Tray 9–C. Handtool Use and Selection Principles*

1. Maintain straight wrists. Avoid bending or rotating the wrists. Remember, bend the tool, not the wrist. A variety of bent-handle tools are commercially available.

2. Avoid static muscle loading. Reduce both the weight and size of the tool. Do not raise or extend elbows when working with heavy tools. Provide counter-balanced support devices for larger, heaver tools.

3. Avoid stress on soft tissues. Stress concentrations result from poorly designed tools that exert pressure on the palms or fingers. Examples include short-handled pliers and tools with finger grooves that do not fit the worker's hand.

4. Reduce grip force requirements. The greater the effort to maintain control of a handtool, the higher the potential for injury. A compressible gripping surface rather than hard plastic may alleviate this problem.

5. Whenever possible, select tools that use a full-hand power grip rather than a precision finger grip.

6. Maintain optimal grip span. Optimum grip spans for pliers, scissors, or tongs, measured from the fingers to the base of the thumb, range from 6 to 9 cm. The recommended handle diameters for circular-handle tools such as screwdrivers are 3 to 5 cm when a power grip is required, and 0.75 to 1.5 cm when a precision finger grip is needed.

7. Avoid sharp edges and pinch points. Select tools that will not cut or pinch the hands even when gloves are not worn.

8. Avoid repetitive trigger-finger actions. Select tools with large switches that can be operated with all four fingers. Proximity switches are the most desirable triggering mechanism.

9. Isolate hands from heat, cold, and vibration. Heat and cold can cause loss of manual dexterity and increased grip strength requirements. Excessive vibration can cause reduced blood circulation in the hands causing a painful condition known as white-finger syndrome.

10. Wear gloves that fit. Gloves reduce both strength and dexterity. Tight-fitting gloves can put pressure on the hands, while loose-fitting gloves reduce grip strength and pose other safety hazards (e.g., snagging).

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