

APPENDIX V

Principles for Manual Material Handling (MMH)

OSHA, the Occupational Safety and Health Administration, does not presently have a standard that specifies quantitative force limits for manual material handling operations, however, the Agency references the [Revised NIOSH Lifting Equation](#), which provides a mathematical means of evaluating MMH tasks for risk of injury. In accordance with NIOSH research, EH&S recommends that lifting tasks have a Lifting Index lower than 1.0, as calculated using the Lifting Equation. For assistance with the NIOSH Lifting Equation, it's recommended to contact EH&S, or take the EHS Ergonomics and Back Safety Training on MyPath.

Eliminate the Need for Heavy MMH

The optimal solution to MMH-related problems is to eliminate the need for heavy MMH. In general, two means exist to accomplish this:

- The use of mechanical aids such as hoists, lift trucks, lift tables, cranes, elevating conveyors, gravity dumps, carts, and chutes, which can eliminate (or at least significantly decrease) physical stresses due to MMH.
- To eliminate heavy MMH, change the work area layout to make all materials available at work level and as close as possible to the work point.

Decrease MMH Demands

If MMH cannot feasibly be eliminated, then attempts should be made to decrease the MMH demands of the job. There are several means by which this principle of work design can be accomplished:

- Decrease the weight of the object being handled, including assigning the handling to two or more people.
- Change the type of MMH activity so the demands of the job can be decreased. Lifting, lowering, pushing, pulling, carrying, and holding are all types of MMH activity. It is preferable for a job to require lowering rather than lifting, to require pulling rather than carrying, and to require pushing rather than pulling.
- Maximizing the time available to perform the job can decrease job demands. Accomplish this by reducing the frequency of the lift, and by incorporating work/rest schedules or job rotation programs into the work design.

Minimize Stressful Body Movements

Another principle of work design is to minimize stressful body movements required by the job. Specifically, bending and twisting motions should be reduced.

- Reduce bending by locating objects to be handled within the arm-reach envelope of the worker. Provide all material at the work level of the worker.

- Locate objects within the worker's arm-reach envelope to reduce twisting motions of the back. Arrange the work area to allow sufficient space for the entire body to turn and pivot with the feet. If the worker is seated, an adjustable swivel chair should be used.
- Design considerations should allow the worker to lift objects in a safe manner. Practice and encourage the safe lifting techniques described below.

Safe Lifting and Good Body Mechanics

- If an object is too heavy for you to lift safely by yourself, get help.
- Try to handle the object close to the body.
- Use devices such as handles, grips, etc., to provide better control of the object
- Balance the contents of containers.
- Provide rigid containers for increased worker control of the object.
- Avoid lifting objects from floor level, especially those that are excessively wide.
- Use good body mechanics: **bend your legs, not your back, when lifting.**
- Never twist your back when lifting; instead, turn with your feet.

Recognize the Risk for Repetitive Motion Injury (RMI)

OSHA has identified five specific situations, which create significant risks for RMI, if incurred over a period of more than two to four hours:

- Performing the same motion or motion pattern for more than two hours continuously or four hours daily.
- Maintaining an unsupported fixed or awkward posture for more than one hour continuously or four hours daily.
- Using vibrating or impact tools or equipment for more than one hour continuously or two hours daily.
- Using forceful hand exertions for more than two hours daily.

Recovery Cycles

Other important measures to prevent repetitive motion injuries include:

- Taking frequent breaks
- Moving around and changing postures frequently
- Do not repeat the same motions and postures
- Avoiding awkward motions and postures
- Performing relief exercises
- Minimizing the constant repetition of any one particular task as able

Without recovery periods, ergonomic stresses incurred during one activity become cumulative with stresses from another similar activity. For instance, hand movement stresses you incur in the lab can be cumulative with those you incur performing other activities such as using a computer keyboard or playing the piano. It is crucial to balance these activities and allow adequate recovery periods.