

Dear Employer:

An inspection of your workplace at *(location)* on *(date)* disclosed the following hazards.

- Feeders in the Bindery are exposed to the ergonomic stressors of repetitive reaching while supporting a load in the hands. The extent of reaching is such that the arms are fully, or nearly fully, extended when placing stacks of signatures (paper) into vertical rotary feeders (pockets) as shown in Figure 1. The hazard of this task is further increased by the fact that feeders must also lift the stack of signatures up and over the alignment guides of the pockets. Repetitively performing this task increases the risk of development of Musculoskeletal Disorders (MSDs) of the shoulder and upper back such as muscle strain, tendinitis, bursitis, and rotator cuff injuries.



**Figure 1**

- Feeders in the Bindery are exposed to the ergonomic stressors of repetitive deviation of the wrist while exerting significant finger force to place stacks of signatures into the pockets in a horizontal alignment as is shown in Figure 1. The force which must be exerted by the fingers is greatly increased by the fact that elongated grip postures must be used to control materials which are routinely stacked 3 to 4 inches high, and that the material is glossy and relatively slick. The risk of injury increases as the finger force exerted is increased. Repetitively performing this task increases the risk of development of MSDs to the hand, wrist, and lower arm such as tendinitis, tenosynovitis, epicondylitis, and potentially Carpal Tunnel Syndrome.
- Feeders in the Bindery are exposed to the ergonomic stressors of repetitive forward bending of the torso to reach pockets which are located in excess of 20 inches away from the edge of the machine as can be seen in Figure 1. Most of the employees can not reach the distances required by the machinery without bending forward at the waist. Repetitively performing this task increases the risk of development of MSDs to the low back such as muscle strain and disc injuries

- Feeders must perform many additional lifts of signatures and perform additional reaching while supporting a load in the hands to access and retrieve stacks of signatures from the central or back regions of palletized supplies of product as can be seen in Figure 2. The feeding process forces employees to continually reach, lift, and place stacks of signatures from the back of the



**Figure 2**

pallet forward since the pallets can not be turned for better access and product can not slide forward without folding, tearing or other damage which would make the signature unusable. This problem may be much worse during busier times of the year when there are more sections to each magazine, more pallets on the work area, and thus less room to move between pallets. Less room between pallets will force employees to perform even longer reaches to access product. Performing increasing numbers of reaches and lifts increases the risk of development of MSDs to the back, shoulder and hands, such as muscle strain, rotator cuff injuries and tendinitis.

- Loaders at the end of the Bindery line are exposed to the ergonomic stressors of repetitive reaching while supporting a load in the hands. The extent of reaching is such that the arms are fully, or nearly fully, extended to place bundles of magazines onto pallets for shipping as shown in Figure 3. Employees have no choice but to reach to place product since the scissors lift used at this station is guarded and has stack walls on the far side. The guards and walls limit access to loading areas. Repetitively performing this task increases the risk of development of (MSDs) of the shoulder and upper back such as muscle strain, tendinitis, bursitis, and rotator cuff injuries.



**Figure 3**

- Loaders at the end of the Bindery line are exposed to the ergonomic stressors of repetitive forward bending of the torso to place bundles of magazines onto pallets for shipping as can be seen in Figure 3. Employees have no choice but to reach to place product since the scissors lift used at this station is guarded and has stack walls on the far side. The guards and walls limit access to loading areas. Repeatedly bending forward at the waist is stressful even if there is no load in the hand since the weight of the upper body must be supported. Supporting a load in the hand using these postures greatly increases the stress of the task. Repetitively performing this task with a heavy load in the hand increases the risk of development of MSDs to the low back such as muscle strain and disc injuries.
- Employees at several locations throughout the facility must push and pull heavily loaded pallet jacks. Pallets are loaded with signatures at the printing area and transported to the Bindery or loaded with finished product at the Bindery and taken to shipping. Employee move pallets that can weigh several hundred pounds and are stacked above head height. Pushing and pulling heavily loaded pallet jacks increases the risk of development of MSDs of the shoulder, back, and lower extremities such as musculoskeletal strain and sprain. Additionally, instantaneous injuries can occur when attempting to stop or maneuver pallet jacks especially through congested work areas. Contact trauma such as bruises, or crushed fingers or hands, lacerations, or torn muscles or tendons can occur dealing with large and unmanageable loads.

