

FS No. 88-034-0821

## ERGONOMICS—PUSHING AND PULLING TASKS

A poorly designed materials-handling task is one where the strength requirements to complete the task exceed the strength capabilities of most workers. Simply put, most workers would not be able to perform the task without overexertion.

Poorly designed tasks generally require workers to lift, lower, push, pull, or carry heavy loads. These tasks may also include excessive bending, reaching, or twisting of the body. The following guidelines provide suggestions on how to properly push and pull various objects.

### TO ELIMINATE THE NEED TO PUSH OR PULL, USE:

- Conveyors (powered and nonpowered).
- Powered hand trucks.
- Lift tables.
- Slides or Chutes.

### TO REDUCE THE FORCE REQUIRED TO PUSH OR PULL:

- Improve the handhold or grip on the handle.
- Reduce the size or weight of the load.
- Use four-wheel trucks or dollies.
- Use nonpowered conveyors.
- Require that wheels or casters on hand trucks and dollies have periodic lubrication of bearings and adequate maintenance.
- Ensure wheels or casters are appropriate size and Type for the task. (e.g., provide larger diameter wheels and casters).
- Maintain floors to eliminate cracks and bumps.
- Improve the sole of the shoe to increase the shoe's grip on the floor surface.



Source: U.S. Army photo by Sgt. Brandon Hubbard. Cleared for public release.



Source: U.S. Army photo by Capt. Patrick Bracken. Cleared for public release.

### TO REDUCE THE DISTANCE OF THE PUSH OR PULL:

- Relocate receiving, storage, production, or shipping areas so they are close to each other.
- Improve production process to eliminate unnecessary material handling steps.

U.S. Army Public Health Center, Ergonomics Division  
8252 Blackhawk Road, Aberdeen Proving Ground, MD 21010  
410-436-2439 or DSN 584-2439

Approved for public release; distribution unlimited

**TO OPTIMIZE THE TECHNIQUE OF THE PUSH OR PULL:**

- Replace a pull with a push whenever possible.
- Eliminate one-handed pushing or pulling tasks.
- Provide variable-height handles so that both short and tall persons can maintain an elbow bend of 80 to 100 degrees. Make sure wrists are in a neutral position when pulling. Vertical handles allow for a more neutral wrist posture and greater force production.
- Use ramps with a slope of less than 10%.
- Provide variable-height handles so that both short and tall persons can maintain an elbow bend of 80 to 100 degrees.
- Make sure wrists are in a neutral position when pulling. Vertical handles allow for a more neutral wrist posture and greater force production.
- Use ramps with a slope of less than 10%.