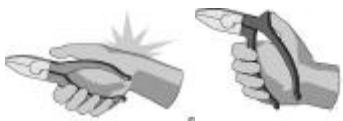
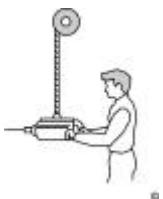
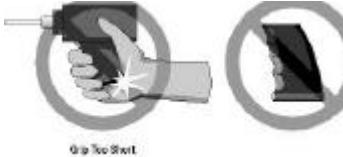
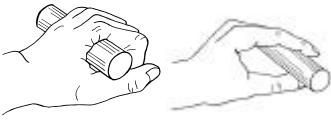
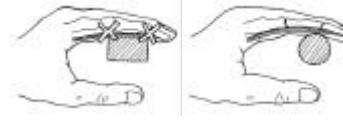
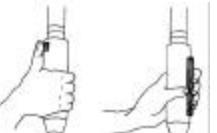


# HAND TOOL USE AND SELECTION PRINCIPLES

(Adapted from NIOSH Elements of Ergonomics Programs – Toolbox Tray 9-C)

Modified by EWI Works – January, 2002

	Maintain straight wrists. Avoid bending or rotating the wrists: bend the tool, not the wrist. A variety of bent-handle tools are commercially available.		Avoid static muscle loading. Reduce both tool weight and size. Do not raise or extend elbows when working with heavy tools. Provide counter-balanced support devices for larger, heavier tools.
 <small>Grip Tool Short</small>	Avoid stress on soft tissues from poorly designed tools exerting pressure on the palms or fingers (ie: short-handled pliers or tools with finger grooves that do not fit the worker's hand).		Reduce grip force requirements. The greater the effort to maintain control of a hand tool, the higher potential for injury. A compressible gripping surface rather than hard plastic may alleviate this problem.
	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 .075 to 1.5 cm when a precision finger grip is needed.
	Avoid sharp edges and pinch points. Select tools that will not cut or pinch the hands even when gloves are not worn.		Avoid repetitive trigger-finger actions. Select tool with large switches that can be operated with all four fingers. Proximity switches are the most desirable triggering mechanism.
	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).		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.