

Ergonomic Risk Assessment

Naval Facilities Engineering Command (NAVFAC) East Division

An ergonomic risk assessment was conducted on November 30th, 2000. The mail processing facility was observed in order to identify sources of ergonomic stress and make recommendations to reduce the risk of work-related musculoskeletal disorders (WMSDs). This assessment is based upon interviews with employees, supervisors, and safety personnel as well as evaluation by the NAVFAC Hazard Abatement East Coast occupational 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 the mail processing facility is an Ergonomic Problem Area.

Recommendations to reduce the risk of WMSDs include considering equipment purchase, process redesign, and implementation of administrative controls. 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.

Mail Processing Facility

The mail facility is responsible for processing incoming and outgoing mail for the base. The mail facility has their own vehicles used in delivering and picking up mail. There are currently ten full-time employees in this area. Although no injuries have been recorded lately, four back injuries occurred during a three-year period prior to applying for Hazard Abatement funding. Employee interviews revealed that loading the truck and lifting heavy boxes were the most difficult tasks in this operation. Personal protective equipment include steel-toed shoes. Employees in this area have been trained in proper lifting techniques.

The JR/PD indicates 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). Significant amounts of discomfort and ergonomic risk were found throughout the entire body. The mail processing operation was assessed as a “somewhat hard” task. JR/PD results also indicate that employees are experiencing work related pain or discomfort, which doesn’t improve away from work and has interfered with carrying out normal activities. A significant number of employees have also seen a health care professional in the past 12 months for pain or discomfort that he/she feels is related to their job. The JR/PD indicates the presence of pre-existing WMSDs as well as other medical conditions recognized as contributing factors for WMSDs, which may have contributed to the overall priority score. The employee’s tasks may have caused or contributed to the pre-existing WMSDs.

Recommendations:

Problem:

Employees are standing for extended periods of time processing mail on concrete floors, which can lead to fatigue and discomfort in the legs and feet.

Solution:

Install Anti-fatigue Matting at all possible standing workstations (x-ray machine, sorting stations, bar code conveyor sorter, weighing and stamping machines). To increase employee acceptance, it is a good idea to obtain samples from different manufacturers and let the employees provide feedback before purchasing. For areas where carts will be going in and out, Anti-fatigue matting should be smooth with beveled edges. The Bar Code Conveyor Sorter is 28.8 feet long and would require a narrow mat (24") on both sides.

Shoe inserts are also recommended for the employees. Shoe inserts improve employee comfort and benefit workers while working outside of the mailroom.

Vendors: Global Industrial 1-800-645-1232

Lab Safety 1-800-356-0783

C&H 1-800-336-1331

Matting World 1-800-257-8557

Alimed 1-800-225-2610 (Anti-Fatigue Matting and Shoe Inserts)

Cost Estimate: \$1,500

Problem:

The mailroom has two delivery trucks, which deliver and pick up mail at different buildings around the base. Each delivery truck makes two trips a day. At the mailroom, two to three employees load and unload the delivery trucks using low pallet trucks. Bending to lift packages from the low pallet truck onto the back of the delivery truck places employees at risk of back strain. The delivery truck has a loading height of 28.5"; whereas the pallet truck is less than 10" above the ground. Figure1 shows an employee bending to place a load on a low pallet truck. Two employees ride the delivery trucks and are responsible for unloading the trucks at each building, delivering the mail, collecting outgoing mail, and reloading the trucks. Employees use a hand truck, which is stored on the delivery truck for delivering and receiving mail.

The current carts often have flat tires. Flat tires increase the force required to move cart.

Solution:

The mailroom should have 4 height adjustable carts to be used for loading and unloading delivery trucks. The height adjustable carts can pick up packages within the mailroom and transport them to the delivery truck. The adjustable height carts can be raised to the height of the delivery truck and lowered to workstation height within the mailroom to promote neutral work heights and minimize back strain. Two additional smaller height adjustable carts in addition to the four larger carts can be used throughout the mail processing operation to move packages and mail totes during mail processing.

The two buildings on the base, which receive the highest quantity of heavy packages, should each have two tall fixed height platform trucks. The fixed height platform trucks will allow for packages to be slid from the delivery truck onto the platform truck. At each of the two buildings, one platform truck should be loaded with outgoing packages and one should remain empty for the delivery truck to load with incoming packages.

All carts should be inspected regularly for wear. Employees should be encouraged to report mechanical problems. Maintenance should be contacted as soon as possible to correct problems.

Cost estimate- \$7,000



Figure 1: Employee bending to load pallet truck

Tall Fixed Height Platform				
Vendor	Product	Model	Size	Price
C&H 1-800-558-9966	DURA Work Height Platform Truck-Fixed Height *	71-575DX (02)	24"x48"	\$323.80
		71-576DX (02)	30"x60"	\$365.90
Lab Safety 1-800-356-0783	DURA Work Height Platform Truck *	OM-65008 OM-65009	24"x48" 30"x60"	\$291.50** \$368.65**
Grainger 901-372-7570 (Memphis)	DURA Work Height Platform Truck*	4ZZ64	24"x48"	\$332.24
		4ZZ66	30"x60"	\$377.78

*The Work Height Platform Truck can be set at a height of 26 ¼", 30 ¼", or 32 ¼", but it is not adjustable while loaded.

