

### **Tray 9–D. Design Principles for Lifting and Lowering Tasks\***

1. Optimize material flow through the workplace by
  - reducing manual lifting of materials to a minimum,
  - establishing adequate receiving, storage, and shipping facilities, and
  - maintaining adequate clearances in aisle and access areas.
2. Eliminate the need to lift or lower manually by
  - increasing the weight to a point where it must be mechanically handled,
  - palletizing handling of raw materials and products, and
  - using unit load concept (bulk handling in large bins or containers).
3. Reduce the weight of the object by
  - reducing the weight and capacity of the container,
  - reducing the load in the container, and
  - limiting the quantity per container to suppliers.
4. Reduce the hand distance from the body by
  - changing the shape of the object or container so that it can be held closer to the body, and
  - providing grips or handles for enabling the load to be held closer to the body.
5. Convert load lifting, carrying, and lowering movements to a push or pull by providing
  - conveyors,
  - ball caster tables,
  - hand trucks, and
  - four-wheel carts.

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