

Tray 9–E. Design Principles for Pushing and Pulling Tasks*

1. Eliminate the need to push or pull by using the following mechanical aids, when applicable:
 - Conveyors (powered and non-powered)
 - Powered trucks
 - Lift tables
 - Slides or chutes
2. Reduce the force required to push or pull by
 - reducing side and/or weight of load;
 - using four-wheel trucks or dollies;
 - using non-powered conveyors;
 - requiring that wheels and casters on hand-trucks or dollies have (1) periodic lubrication of bearings, (2) adequate maintenance, and (3) proper sizing (provide larger diameter wheels and casters);
 - maintaining the floors to eliminate holes and bumps; and
 - requiring surface treatment of floors to reduce friction.
3. Reduce the distance of the push or pull by
 - moving receiving, storage, production, or shipping areas closer to work production areas, and
 - improving the production process to eliminate unnecessary materials handling steps.
4. Optimize the technique of the push or pull by
 - providing variable-height handles so that both short and tall employees can maintain an elbow bend of 80 to 100 degrees,
 - replacing a pull with a push whenever possible, and
 - using ramps with a slope of less than 10%.

*Adapted from design checklists developed by Dave Ridyard, CPE, CIH, CSP. Applied Ergonomics Technology, 270 Mather Road, Jenkintown, PA 19046-3129.