Hand Tools
An Ergonomics Guide

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Introduction
Introduction
Hand Tool Selection Criteria

Examine the ergonomic design and work environment of the products of the hand and arm in the operation. For a General discussion of the ergonomic design, refer to the above guidelines. However, the operation of tools is associated with the physical and work environment of the products. A good design of the tools for the physical environment of the products can avoid the adverse effects associated with the use of tools. A good design also ensures that tools are used within the limits of the operation. Some tools are designed for specific jobs, and others are designed for a variety of jobs. The design of the tools and work environment of the products should be considered in the selection of tools.

Some tools are now being marketed as "ergonomic," implying that they are designed for ergonomic use. The design of the tools and work environment of the products should be considered in the selection of tools. The design of the tools and work environment of the products should be considered in the selection of tools.
<table>
<thead>
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<th>Hammered Tools</th>
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<tbody>
<tr>
<td>Nail sets</td>
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<td>Nail-puller bars</td>
<td>Woodchopping mauls</td>
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<td>Wood-splitting wedges</td>
<td>Bush hammers</td>
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<td>Brick chisels and chisel sets</td>
<td>Hand chisels or mash hammers</td>
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<td>Square shank</td>
<td>Stone chisels and splitting hammers</td>
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<td>Sledge</td>
<td>Chisels</td>
</tr>
<tr>
<td>Broad chisels</td>
<td>tools for metalworking (e.g., chisel, chisel hammer, Cold chisels (flat, cap, diamond point, round nose)</td>
</tr>
<tr>
<td>All-round wood and nipping chisels</td>
<td>Chisels and hammers, socket wrenches</td>
</tr>
<tr>
<td>Hoof chisels</td>
<td>Screwdrivers, ax (irr or lead)</td>
</tr>
<tr>
<td>Snipe</td>
<td>Screwdrivers, Key, serrated, pliers</td>
</tr>
<tr>
<td>Ditch point (ditch, regular)</td>
<td>Screwdrivers, key, serrated, pliers</td>
</tr>
<tr>
<td>Bevel chisels (bevel, center, pin, square, drill)</td>
<td>Screwdrivers, key, serrated, pliers</td>
</tr>
<tr>
<td>Bridge cutting (bridge, center, pin, square, drill)</td>
<td>Screwdrivers, key, serrated, pliers</td>
</tr>
<tr>
<td>Shave chisels</td>
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**TABLE 1. Common Varieties of Hand Tools**
<table>
<thead>
<tr>
<th>Type of Tool</th>
<th>Examples</th>
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<tr>
<td>Abrasive Tools</td>
<td>Tube, pipe, and general cutting, grinding, shaping, and finishing tools.</td>
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<td>Driving Tools</td>
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<tr>
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</tr>
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<tr>
<td>Wire-brush tools</td>
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</tr>
<tr>
<td>Reciprocating and rotary files</td>
<td>Carving and finishing tools.</td>
</tr>
<tr>
<td>Polishers</td>
<td>Surface finishing tools.</td>
</tr>
<tr>
<td>Brushes</td>
<td>Cleaning and finishing tools.</td>
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To maintain a grip on the handle of the tool, the human operator must first grasp the tool handle with a firm grip. The grip force is then distributed to the handle, and the operator then exerts force on the tool. The force is then transferred to the tool tip, where it is applied to the workpiece. The force is then transmitted through the tool to the workpiece, and the workpiece is deformed under the applied force. The deformation of the workpiece results in the desired cut or hole being formed in the workpiece. The force is then transferred back to the operator, who then adjusts the grip force to maintain control over the tool. The grip force is then transferred back to the handle, and the cycle repeats.
The tool's weight and balance are designed to provide a powerful grip without the need for additional effort. The proper grip and stance are essential for effective use of the tool.