**Quantity Discounts Offered

Adjustable Height Cart		
Vendor	Product	Price
C&H 1-800-558-9966	Southworth Dandy Lift Mobile Lift Trucks Bishamon Mobile Scissor Lift Trucks Presto Mobile Scissor Lift Tables	\$500-\$1300
Lab Safety 1-800-356-0783	Bishamon Scissor Lift Tables	\$560-\$1,260
Global 1-800-645-1232	Scissor Lift Table Presto Mobile Scissor Lifts Bishamon Mobile Scissor Lift Table	\$330-\$1,300



Tall Hand Truck



Height Adjustable Cart

Problem:

Employees in the mailroom pull mail from the standard United States Postal Service (USPS) white mail totes for processing at their workstation. Employees either stack the white totes in a tower at their workstation or place them on top of low trashcans (about 1' tall). Small trashcans were found being used as a stand at both sitting and standing operations, as shown in figure 2. Repetitive bending into the white mail totes places strain on the back and shoulders.

Solution:

Employees at standing workstations would benefit from a mobile stand (suggested quantity – 4) to hold the white mail totes at a neutral work height, angled towards the operator. Height adjustable tote stands are preferable, so that the stand can be adjusted for each operator. A temporary solution is to use a full-size industrial garbage can on wheels, as shown in figure 3.

Employees at the computer workstation were also found using small trashcans as stands, shown in figure 4. The seated computer workstations would also benefit from an angled stand (suggested quantity – 2) to hold the mail totes. The stands should adjust low enough to keep totes below elbow height. Height adjustable chairs at the computer workstation would also help promote a neutral work height, and reduce bending and reaching.

Cost Estimate = \$1150



Figure 2: Employee using small Trashcan as stand



Figure 3: Using large trashcan as stand



Figure 4: Employee using small trashcan as a stand at a computer workstation

Angled Work Stand				
Vendor	Product	Model	Size	Price
C&H 1-800-558-9966	Eurokraft Parts Stand Adjustable	70-141A	19 ¼" x 17 ¼" Lift range (28"-43") Capacity 150lbs. Angle (0 to 40°)	\$169.40
Lab Safety 1-800-356-0783	Adjustable Tilting Work Stand	OM-65176	22"x 21" Lift range (28"-38") Capacity- 150lbs. Angle- (0 to 45°)	\$189.95
Lab Safety 1-800-356-0783	Portable Personal Tote Stand Non-adjustable	OM-64576	40"x15 ½" x 17" Capacity 200lbs. 45° angle	\$81.35
Grainger 901-372-7570 (Memphis)	Mobile Tilting Work Table	WT-2221	22" x 21" Lift Range (28" – 38") Capacity 150 lbs. Angle- (0 to 45°)	\$195



Height Adjustable Angled Work Stand



Non-Adjustable Tote Stand

Problem:

Employees bend over into large hampers to remove mail. Bending over the side of a hamper places the employee at risk of back strain and places stress on the arms and shoulders.

Solution:

The hampers are slowly being replaced with hampers with drop sides. Hampers with elevating bottoms are a better solution for packages. Carts with elevating bases use bungee cords to raise the bottom of the hamper, as more mail is unloaded; thereby maintaining a neutral working height. Letter mail (flats) may not have enough weight to operate the elastic and should be placed into the hampers with drop sides. It may be possible to retrofit some of the current mail hampers with elevating platforms.

Estimated Cost- \$1,000

Hamper		
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



Mail Hamper with Spring Platform
(Platform moves independently)



Elevated Basket Truck
(The entire hamper elevates)

Problem:

Employees at the weigh and stamp station currently throw processed mail into a white mail tote. The white mail tote is then carried to a stationary stand with mailbags and emptied by dumping the tote into the mailbag. This is an awkward task since the opening of the tote is larger than the mailbag, and the height of the mailbag requires the elbow to be lifted above shoulder height when dumping the totes.

Solution:

Replacing the fixed mailbag stand with individual mailbag racks on wheels would allow the operator to place the mailbag at the workstation. This would improve productivity and material handling by eliminating the process of filling and emptying the mail totes. Single or double mailbag racks could be used.