- Employees at the Printing Press must repeatedly perform elevated and extended reaches with a load in the hand to place stacks of finished signatures onto pallets for transportation to the Bindery as can be seen in Figure 4. Full arm extension is necessary to reach the interior areas of the pallet and elevated reaches above shoulder height are necessary to reach the final few tiers of the stack. Repetitively performing this task increases the risk of development of (MSDs) of the shoulder and upper back such as muscle strain, tendinitis, bursitis, and rotator cuff injuries.



**Figure 4**

- Employees at the Printing Press must repeatedly bend at the waist while supporting a load in the hand to place finished signatures onto pallets placed at approximately floor height as can be seen in Figure 4. Repeatedly bending forward at the waist is stressful even if there is no load in the hand since the weight of the upper body must be supported. Performing this motion with a load in the hands greatly increases the risk of the task. Repetitively performing this task increases the risk of development of MSDs to the low back such as muscle strain and disc injuries.

- Employees packing bundles of magazines in bags for shipment must repeatedly reach and twist to pull bundles of magazines from a rotating turntable and then manually push them through a loader for packing into shipping bags as can be seen in Figure 5. The amount of weight moved with these motions can be considerable with up to four bundles of magazines moved at a time. The postures used are generally quite awkward with the arm fully extended and the back in an unstable, asymmetrical posture. Moving significant weight in these postures places considerable stress on the shoulder and back and increases the risk of development of MSDs to both these areas.



**Figure 5**

- Employees loading pallets with bags filled with bundles of magazines must bend at the waist to place them essentially at floor level as can be seen in Figure 5. Repeatedly bending at the waist is a hazard in and of itself since the weight of the upper body must be supported. Most of the bags loaded at this task are quite heavy with each bag containing 2 to 6 bundles of magazines. Performing this task with the heavy loads observed at this operation greatly increases the risk of development of MSDs to

the low back such as muscle strain and disc injury such as bulging or herniation.

- Employee loading pallets with bags filled with bundles of magazines must lift heavily loaded bags by bunching up a hand full of bag material since there are no handles on the bags. Using this technique requires the use of forceful finger exertions to maintain a secure hold on the bag and awkward hand and wrist postures. The amount of finger force required is also increased since the material that the bags are made of is a slick plastic. Performing this task in this manner increases the risk of development of MSDs to the hand, arm, and elbow such as tendinitis, muscle strain, epicondylitis, and potentially Carpal Tunnel Syndrome.
- Employees must work prolonged hours of daily overtime and often work extended periods of overtime consisting of 6 day work weeks. Many employees interviewed said that they had worked as many as 8 months of 6 days a week, 12 hours per day. This type of staffing pattern does not permit adequate rest and recuperation for tasks that require heavy physical labor. Continuing to work these long and extended work shifts increases the risk of development of all kinds of MSDs.

Employees were experiencing a significant number of injuries/illnesses related to the observed hazards, that had caused and/or are likely to cause musculoskeletal disorders (MSDs). These disorders include **Note: only include MSDs that were listed on the log.** Our review of your OSHA 200 logs show that from 19\_\_ through 19\_\_, a high rate of MSDs were recorded in the facility.

Since no OSHA standard currently applies and it is not considered appropriate at this time to invoke Section 5(a)(1), the General Duty Clause of the Occupational Safety and Health Act, no citation will be issued for these hazards at this time. In the interest of workplace safety and health, however, I recommend that you voluntarily take the necessary steps to eliminate or materially reduce your employees' exposure to the hazards listed above.

While some hazards may be materially reduced or eliminated by implementing a single means of abatement, in most cases a process utilizing components, such as the following, will provide the most effective method of addressing these ergonomic hazards. These components include accurate injury and illness record keeping, medical treatment for employees suffering work related injuries, work place analysis of jobs and tasks to assess hazards and the steps to abate them, engineering, administrative and work practice controls or actions to materially reduce the hazards, and education and training of workers and management. If a hazard is to be addressed on an incremental basis to determine the effectiveness of a specific control strategy believed likely to provide a protective solution, it is important to track and evaluate the effectiveness of the results in a timely manner, and to timely implement additional measures if initial controls fail to eliminate or materially reduce worker exposures.

We have examined available information on your efforts to address ergonomic hazards. The evaluation indicated potential weaknesses in your attempts to minimize ergonomic stressors. The following are control strategies which we feel will be effective in reducing the ergonomic

stressors observed at your site..

T Place “slip sheets” made of a smooth and slick surface between layers of signatures which are printed on-site. The use of slip sheets will allow feeders to easily slide stacks of signatures close to their bodies before attempting to lift them to the jogging table. They will also allow printing employees to place stacks of signatures onto the slip sheet and then slide them to the center of the pallet rather than reaching while lifting to place them as is currently the case. Keeping the load close to the body reduces the risk of injury to employees.