**Grip Strength**

- **SMALL**
- **MEDIUM**
- **LARGE**

**Hand Span (cm)**

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<tr>
<td>LOW</td>
<td>170-180</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>190-200</td>
</tr>
<tr>
<td>HIGH</td>
<td>220-230</td>
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**Proper Stance**

- **Foot Position**
- **Body Rotation**
- **Leverage**

**Safety Precautions**

- **Proper Use**
- **Maintenance**
- **Storage**

**Operational Guidelines**

- **Preparation**
- **Execution**
- **Follow-Up**

The tool is designed for right-handed users only. The left-handed version is optimized for use with the left hand, providing a comfortable grip and improved control.

**Conclusion**

The tool's versatile design makes it suitable for a wide range of applications, from cutting and shaping to carving and sanding. With proper use, it can be a valuable tool in the hands of any craftsman or workshop enthusiast.
location and operation cannot be adjusted to suit the worker's comfort or convenience. Therefore, the worker may position the handles so that they are not directly in line with their body when cutting is required. This can cause discomfort and stress, leading to injury.

The correct posture for cutting is to stand with the feet shoulder-width apart and the knees slightly bent. The body should be aligned with the handle, and the hand should be placed on the handle with the palm facing forward. This position allows for better control and reduces the risk of injury. The grip should be firm but not too tight, and the fingers should be spread to provide a stable base.

When cutting, the motion should be smooth and steady, with the blade moving in a straight line. The cutting tool should be used with the correct technique, such as the French cut or the Swedish cut, depending on the material being cut. The cutting tool should be held at a 45-degree angle to the surface being cut, and the blade should be angled so that it is not perpendicular to the cutting surface.

Proper posture and technique can help prevent injury and improve efficiency. It is important to maintain a comfortable and ergonomic position when using cutting tools. Regular breaks and the use of ergonomic tools and equipment can also help prevent injury and improve overall productivity.
Work methods and standards: 
- Tools and equipment: 
  - Gauges: 
  - Tools: 
  - Work area: 
  - Work location: 

Workstation exposures and task factors: 
- Manual handling activities: 
  - Handling and moving objects: 
  - Holding and grasping objects: 
  - Reaching and manipulating objects: 
  - Postural and postural changes: 

Workstation exposures and task factors (continued): 
- Work-related exposure assessment and control measures: 
  - Exposure assessment methods: 
  - Control measures: 

Workload and task factors: 
- Work method and work content: 
  - Work tasks and responsibilities: 
  - Work intensity and complexity: 
  - Work duration and frequency: 

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Manual Hand Tools

Manual hand tools can be exchanged quickly, are precise, and are cost-effective. They allow for detailed work and are essential in certain tasks. However, they can also be labor-intensive and require a higher level of skill compared to power tools. Proper selection and usage of hand tools are crucial for efficient and safe work.

Manual hand tools are typically used in settings where precision is critical, such as in automotive repair, electronics, and woodworking. They include items like screwdrivers, wrenches, pliers, and wrenches, which are designed for specific tasks and require manual manipulation.

While manual hand tools offer precision and control, they may not be as efficient as power tools for heavy-duty work. Therefore, the choice between manual hand tools and power tools often depends on the nature of the task and the desired outcome. Proper training and safety measures are essential when using manual hand tools to prevent injuries and ensure effective work.

In conclusion, manual hand tools are a valuable addition to any toolbox, offering precision and control for detailed work. However, they should be used appropriately and with caution to ensure safety and efficiency.
When holding an object, such as a tool or a heavy object, it's important to distribute the weight evenly across your hands. This reduces the strain on your wrist and fingers, making it easier to hold and manipulate the object. When working with tools, it's essential to use the right tool for the job. The right tool can make a task easier and more efficient. For example, using a screwdriver to tighten a screw is much easier than using a hammer. When cutting, using the right knife or tool can also prevent accidents and injuries. Always wear appropriate safety gear, such as gloves and eyewear, to protect yourself from cuts and splinters. When lifting heavy objects, it's important to use your legs and core muscles to lift the object, rather than your back. This reduces the risk of injury. When working with power tools, always read the instructions and follow safety guidelines. Misusing power tools can be dangerous and lead to accidents. Remember, safety should always be your first priority.
operation should be minimized. Drill lead force is affected by the drill power and
sharpness of the tool. When using a sharp tool, the lead force required is less than
when using a blunt tool. In addition, the tool's material and design also play a role in
the lead force.

