging and inspecting incoming packages as well as preparing outgoing parcels for shipment. Both employees work nine hour days and alternate four and five day weeks.

#### Issues:

All packages coming to Shipping and Receiving arrive on a cart like the one shown in figure 1. The base height of the cart is 11.5" from the ground. Lifting boxes from this height as well as pushing or pulling a fully loaded cart places strain on the upper extremities and back.



Figure 1: Cart used in shipping/receiving

Outgoing packages are weighed for postage in Shipping and Receiving. Containers like those shown in Figure 2 have to be manually carried to the scale shown in Figure 3 or lifted onto a cart to be taken to the scale. All packages are then lowered onto the scale for weighing. Large weight and poor or non-existent handles increases stress on the back during the handling of packages for weighing.



Figure 2: Containers to be shipped



Figure 3: Scale used to determine postage

Employees in the Shipping and Receiving area use an Exacto knife to open pallets of packages like those shown in figure 4. This cutting tool promotes non-neutral hand and wrist postures while applying mechanical stress to the operator's hand. The cutting motion also requires repetitive force.



Figure 4: Pallet shrink-wrapped and tied

**Recommendations:**

**Mobile Lift Table**

1. Incoming packages should be loaded on mobile lift tables to maintain a proper work height when inspecting packages. The recommended tables can be used as work surfaces as well as for transporting packages. A neutral working height will minimize the strain caused by repeatedly handling heavy packages at various heights. The dimensions of the recommended tables are smaller than the current carts; therefore, additional tables may be necessary. Vendor information is supplied in Table 1.

<b>Table 1: Mobile Lift Table Recommendations</b>						
Product	GSA	Capacity	Dimension	Height Range	Price	Vendor
Hydraulic Lift Table with Casters Product A	GSA # 260 063	2,000 lb. Capacity	32"x48"	30.5" to 47.5"	\$738	Alzar Lift
Scissor Lift Table Product A		1,000 lb.	32"x63"	11.25" to 36"	\$689	Vestil Manufacturing 1-800-348-0868
Hydraulic Lift Table with Casters Product B		2,000 lb.	30"x36"	36" to 54"	\$950	Grainger 301-869-0011
Autohite Self-Elevating Cart Product C		1,000 lb.	42"x42"	14" to 34"	\$1,090	Vestil Manufacturing



A - Hydraulic Table



B - Scissor Lift Table



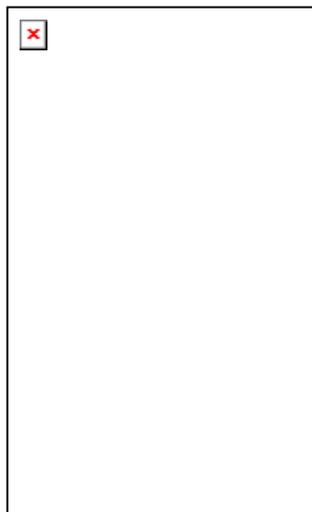
C - Autohite

**Flexible Conveyors**

2. Currently, many packages are delivered directly to NRL employees. If more packages for NRL are routed through Shipping and Receiving, flexible conveyors will allow this area to increase capacity. Flexible conveyors can be used in conjunction with the mobile lift tables to maintain neutral working heights. Flexible conveyors are easy to use and can conform to any layout. Telescoping legs allow the conveyor to be placed at a variety of work heights and can turn it into a gravity fed incline. When not in use, the conveyor can be compressed and stored. The delivery person should load incoming packages directly onto the conveyor. Refer to table 2 for product information.

<b>Table 2: Flexible Conveyor Recommendations</b>					
Product	Length (ft)*	Width *	Height Range	Price	Vendor
Flexible Portable Conveyor 9H-32161 with plastic wheels	39" to 154"	24"	28" to 44"	\$732	Lab Safety Supply 800-543-9910
Expandable Portable Conveyor 76-080DX with plastic wheels	39" to 146"	24"	28" to 44"	\$685	C & H 800-336-1331
Flexible/Expandable Conveyor 4W587	36" to 144"	24"	28.5" to 41.5"	\$850	Grainger 301-695-5063

\*Other conveyor lengths and widths are available



Flexible Conveyor

### Pallet Lifter

3. Pallet scissor lifts should be used when unloading pallets to maintain a neutral working height. A pallet lifter will eliminate bending to pallet height to lift packages. Table 3 contains vendor information.

<b>Table 3: Pallet Lifter Recommendations</b>						
Product	GSA	Capacity	Fork Dimension	Height Range	Price	Vendor
Pallet Lifter*	GSA # 272153	1,100 lbs.	27"x44"	3.2" to 35"	\$433	Alzar Lift
Pallet Lifter	GSA # 272755	2,200 lbs.	21"x44.5"	3.6" to 31.5"	\$543	Alzar Lift
Pallet Lifter		2,200 lbs	21" or 27" x 44"		\$625	Autoquip 513-245-2902
Pallet Lifter		2,200 lbs	21" or 27" x 44"		\$732-\$792	Systems Design, Inc. 252-995-6117

\*Not for use with closed pallets



2,200lb Capacity Pallet Lifter

## Scale

4. A pallet truck with a scale will allow employees to weigh heavy packages without having to manually transfer them from the pallets to the scale. A less expensive alternative is a scale with a ramp. This option would still require the transfer of large items from a pallet to a hand truck, which would then roll the package up the ramp to the scale. Some containers may be too large for the hand trucks, so the pallet truck with scale is preferred. Please refer to table 4 for details.

