Air Powered Hand Tools

Introduction

Common types of air-powered hand tools used in industry are: buffers, chipping hammers, drills, grinders, impact tools, jack hammers, riveting guns, sanders, saws, sprayers and wrenches.

Hazards

- Poorly designed tool (wrist strain)
- Vibration (vibration-induced white finger)
- Noise (hearing loss)
- Dust (respiratory problems)

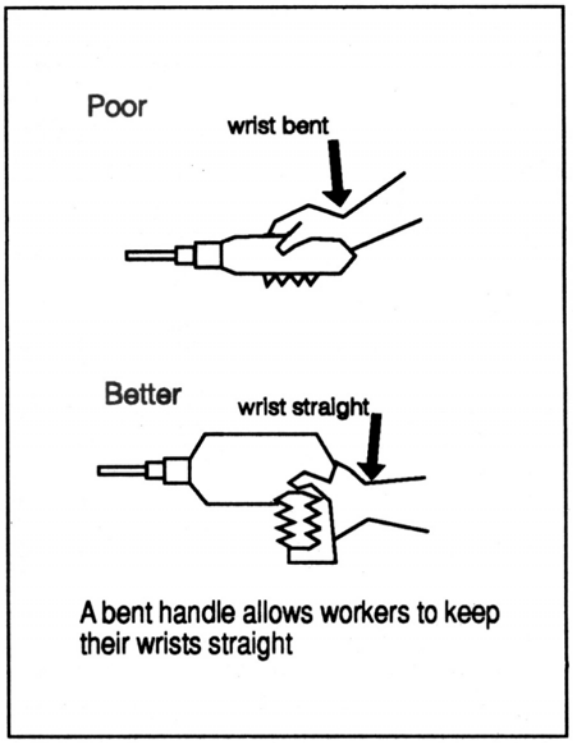
The following hazards have the potential to cause serious bodily injury:

- Incorrect tool selection
- Use of damaged tool
- Improper, inadequate, or no guards
- Rotating shaft (entanglement)
- Wheel breakage (grinder)
- Flying chips
- Whipping of the hose
- Accidental start up
- Compressed air entering the body
- Dropped tool
- Tripping over hose

Controls

Ergonomic Considerations

- Ensure that workers do not have to bend their wrist when using tools:
  - Provide tools equipped with handles designed to keep the wrist straight



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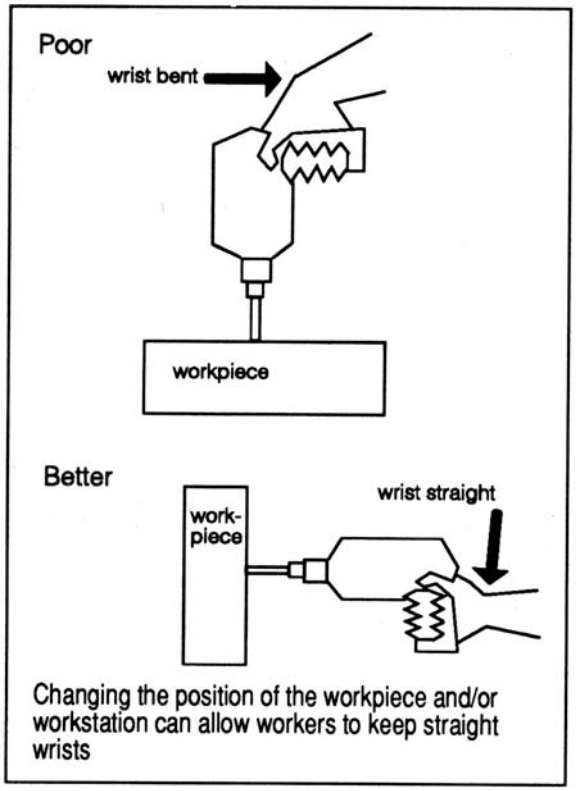
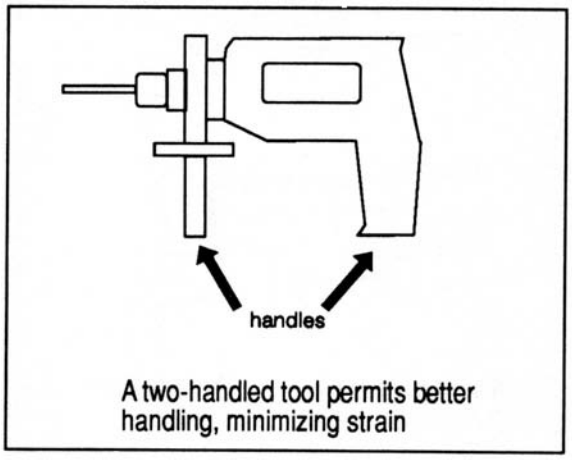
- Design tasks to allow workers to keep their wrists straight