Cost Estimate: \$1,300



Figure 5: Employee emptying mail tote into mail bag

Mailbag Rack		
Vendor	Product	Price
Charnstrom 1-800-328-2962	2 Bag Mobile Folding Rack A-2	\$198*
Mail Products 1-800-229-4500	2 Bag Rack N1013418 Casters	\$169.85* \$56
Mail Products 1-800-229-4500	Single Bag Holder N1005275 Hooks Casters	\$116.25* \$3.56* \$56



An example of a double mail bag

Problem:

Incoming mail currently undergoes a double sort process. Employees take white mail totes to their desks and empty them. They perform a rough mail sort into white mail totes placed on a low platform truck. Totes are then lifted and carried to a second sort station for a finer sort. There are two walls with sorters with three shelves of mail totes, as shown in figure 6. There is also a flat table used as a sorting station, shown in figure 7.

Solution:

The first rough sort should be done in one place to improve productivity and decrease material handling. The current secondary sorting area with the flat tables (figure 7) would be a good place. Incoming mail should be placed on a height adjustable table. Tilting package carts should surround the table so that the employees can toss mail into the package carts. The package carts can then be wheeled to the secondary sort stations, tilted, and unloaded at a neutral work height to reduce bending and reaching. A setup such as this can be flexible to accommodate different flow and demand and should reflect employee feedback. Two employees can work at a single table, or an additional table can be set up when volume rises. Additional package carts can be used to replace carts that are filling during the rough sort so that an employee can get started on the secondary sort. It may be possible to even split package carts with a divider to allow for even finer division within the rough sort process.

Currently, part of the secondary sort is performed on flat tables, figure 7. This system can be replaced with mobile rack units that take up less space, provides better work heights, and can be moved when not in use. The mobile rack units can be purchased in different sizes. Depending on how the sorting operation is set up it may be preferable to purchase more of the 7 capacity or 12 capacity racks rather than the 15 capacity racks.

Cost estimate: \$6,000



Figure 6: Wall unit sort station



Figure 7: Table sort station

Height Adjustable Tables			
Vendor	Product	Price	Details
Lab Safety 1-800-356-0783	Biofit Agility Adjustable Table	\$783.25	30"x60" hand crank
Alimed 1-800-225-2610	Height Adjustable Table R7968	\$873.00	30"x60" lamine surface hand crank
C&H 1-800-336-1331	Height Adjustable Table 55-141D	\$932.60	30"x60" lamine surface, hand crank

Package Cart			
Vendor	Product	Price	Price (3 or more)
Datamation 1-201-393-004	Heavy-Duty Package Cart	\$350.55	\$326.80
Charnstom 1-800-328-2962	Heavy-Duty Package Cart	\$369.00	\$344
Postal Products Unlimited 1-800-229-4500 X1071	U-Cart with Canvas Insert	\$288	\$279

Mobile Rack Unit for Totes			
Vendor	Product	Model	Price
Postal Products Unlimited 1-800-229-4500 X1071	Tote Cart	N1013251	\$487.50*
Postal Products Unlimited 1-800-229-4500 X1071	Mobile Sort Rack	N1016095	\$320.00*
Postal Products Unlimited 1-800-229-4500 X1071	Distribution Racks	N1001138	\$549.98*

*prices depend on quantity



Heavy-Duty Package Cart
Package Cart



Tote Cart (7 cap.)



Mobile Sort Rack (12 cap.)



Distribution Rack (15 cap.)

Problem:

There are two computer workstations used for processing insured, certified, and regular mail. A third computer workstation is used for processing FedEx mail. Employees spend from 4 to 8 hours a day at these workstations. The current computer workstations present ergonomic hazards to the operator associated with awkward postures and repetitive motion. There are other computers in the mailroom at each employee's desk, but the use is much lower.

Solution:

The Safety Department currently offers training sessions on the proper setup of computer workstations. The course instructor can help identify which of the following items may benefit computer users in the mailroom.

- Mouse Bridge or Keyboard Tray with room for the mouse
- Monitor risers
- Ergonomic Task Chairs
- Document holders
- Foot rest
- Glare Screen with privacy filters for the supervisor's station

Appendix II contains further information on computer workstation ergonomics.

Vendors:

Alimed 1-800-225-2610

Work-rite 1-800-959-9675

Kensington (GSA rep. 1-800-999-GTSI ext. 2532)



Figure 8: Seated computer workstation (note positive tilting keyboard, tall monitor height, and chair with 4-star base)

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

Recommendations for Purchasing Chairs*

These recommendations ensure that the chair can be fitted to each individual user and that the user can easily adjust the chair to vary his or her posture throughout the day.

1. Adjustable seat pan height (pneumatic)
2. Independent, height-adjustable backrest
3. Adjustable seat pan depth
4. High density foam used in seat pan, with cloth fabric (except in clean room settings)
5. Armrests not required, if present they should adjust in both height and width
6. Minimum contouring of seat pan
7. Backrests at least 12x12 inches, with pronounced lumbar support
8. Angle between backrest and seat pan should have a range of 90-110 degrees
9. Seat pan 18-20 inches wide
10. Seat pan rocking mechanism and/or forward/backward tilt. Seat pan angle should have a range of 0-10 degrees
11. Swivel capability
12. Changes should be possible while user is seated
13. 5-star base with appropriate casters – carpet or linoleum

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