

III. Ergonomic Principles for Manual Handling Tasks

I. MINIMIZE SIGNIFICANT BODY MOTIONS

1. Reduce Bending Motions

A. Eliminate the need to bend by:

- Using lift tables, work dispensers and similar mechanical aids.
- Raising the work level to an appropriate height.
- Raising or Lowering the worker.
- Providing all material at work level.
- Keeping materials at work level (e.g., don't lower anything to the floor that must be lifted later).



2. Reduce Twisting Motions

A. Eliminate the need to twist by:

- Providing all materials and tools in front of the worker.
- Using conveyors, chutes, slides, lifts or turntables to change direction of material flow.
- Providing adjustable swivel chairs for seated workers.
- Providing sufficient workspace for the whole body to turn.
- Improving the layout of the work area.



3. Reduce Reaching Out Motions

A. Eliminate the need to reach by:

- Providing tools and machine controls close to the worker, to eliminate horizontal reaches over 16 inches.
- Placing materials, workplaces and other heavy objects as close to the worker as possible.
- Reducing the size of cartons or pallets being loaded, or allowing the worker to walk around them; rotate, raise or lower them.
- Reducing the size of the object being handled.
- Allowing the object to be kept close to the body (i.e. Scissor Lifts).



II. REDUCE OBJECT WEIGHTS/FORCES

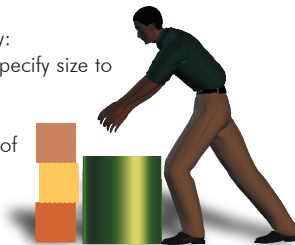
1. Reduce Lifting and Lowering Forces

A. Eliminate the need to lift or lower manually by:

- Using lift tables, lift trucks, cranes, hoists, balancers, industrial manipulators, drum and barrel dumpers, elevating conveyors, and similar mechanical aids.
- Raising the work level. Lowering the operator. Using gravity dumps and chutes.

B. Reduce the weight of the object by:

- Reducing the size of the object (specify size to suppliers).
- Reducing the capacity of the containers. Reducing the weight of the container itself.
- Reducing the load in the containers (administrative control).
- Reducing the number of objects lifted or lowered at one time (administrative controls).



C. Increase the weight of the object so that it must be handled mechanically:

- Use the unit load concept (such as bins or containers, preferably with fold down sides rather than smaller totes and boxes).
- Use palletized loads.



D. Reduce the hand distance by:

- Changing the shape of the object.
- Providing the grips or handles
- Providing better access to object (i.e. scissor lifts, turntables or tilters).
- Improving layout of work area.

2. Reduce Pushing and Pulling Forces

A. Eliminate the need to push or pull by:

- Using powered conveyors.
- Using powered trucks.
- Using powered scissor lifts or turntables.

B. Reduce the required force by:

- Reducing the weight of the load.
- Using non-powered conveyors, air bearings, ball caster tables, monorails, and similar aids.
- Providing good maintenance of floor surfaces, hand trucks, etc.
- Treating surfaces to reduce friction.
- Using powered scissor lifts.



C. Reduce the distance of push or pull by:

- Improving layout of work area.
- Relocating production or storage area.

3. Reduce carrying forces

A. Eliminate the need to carry by converting to pushing or pulling.

- Use conveyors, air bearings, ball caster tables, monorails, slides, chutes and similar aids.
- Use lift trucks, two wheel hand trucks, four wheel hand trucks, dollies and similar aids.

B. Reduce the weight of the object by:

- Reducing the size of the object (specify size to suppliers).
- Reducing the capacity of containers.
- Reducing the weight of the container itself.
- Reducing the load in the container (administrative control).
- Reducing the number of objects lifted or lowered at one time (administrative control).



C. Reduce the distance by:

- Improving the layout of the work area.
- Relocating production or storage areas.

Ergonomics Toolbox™ multimedia tool for identifying, analyzing and implementing ergonomic solutions for material handling problems available from MHIA 1-800-345-1815