Rejection Force and Reaction Force

In addition to supporting the tool, the hand and hand operation should have the

weight of the tool and the weight of the tool. The weight of the tool is necessary to

prevent the tool from falling or moving during the operation. When operating a heavy
power tool, the hand and hand operation should support a heavy power tool.

Figure 7 - Method for determining the center of gravity. The tool is suspended from

a suspension point. When the tool is suspended, the center of gravity is determined.

The distance from the center of gravity to the suspension point is equal to the

distance from the center of gravity to the suspension point.
in hand, and more than 3000. For a solid join, the procedure is described in detail. The location of the joint is determined by visual inspection, and the joint is marked with a pencil or other marking tool. The joint is then cut with a hacksaw or a range of cutting tools. The cutting process is then repeated on the other side of the joint to ensure a tight fit. The joint is then cleaned with a brush and a solvent to remove any debris. The joint is then fastened with a clamp or a bolt, and the clamp is tightened to ensure a secure joint. The joint is then checked for any gaps or misalignments. If the joint is not secure, the process is repeated until a secure joint is achieved.
The ability to exert against the torque and hence the associated reaction force increases the length of the moment arm. The reaction force depends on the torque requirements of the job.

**Figure 11**—Selection of the tool shape depends on the torque requirements of the job.

\[ M_{\text{reaction}} = M_a + M_f \]

Methods for minimizing reaction force include the use of long-reach and mini-tools for jobs that the user will perform with the extended arm. Compare the potential for reaction force reduction of the arm with the ability to exert force with the arm and the ability to exert force with a tool with arm extension.

**Figure 10**—Representative muscle EMG responses for a 0.5-sec short arm reaction time. The flexor and extensor EMGs indicate muscle activity during and immediately after the load.

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Figure 12 - Torque Reaction arms for inline power tools

Work Location

When performing torque reactions, the location of the tool is critical to ensure proper use and safety. The torque reaction force acts directly through the center of the tool, opposing any movement. This force can be significant and should be considered when selecting tools and locations. Here are some key points to consider:

1. **Torque Reaction Force**: The torque reaction force acts directly through the center of the tool, opposing any movement. The force is directly proportional to the torque applied and is perpendicular to the direction of the torque.

2. **Center of Gravity**: The center of gravity of the tool plays a crucial role in determining the location of the reaction force. The reaction force is always directed through this point, regardless of the orientation of the tool.

3. **Torque Reaction Arm**: The torque reaction arm is the distance between the center of gravity of the tool and the axis of rotation. A smaller torque reaction arm results in a higher reaction force, whereas a larger arm results in a lower force.

4. **Safety Considerations**: When working with power tools, it is essential to ensure that the reaction force is directed away from the operator. This can be achieved by positioning the tool in a way that the reaction force is directed towards a safe area.

By understanding and considering these factors, you can ensure the proper use and safety of power tools when performing torque reactions.
Summary

In summary, using picture frames as place figures helps people read in place with action. Pads make it easier for the eye to follow the words, and of course, the pads can be replaced by using different print materials or even by using the pads to serve as a sort of canvas for the reader. The e-reader makes it easier for the eye to follow the words, and of course, the e-reader can be replaced by using different materials or even by using the e-reader to serve as a sort of canvas for the reader. The e-reader is more effective in accommodating the high-frequency noise of the reader, and of course, the e-reader can be replaced by using different materials or even by using the e-reader to serve as a sort of canvas for the reader. The e-reader is more effective in accommodating the high-frequency noise of the reader, and of course, the e-reader can be replaced by using different materials or even by using the e-reader to serve as a sort of canvas for the reader.


