

Ergonomic Principles for Manual Handling Tasks

Minimize Significant Body Motions

1. *Reduce Bending Motions*
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
 - * Keep materials at work level (e.g., don't lower anything to the floor that must be lifted later)
2. *Reduce Twisting Motions*
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 significant workspace for the whole body to turn
 - * Improving the layout of the work area
3. *Reduce Reaching-Out Motions*
Eliminate the need to reach by:
 - * Providing tools and machine controls close to the worker to eliminate reaches over 16 inches
 - * Place 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)

Reduce Object Weights/Forces

1. *Reducing Lifting and Lowering Forces*
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 or using gravity dumps and chutes
Reduce the weight of the object by:
 - * Reducing the size of the object (specify size to suppliers)
 - * Reducing the capacity of the containers and the size of the container itself
 - * Reducing load in the containers (administrative controls)

- * Reducing the number of objects lifted or lowered at one time (administrative controls)
- Increase the weight of the object so that it must be handled mechanically:*
- * the unit load concept (such as bins or containers, preferably with fold down sides rather than smaller totes and boxes)
 - * Use palletized loads

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*
Eliminate the need to push or pull by:

- * Using power conveyors
- * Using powered trucks
- * Using powered scissor lifts or turntables

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

Reduce the distance of push or pull by:

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

3. *Reduce Carrying Forces*
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

Reduce the weight of the object by:

- * Reducing the size of objects (specify size to suppliers)
- * Reducing the capacity of the containers
- * Reducing the weight of the container itself
- * Reducing the load in the container (administrative control)

Reduce the distance by:

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