

### **Tray 9–B. Design Principles for Repetitive Hand and Wrist Tasks\***

1. Reduce the number of repetitions per shift. Where possible, substitute full or semi-automated systems.
2. Maintain neutral (handshake) wrist positions:
  - Design jobs and select tools to reduce extreme flexion or deviation of the wrist.
  - Avoid inward and outward rotation of the forearm when the wrist is bent to minimize elbow disorders (i.e., tennis elbow).
3. Reduce the force or pressure on the wrists and hands:
  - Wherever possible, reduce the weight and size of objects that must be handled repeatedly.
  - Avoid tools that create pressure on the base of the palm which can obstruct blood flow and nerve function.
  - Avoid repeated pounding with the base of the palm.
  - Avoid repetitive, forceful pressing with the finger tips.
4. Design tasks so that a power rather than a finger pinch grip can be used to grasp materials. Note that a pinch grip is five times more stressful than a power grip.
5. Avoid reaching more than 15 in. in front of the body for materials:
  - Avoid reaching above shoulder height, below waist level, or behind the body to minimize shoulder disorders.
  - Avoid repetitive work that requires full arm extension (i.e., the elbow held straight and the arm extended).
6. Provide support devices where awkward body postures (elevated hands or elbows and extended arms) must be maintained. Use fixtures to relieve stressful hand/arm positions.
7. Select power tools and equipment with features designed to control or limit vibration transmissions to the hands, or alternatively design work methods to reduce time or need to hold vibrating tools.
8. Provide for protection of the hands if working in a cold environment. Furnish a selection of glove sizes and sensitize users to problems of forceful overgripping when worn.
9. Select and use properly designed hand tools (e.g., grip size of tool handles should accommodate majority of workers).

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