

Principles of Task Redesign



The following ergonomic recommendations should be used for guidance when designing manual material handling tasks. The significant body motions, and the weights and forces involved in manual handling, have been identified as low back injury risk factors. Both require consideration when you are evaluating or designing tasks.

Minimize Significant Body Motions

Reduce Bending Motions

Eliminate the need to bend by:

- Using lift tables, work dispensers, and similar aids.
- Raising the work level to an appropriate height.
- 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).

Reduce Twisting Motions

Eliminate the need to twist by:

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

- Improving layout of work area.

Reduce Reaching Out Motions

Eliminate the need to reach by:

- Providing tools and machine controls close to the worker.
- Placing materials, workplaces, and other heavy objects as near the worker as possible.
- Reducing the size of cartons or pallets being loaded, or allowing the worker to walk around them, or rotate them.
- Reducing the size of the object being handled.
- Allowing the object to be kept close to the body.

Reduce Object Weights and Forces

Reduce Lifting and Lowering Forces

Eliminate the need to lift or lower manually by:

- Using lift tables, lift trucks, cranes, hoists, balancers, drum and barrel dumpers, work dispensers, elevating conveyors, and similar mechanical aids.
- Raising the work level.
- Lowering the operator.
- 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 containers.
- Reducing the weight of the container itself
- Reducing the load in the container (administrative control).

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- 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 by:

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

Reduce the hand distance by:

- Changing the shape of the object.
- Providing grips or handles.
- Providing better access to the object.
- Improving the layout of the work area.

Reduce Pushing and Pulling Forces

Eliminate the need to push or pull by:

- Using powered conveyors.
- Using powered trucks.
- Using slides and chutes.

Reduce the required force by:

- Reducing the weight of the load.
- Using non-powered conveyors, air bearings, ball caster tables, monorails, and similar aids.
- Using the four-wheel hand trucks and dollies with large diameter casters and good bearings.
- Providing good maintenance of floor surfaces, hand trucks, etc.

- Treating surfaces to reduce friction.
- Using air cylinder pushers or pullers.

Reduce the distance of push or pull by:

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

Reduce Carrying Forces

Eliminate the need to carry by converting to pushing or pulling by:

- Using conveyors, air bearings, ball caster tables, monorails, slides, chutes, and similar aids.
- Using 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 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 controls).

Reduce the distance by:

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

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