

Hand Tool Ergonomics Meeting Kit



What's At Stake

EVALUATE THE ERGONOMIC DESIGN OF HAND TOOLS

Ergonomic hand tools are in almost every home improvement or hardware store. Devices labeled as “ergonomically enhanced” have a design that makes it more efficient to use while reducing fatigue and discomfort and minimizing injury risk.

ERGONOMIC GUIDELINES

Before beginning the search into ergonomic hand tool design, ask these questions:

- Who will use the tool? (worker's anthropometry and gender)
- What is the work surface orientation of the tool? (i.e., where will it be used?)
- What are the specific task requirements?
- What will be the tool's function?

What's the Danger

HAND TOOL MAINTENANCE CAN REDUCE THE RISK FOR INJURIES

The condition of tools is an important factor. Blunt or dull tools such as scissors, cutters, saws, screwdriver tips, in fact any tools in a poor state of repair, not only compromise safety but also increase (sometimes by a factor of ten) the effort needed to use them. Tools in poor condition should be discarded (with the exception of those few that can be restored to optimum condition, for example, a wood chisel or wood saw) and replaced with new ones.

According to the National Institute for Occupational Safety and Health (NIOSH), workers should select tools that can be used with the least amount of force, repeated movement, and awkward positioning possible to perform a task. Over time, things like using a tool at the wrong angle or lifting a heavy tool repeatedly can get employees into trouble and lead to what are called musculoskeletal disorders.

Symptoms of musculoskeletal disorders in the hands and arms include decreased movement, decreased grip strength, muscle fatigue, tingling, joint swelling, soreness, numbness, changes in skin color and pain, and any workers experiencing these symptoms should discuss their current work behaviors with a doctor. To prevent these types of problems, it's essential to select the right tools for the job.

HOW TO PROTECT YOURSELF

CHOOSE THE RIGHT TOOL FOR THE JOB

Hand tool choices can also help prevent injury. Consider the type of task when you choose a tool. Fine tasks may use smaller, lighter tools for delicate maneuvering and fitting into small work areas. Power tasks such as driving nails and cutting bulky objects may require large, heavy tools with bigger grips. Choose a tool that:

- Fits comfortably in your handgrip.
- Has the correct handle length for the job.
- Allows you to pinch for precision or grip for power actions.
- Fine Tasks require thinner handles, shorter handles, Pinch grip.
- Power Tasks require thicker handles, longer handles, power grip.

Other tool characteristics to look for:

- Spring-loaded tools that snap back to position easily.
- Smooth tool handles with no ridges or edges that can cut into your knuckles or palms.
- Handles coated with a soft material.
- Handles coated with non-slip materials.
- Tools that have the correct handle angle to help you keep your wrist straight during the task.

WHAT TO LOOK FOR IN A TOOL – ERGONOMIC CONSIDERATIONS

Non-electric tools like hammers, trowels and brushes may seem simple, but you should consider a number of factors before selecting a tool for a job.

Handle Size. The diameter of a tool's handle is one of the most important characteristics of a tool because a proper diameter will give you the best grip. For single-handle tools (most tools), NIOSH recommends a handle diameter of 1- $\frac{1}{4}$ inches to 2 inches for tools that will require a power grip and $\frac{1}{4}$ to $\frac{1}{2}$ inch for tools that will require precision grips.

Some tools like pliers, cutters or tweezers have two handles so they are referred to as double-handle tools. If you will use a power grip to complete a task with a double-handle tool, the tool should have an open grip span of 3- $\frac{1}{2}$ inches or less and a closed grip span of 2 inches or greater. For tasks that will use the pinch grip, the grip span should be slightly smaller: 3 inches or less when open and 1 inch or more when closed.

Handle Length. You will always want to select a tool whose handle is long enough that its end won't press into your palm. This typically means the handle must be at least four to six inches long.

Handle Angle. A bent wrist can over time become an injured wrist, so always choose tools that allow you to keep your wrist straight while you use them. Sometimes this means the handle will be straight, but other times this might mean the handle is at an angle. For example, if you want to apply force in the same direction as your straight forearm, a bent handle will work better than a straight one.

Weight. When it comes to a tool's weight, lighter is usually better. At first glance, it might seem like a heavy tool could get the job done faster, but oftentimes a heavy tool will cause worker fatigue sooner and can place extra strain on muscles. Consequently, it's important to select the lightest tool possible that can still effectively accomplish the task at hand.

Handle Material. Tool handles are made from a variety of materials including metal, wood and fiberglass. Each material has benefits, but as a user you should think about

how the material could impact your safety.

When using a heavier tool like a hammer, the handle will vibrate each time you strike something. Over time, this can cause nerve damage in the hands and wrist. Wood and fiberglass tend to vibrate less than metal, so those materials will likely keep your hands safer when using striking tools.

Adjusting Tools to Fit Your Hand. Tools can be adjusted to make them more ergonomic. Tool sleeves can be added when handles are too small. If a handle is too big, it's sometimes possible to replace the handle. Wood handles can also be sanded down to make them smaller (although if you go this route, make sure your adjustments to the tool won't make it more likely to break during use).

FINAL WORD

When choosing ergonomic tools, consider grip diameter on the single – handle tool such as hammers, nut drivers, wrenches, and screwdrivers. Large diameters allow workers to grip these tools more comfortably and reduces stress on hands, wrists, and fingers.