<b>Table 4: Scale Recommendations</b>					
Product	GSA	Capacity	Dimension	Price	Vendor
Pallet Truck with Scale*	GSA # 123000	5,000 lb.		\$2447	Intercomp.
Pallet Truck with Scale		4,000 lb.	Fork Dimensions 22" by 45"	\$2,450	Vestil Manufacturing. 1-800-348-0868
Pallet Truck with Scale		5,000 lb.	Adjustable Fork Dimensions	\$2350	Systems Design Inc. 252-995-6117
Industrial Scales**		1,000 lbs. to 10,000 lbs.	30"x30", 36"x36", and 48"x48".	\$1436- \$1596	The Scale People

\*Measures in one pound increments.

\*\*Purchase with optional ramp.



Pallet Truck with Scale

## Knives

5. A knife with an ergonomic handle and a box opener would encourage neutral wrist posture and decrease the force required in opening boxes.

Vendor: Box Cutter Price \$22.95 Alimed 1-800-225-2610

Box Cutter Price \$15.30 C&H 1-800-558-9966

Vendor: SK-4 Safety Knife \$34.95 Alimed 1-800-225-2610



Box Cutter



Ergonomic Knife

## II. Computer Redistribution Area

The computer redistribution area receives retired computer equipment, which is then processed and designated for disposal, internal reutilization, or donation.

### Issues:

Pallets are often used to hold equipment being processed or awaiting storage, as shown in figure 1. Employees bending over to work on equipment on pallets are at risk of back and neck strain. Figure 2 shows an employee picking a monitor up from a pallet. Computer equipment can weigh up to 40 pounds apiece. The low height of the pallets and poor handles on equipment like monitors adds to the weight of the load to increase the biomechanical stress on the spine while lifting.



Figure 1: Employee working on printer on pallet



Figure 2: Lifting monitor from pallet

The current storage units in the computer redistribution area are 3 and 4 shelf systems, as shown in Figure 3. Shelf heights vary from 9.25" to 96". The lower shelves require the employee to bend over to retrieve and return equipment. The stairs shown in figure 4 are used to place equipment on the top shelves. These stairs present a fall hazard, particularly when carrying heavy equipment.



Figure 3: Storage Systems



Figure 4: Ladder for accessing shelves

**Recommendations:**

**Mobile Lift Tables**

1. Individual equipment arriving in the computer redistribution area should be placed directly onto height adjustable carts and remain there until transferred to the storage racks. These carts will reduce the need for manually lifting parts and allow the operator to work on equipment at a neutral working height. Vendor information is supplied in Table 1.

<b>Table 1: Mobile Lift Table Recommendations</b>						
Product	GSA	Capacity	Dimension	Height Range	Price	Vendor
Hydraulic Lift Table with Casters Product A	GSA # 260 063	2,000 lb. Capacity	32"x48"	30.5" to 47.5"	\$738	Alzar Lift
Scissor Lift Table Product A		1,000 lb.	32"x63"	11.25" to 36"	\$689	Vestil Manufacturing 1-800-348-0868
Hydraulic Lift Table with Casters Product B		2,000 lb.	30"x36"	36" to 54"	\$950	Grainger 301-869-0011
Autohite Self-Elevating Cart Product C		1,000 lb.	42"x42"	14" to 34".	\$1,090	Vestil Manufacturing



A - Hydraulic Table



B - Scissor Lift Table



C - Autohite

## Pallet Lifter

2. Equipment arriving on pallets should be moved using a scissor lift pallet lifter. The pallet can then be raised to an appropriate working height or to a point where the parts can be transferred to shelving or carts. The pallet lifter will eliminate lifting heavy parts from a low level and allow the operators to work at a neutral height. Table two contains product information for pallet lifters.

<b>Table 2: Pallet Lifter Recommendations</b>						
Product	GSA	Capacity	Fork Dimension	Height Range	Price	Vendor
Pallet Lifter*	GSA # 272153	1,100 lbs.	27"x44"	3.2" to 35"	\$433	Alzar Lift
Pallet Lifter	GSA # 272755	2,200 lbs.	21"x44.5"	3.6" to 31.5"	\$543	Alzar Lift
Pallet Lifter		2,200 lbs	21" or 27" x 44"		\$625	Autoquip 513-245-2902
Pallet Lifter		2,200 lbs	21" or 27" x 44"		\$732- \$792	Systems Design, Inc. 252-995-6117

\*Not for use with closed pallets



2,200lb Capacity Pallet Lifter

## Stockpicker

- The top storage shelves should be used as little as possible to reduce the risk of equipment falling from heights during handling. A forklift should be used to place pallets of items on the top shelf. If there is not enough room in the aisle for a fork lift, an automated stock picker should be obtained. The scissor lift tables and pallet lifters can be adjusted to the same height as the lower shelves to ease the loading of equipment onto the shelves. The bottom shelves could be raised to reduce back bending while placing or retrieving equipment. The distance between the bottom shelf and the next shelf should allow for the tallest piece of equipment and clearance for a pallet or hands. A stockpicker truck can be used for loading shelves of 54" and 72" heights instead of the current ladder. Refer to table 3 for product information.

Product	GSA	Capacity	Dimension	Total Height	Price	Vendor
Stockpicker Truck	GSA#3502 54	500 lb.	Three shelves 22"x40"	50"	\$343	Alzar Lifts
Stockpicker Truck		500 lb.	Two Shelves 19.5"x34"	50"	\$475	Rol-Away 1-800-547-4548
Stockpicker Truck		1,000 lb.	Three Shelves 28"x48"		\$470	Grainger



Stockpicker Ladder

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