T Provide turntables under the pallets of signatures so they can be easily turned by Feeders during unloading. This will provide better access to signatures for employees and allow product to be placed closer to the employees bodies before they attempt to lift them to the jogging table. A turntable attached to height adjustable pallet lift is shown in Figure 6.



**Figure 6 - Height adjustable pallet lifter with turntable**

T Provide a height adjustable pallet lift with turntable as shown in Figure 6, or other appropriate device, at the Printing Press off-load areas. This type of device will elevate the empty pallet so the first few tiers of a load can be put in place without employees repeatedly bending at the waist. The use of a turntable will allow employees to easily turn the pallet as the load is being built so they do not need to reach to access areas at the back of the pallet.

T Use the adjustable height pallet lifter shown in Figure 7. This device was observed on-site but was not in use in any of the operations observed. This type of device would alleviate the use of deep bending at the waist while loading pallets.

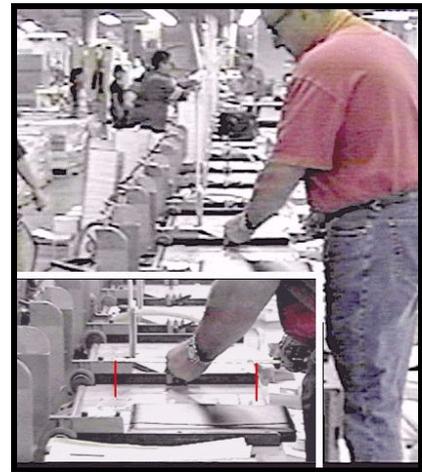


**Figure 7 - Height adjustable pallet lifter seen at plant**

T Limit the height that signatures can be stacked to no more than about 4 feet. At this height most of the work force should be able to access the upper tiers of product without pulling the elbows away from the body. Most tasks should be able to be performed with the elbows in close to the body. This will also help limit the amount of weight that employees are required to push and pull while moving pallet jacks between the printer and binder.

- T Provide tugs or powered pallet jacks to move heavily loaded pallets around the plant.
- T Elevate employees. Many of the shorter employees had considerable difficulty in lifting stacks of signatures up into the pockets. Elevating the employees somewhat will permit them to reach the pocket while keeping the arm as low and close to the body as possible. Care needs to be taken to not raise the entire workstation too high as this may force taller employees to bend at the waist which is a risk factor for back injuries.

T Replace the current equipment with other brands which do not require the use of long forward reaches. Other manufacturers of bindery equipment have significantly reduced reach requirements as shown in Figure 8. The reach as shown in the picture is 13 inches to the center of the pocket.



**Figure 8 - Reaches are shorter on other bindery equipment**

T Move the employees to other side of the Bindery machine. If feeders were placed on the other side of the gatherer/collator they would be directly adjacent to the pocket and could place materials into the pocket while maintaining their elbows in close to the body. It is realized that there are space and guarding considerations with this arrangement, but other bindery operations have successfully used this type of arrangement as shown in Figure 8. Employees at this operation load from the left side of the collator and have about a 10 inch reach to the center of the pocket. The manager of this operation stated that the feeders are responsible for clearing their own jams since they are on the open ended side of the collator.



**Figure 9 - Stream Feeders reduce reaches and awkward hand postures.**

T Use mechanical devices to limit the distance that employees must reach to fill pockets and minimize deviation of the employee's wrist. This can be accomplished by

providing stream feeders or similar devices as shown in Figure 9 which can be used with the companies current equipment or incorporated into future equipment plans. These types of devices allow employees to place signatures on a mechanical feed mechanism which then moves the material to the pocket. Since the machine moves the material, extended and elevated reaches to the pocket are eliminated. The height of the feeder can then be adjusted to accommodate the employees needs allowing them to perform all loading at about waist level and with the elbows in close to the body. Deviation of the wrist while exerting finger force is also limited since the signatures are loaded in a vertical alignment which allows employees to maintain a straight, neutral wrist posture. It is recognized that these devices are expensive and complete implementation may not be possible immediately. These devices should be provided on pockets servicing the larger signatures such as 16, 24 or more pages first since these signatures are heavier, empty faster, and require higher repetitions to maintain. This type of prioritization is also appropriate since manufacturers state that these devices work better with product having larger page counts. As the application of this technology is perfected and when additional funding becomes available additional units can be provided at stations loading smaller product.

