

Date:

Department: Applied Science at

Job: Material Handler

The Allied Science Department was observed by Sheila Denman, PT, and Sandi Herring, ATC, of Advanced Consulting & Ergonomics and *name*, Safety Consultant for *company name* on *date*. The purpose of this assessment was to perform visual, dimensional, and functional inspections of the Material Handling process.

General Information:

Material Handlers in the Applied Science Department work an 8 hour shift, 5 days per week, for a total of approximately 40 hours per week. Overtime is available depending upon business needs but may be mandatory at times. In the Applied Science Department, all Material Handlers work as a team. Job rotation, within the department, occurs on an informal basis.

PPE Equipment:

Employees handling dry ice are required to wear gloves. Jackets are furnished to those employees who work inside the freezers. For employees who are adding water to batteries, goggles and gloves are required.

Job Description:

Material Handlers in the Applied Science Department are responsible for the packaging and shipping of various *company name* products. Many of the products are temperature sensitive and are shipped with dry ice. The current Applied Science Department is located in a warehouse setting with limited available space. A new, expanded facility is planned for 2009.

Based on the repetitive nature of the job and the sustained, awkward, and static postures of the spine and upper extremities, the following areas may be exposed to increased risk for Work-Related Musculoskeletal Disorders[†] (WMSDs).

1. Hand/Wrist
2. Elbow/Forearm
3. Shoulder/Upper Extremity
4. Neck
5. Low Back

Please note that increased exposure to occupational risk factors does not guarantee development of an injury. Risk factors merely increase the probability that people, in general, will develop an occupational injury.

The following are suggestions which, we feel, will reduce exposure to Work-Related Musculoskeletal Disorders. These recommendations are intended to be a starting point and are provided for further review and consideration.

General Summary:

The existing area currently available for the Material Handling process is extremely limited in floor space. Material Handlers are performing excessive walking and, on many occasions, are handling the same box four to seven times in the process of packaging the products.

It is recommended that the Department consider a revised floor plan that would result in the elimination of:

1. the building of the box tower
2. multiple handling of the same package
3. excessive carrying of boxes
4. extended dry ice exposure prior to shipping

Attached (Attachment A) is a floor plan that would revise the work flow in the Applied Science area. Please note, that without dimensional information, this drawing may not be to scale; and therefore, may need to be altered in several areas.

[†]As defined by the Occupational Safety and Health Administration (OSHA)

Job Site Analysis **SAMPLE**
Company:
Department: **Applied Science**
Job: **Material Handler**

HAND/WRIST:

Repetition/Grasping Force: Risk factors for repetition induced fatigue and muscle tendon strain exist during all operations of product transfer. These repetitive, static, grasping positions increase inflammation in the wrist muscle fibers, which may increase exposure to Carpal Tunnel Syndrome (CTS). **Repetitive Sustained Ulnar Deviation:** Repetitive sustained ulnar deviation increases strain to the hand tendons and wrist joint.



Source: Material Handlers are required to frequently handle and transfer small products to and from cartons. The hand position is often found to be in a palm down, grasping position.



Force generated in the wrist during grasp is magnified by the wearing of loose fitting gloves.

Hand/Wrist injury exposure is increased by repetitive radial and ulnar deviation required during the scooping of pellets, grasping of boxes, and loading of boxes.



Improvement Ideas:

1. Educate employees on proper hand mechanics for repetitive grasp (including neutral hand position and power grasp).
2. Ensure that gloves are correctly sized and have rubberized finger tips to reduce the amount of grip force needed for the handling of product.

www.reddeninc.com

1st paragraph text. Select: *Atlas Gloves*
 Scroll to mid page. Select: *Atlas 451 or Atlas 460 Insulated*



3. Obtain a scoop that allows for better positioning of the wrist.

www.usplastic.com

In upper Search box type: *Polypropylene Scoop*



4. Install additional rollers to minimize or eliminate need to carry boxes. (See Attachment A)

ELBOWS/FOREARM:

Elbow Postures: Lifting with the elbows away from the body reduces circulation to the hands/wrists and increases strain to the elbow tendons. This can increase exposure for generalized elbow tendonitis or lateral epicondylitis (Tennis Elbow).

Repetitive Wrist Flexion/Extension: Repetitive flexion and extension of the wrists increases strain on the wrist flexor and extensor muscles at the lateral and medial epicondyle.

Source: Current height of the workstation requires the Material Handlers to place product in boxes at chest height. This movement results in “flaring” of the elbows and elevation of the shoulders, increasing stress on the rotator cuff and elbow tendons.



Building the “tower” requires Handlers to retrieve product from floor level. The placement and retrieval of these boxes encourages a flaring elbow position.



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Improvement Ideas:

1. Lower packaging tables and purchase tilting carts and/or manual rollers. Tilting carts will encourage proper body mechanics by limiting unnecessary upper extremity reach. Educate all Material Handlers to fill cartons using proper body mechanics (neutral postures).

www.becontechology.com

At the Tilt & Lift Tables page:

Search: *Mobile Tilting Work Table*

Select: *Mobile Tilting Work Tables*



2. Eliminate the building of a “tower” by the placement of additional rollers.

www.theonlinecatalog.com

Search: *Conveyor*

Select: *Light Duty Roller Conveyors*



SHOULDERS/UPPER EXTREMITY:

Repetitive Shoulder Extension: Repetition with the shoulders at 90° extension or greater increases strain to the rotator cuff musculature. In addition, this posture promotes rounded shoulders and increases exposure for shoulder impingement.