T Develop a set of metal supports that extend from the alignment guides back towards the employees. These supports should be arranged such that employees can place a stack of signatures on them immediately after jogging. After the stack is placed on the supports, it can then slide along the supports until it is in position to be placed into the pockets. Using the support to hold the weight of the signature will reduce the amount of finger force necessary to hold the stack and will reduce the amount of weight which must be supported by the employees shoulders and back.



**Figure 10 - Extensions support the weight of signatures**

T Minimize the use of long term overtime, especially overtime which is accomplished by extending the work day. Additional staff, or temporary contract staff, should be hired so an eight hour work day can be maintained for the majority of the time. When overtime needs arise they should be addressed with the use of additional days as opposed to extending the work day. If longer days must be used it should be on a voluntary basis if at all possible. Additional rest periods should also be provided if employees are to work extended day shifts. The use of long days increases fatigue, reduces recuperation, and magnifies the effects of stressors found in the work place.

T Perform a Job Hazard Analysis of the various operations that are performed at the plant.

The nature and quantity of exertions and postures should be evaluated so an appropriate work-rest and rotation scheme can be developed.

- T Develop rotation schemes which reduce the level of exertion to any particular muscle group. Currently employees simply move one position down the line, regardless of the level of exertion which is needed at that station. Rotation schemes should attempt to move employees to a position which is less stressful to a particular musculoskeletal group so that muscles can have a period of rest and recovery. For example; employees should rotate from a station which fills several pockets with large 16, 24, or 32 page product After work on one of these stations employees should be placed on a station where smaller product, which feeds slower, is processed.
- T Investigate possible improvements to the quality control plans and policies with a goal of reduction or at least more consistency in standardization of down time. Staffing patterns are based on down time but the current system has such a wide range that developing effective schedules seems tenuous at best. The down time documented while on site ranged between about 20% up to 70% with the range at about 40%. Operations should be observed to see if a pattern for down time can be established based on product, time of day, person loading, or other variable. These variables can then be corrected to provide a more consistent pattern and thus a better basis for production standards. Plan staffing patterns assuming that machinery will run for prolonged times. Planning staffing patterns based on erroneous rates will lead to over exertion and injuries, especially when working prolonged periods of overtime.
- T Educate all employees about proper body positioning and lifting implications. Training will emphasize proper techniques and increase the understanding of the importance of avoiding harmful and hazardous postures and procedures. Generally, proper ergonomic design will allow the employee to work at a standing task without bending forward at the waist and with the elbows maintained in close to the body. All tasks should be performed in front of the employee so twisting of the body is minimized. Tasks performed with the hand should be designed so the wrist is not bent either up or down, or to either side while the fingers are being used.

Employees should be provided with task specific training so they can perform the task while using safer practices and techniques. Employees generally should lift less material each time. This will reduce the amount of weight lifted, lessen the strain on the shoulder, and will allow employees to grasp product with a power grip rather than an elongated finger span, which will reduce the force exerted on the tendons of the hand. Jogging should be performed in closer to the body where the stomach and forearms can be used for most of the maneuvers instead of using the fingers and hands. Transport of stacks should be performed by cradling the product between the fingers instead of using forceful pinch grips.

Training can also be useful for management since it can assist them in encouraging

proper work techniques and will increase their knowledge of the subject allowing them to make better purchasing and work organization decisions. Maintenance personnel can also benefit from this type of training since they often have the best mechanical skills at the work site and can be an invaluable source of ideas about development of new tools or equipment modifications that can reduce the hazard to the employees.

- T Improve, formalize, and continue the work of the Safety/Ergonomics committee. Members of each production line, both management and bargaining unit should be represented. Operators and mechanics should attend. Items of concern should be addressed and plans to abate identified hazards should be formalized. Employees should be encouraged to communicate either through their representatives or directly to management about problems observed on the job. Management should openly communicate to employees about actions taken to abate identified hazards.

Management commitment and employee involvement are important to assure that the above efforts are implemented in an effective manner.

You may voluntarily provide OSHA with progress reports on your efforts to address these hazards. The following resources are available and should be of assistance to you in preventing work-related injuries and illnesses in your workplace.

- C Free consultation, including on site visits, from OSHA's 7(c)(1) on site consultation programs for small businesses;
- C OSHA's Internet ergonomics page at;  
<http://www.osha-slc.gov/SLTC/ergonomics/index.html>
- C Free publications on ergonomics from the National Institute of Occupational Safety and Health (1-800-35-NIOSH).

In addition, loss control services from your insurance carrier may be available.

If you have any questions, please feel free to call [name] at [address].

Sincerely,

Area Director