Source: The packing workstation layout promotes repetitive shoulder extension at 90° or greater to retrieve materials and perform packing operations.



Currently, boxes (tower) and packing material are stored overhead requiring repetitive overhead reach.



Parallel freezer shelving requires Handlers to reach into and over raised shelves and boxes to load.

Improvement Ideas:

1. Lower workstation height so packing material can be placed at a lower height.
2. Install additional rollers to eliminate “tower” building.
3. Freezer shelving should be placed on a downward 15° to 20° angle.



www.tedthorsen.com

Select: *Shelving & Racks*

Select: *Sloped Shelving*



NECK:

Risk factors include: **Repetitive Sustained Neck Posture:** Sustained repetitive rotation, flexion, and extension of the neck increases risk for headaches, neck/trapezius spasms, and can lead carpal tunnel syndrome-like symptoms. Forward head flexion may also contribute to headaches and neck/upper back spasms.

Source: In many areas throughout the Applied Science Department, product is either stacked at a non-optimal height (too low or too high) and/or material is being packed at a height that requires forward bending or overhead reaching.



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Improvement Ideas:

1. Educate employees on the importance of neutral head posture.
2. Redesign department layout (see Attachment A).

LOW BACK:

Risk factors include: Repetitive Sustained Back Posture: Forward head flexion and forward flexion of the lumbar spine, as well as repetitive movements in these directions increases strain on the intervertebral discs and back muscles. This may result in disc herniation or strains and sprains to the cervical and low back musculature.

Source: Loading pallets at a fixed height (requires repetitive forward flexion/bending).



Loading/unloading rack shelving for temporary packaging materials (requires forward flexion/bending).
Employees utilizing substitute items as workstations.



Improvement Ideas:

1. In the skid loading area, install a height adjustable, rotating platform. The spring-loaded platform will ensure that material is always loaded at approximate waist height.

www.bishamon.com

Select: *EZ Loader*



2. Encourage employees to carry documents on a clipboard when writing is necessary. Also, require the use of a cart when picking orders.

www.theonlinecatalog.com

Search: *Order Picking Truck*



www.theonlinecatalog.com

Search: *Bin Cart*



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- 3. In specialty packing area, utilize multiple shelf unit with angled compartments.

www.theonlinecatalog.com
Search: *Bin Systems*



OTHER:

The primary concern with the Allied Science area is space limitations. It is strongly recommended that the area is re-designed to allow for additional rollers and adjustable height carts.

The current dry ice vendor should be contacted to investigate the possibility of delivering smaller, raised containers (ideally 36" in height). This will limit the forward flexion/bending required to access both palletized material and loose dry-ice chunks.

Employees retrieving product from the freezers should be encouraged to utilize a rolling cart for smaller items instead of carrying a cardboard box. Carts can remain outside the freezer while employees pull items.



www.theonlinecatalog.com
Search: *Bin Cart*

During the box delivery process, employees are wedging a hand truck underneath each stack to load the banded boxes. Once these items are delivered to the storage area, employees are manually pushing the loaded boxes off of the hand truck. Due to the force required to perform these tasks, this behavior should be discouraged. The box delivery vendor should be consulted about palletizing the boxes before delivery or at the receiving dock. Palletizing the boxes would reduce the force required at delivery.



www.theonlinecatalog.com
Search: *Economy Pallet Truck*

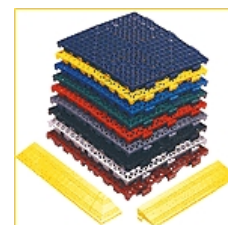


Employees in the Receiving Area should have access to rolling carts to transfer product to the various freezers. Employees are currently utilizing inappropriate transports, such as Rubbermaid carts and/or rolling trash cans. Height adjustable carts are recommended since they can accommodate for a broad range of employees.



http://www.liftproducts.com/liftables/mobile/max_mini_lift.html

In various places throughout the warehouse, several rubber edged carpets have been placed in walkways. These have become trip hazards for several employees. Rubberized mats with holes should be utilized instead, and should only be placed directly in front of the dry ice machine. These mats should have beveled edges to reduce trip hazards as employees' transition back to the floor.



www.greatmats.com
Search: *Perforated Tile*

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ADMINISTRATION:

Job Rotation: Material Handlers should be encouraged to perform job rotation on a daily basis. Job rotation is well documented as a good method for reducing work-related musculoskeletal disorders.

Exercise Breaks: Material handling requires the consistent use of muscles in the wrists, forearms, shoulders, and low back. An exercise program should be implemented that targets these specific areas and employee involvement should be encouraged. Stretching handouts can be produced by Advanced Consulting and Ergonomics that will target the recommended areas and highlight appropriate stretching techniques.

Body Mechanics Training: Material Handlers should be educated about proper body mechanics in the work place. An injury prevention class that focuses on body mechanics, proper tool utilization, and other ergonomic risk factors could be helpful at addressing this end.

SUMMARY:

The Material Handlers working in the Applied Science area have clearly adapted to the limited space and current layout for product packaging. However, Material Handlers are performing excessive walking and handling of product in their area which underscores a need for some layout changes to the process. Changing this process will be complicated by the limited space of the facility, however, with limited expense, several minor adaptations can be made that would significantly improve the process flow and reduce work place injuries.

Thank you for allowing Advanced Consulting and Ergonomics to participate in this evaluation. Should you have any further questions or the need for additional information, please feel free to contact me at (317) 390 -5590.

Sincerely,

Sheila Denman

Sheila Denman, MA, MS, PT
Chief Operations Officer

Attachments