Changing the position of the workpiece and/or workstation can allow workers to keep straight wrists

- Ensure that workers will not strain their wrist when using tools:
  - Provide tools with two handles



A two-handled tool permits better handling, minimizing strain

  - provide tools that have most of their weight in or close to the handle
  - provide lightweight tools that can be easily supported by one hand
  - if the tool weighs more than 0.5 kg (approximately 1 lb), support it with a counter-balance harness

- Ensure that workers have a good grip on the tool. The handle of the tool should:
  - have grips that allow the hand to wrap around the handle easily
  - be longer than the width of the hand
  - have triggers large enough for gripping with 2-3 fingers
  - be rounded and smooth (with no grooves) to prevent any pressure points

- Instruct workers to:
  - hold the tool as close to the body as possible
  - rest their hands by laying the tool down or inserting it in a holster when not in use

- To control the hazard of vibration, provide:
  - low-vibration tools
  - cork, rubber or plastic coverings for tool handles
  - anti-vibration gloves

Safe Use of Tools

Establish work procedures that include the following precautions:

- Ensure that the air supplied to tools is clean and dry. Dust, moisture, and corrosive fumes can damage tools. An in-line regulator filter and lubricator can increase tool life.
- Keep tools clean, lubricated, and maintained according to manufacturer's instructions (see Maintenance)
- Use hoses specifically designed to resist abrasion, cutting, crushing, interior deterioration, and failure from continuous flexing
- Only use attachments and accessories recommended by the manufactures

- Make sure that hoses connected together are equipped with automatic shut-off couplers, or that a small chain is attached to each side of the coupler to prevent whipping if the coupler fails
- Wear the appropriate personal protective equipment (for example, eye/face protection, work boots equipped with metatarsal guards, hearing protection, or respiratory equipment against dust)
- Review the manufacturer's instructions before using a tool
- Operate tools at air pressures recommended by the manufacturers
- Match the speed rating of accessories with that of the tool. Overspeeding is dangerous
- Do not use chrome hand sockets on wrenches. These can shatter dangerously
- Keep clothing and the hands away from the working end
- Never raise or lower a tool by the hose, use a handline
- Shut off the air and release the pressure before disconnecting a hose. *There should be an automatic, quick-release mechanism.*
- Before staring up a tool:
  - check for loose parts
  - clean the air filter
  - check the hose for cuts, wear, and other damage
  - lubricate, unless an airline lubricator is used
  - blow out the hose to remove moisture and dirt, and clean the nipple before connecting
  - check fittings for proper connection
  - ensure closure of control valve to prevent whipping, and open gradually for the same reason
  - check air pressure at the tool against the manufacturer's recommendations
  - close the stop valve in airline when changing tools; never kink the hose to save time
  - check the tool retainer
  - check guards

Training

To prevent serious injury, include the following in your training program:

- general precautions for the use and start up of tools
- what a particular tool is to be used for, and how it is to be held and operated
- manufacturer's recommendations for use, care, etc., of the tool
- the safety devices (for example, guards) with which the tool is equipped
- the operating problems that can occur (for example, binding, seizing, breaking)
- pre-use checks
- procedures for reporting tool defects, etc., to supervisor
- how to transport and store the tool
- how to evaluate possible environmental hazards (for example, flammability of substances, lighting, rough terrain)
- how to use attachments – proper installation, selection of size, speed
- how to inspect the tool
- the hazards of compressed air, and the effects of exposure to vibration, noise, and dusts generated when the tool is in use
- the proper use, care, and limitations of personal protective equipment

Maintenance

Review manufacture's instructions before establishing maintenance procedures. Include the following in your planned maintenance program:

- standard written procedures for each type of tool
- disconnecting the tool from the airline
- regular inspection, cleaning, and oiling of tools
- inspection of hoses and couplings
- checks for damage to frames or parts
- cleaning as recommended by the manufacturer – do not allow the use of flammable or toxic solvents
- availability and condition of guards
- checking with operators if any unusual situations are suspected
- inspection of valves
- replacement of worn parts
- adjustments as recommended by manufacturer
- resharpening blades, bits, etc. according to manufacturer's instructions
- checks of chucks, collets, etc.
- a final visual check
- maintenance records

All maintenance work should be carried out by trained, qualified personnel.

Legislation

Regulations respecting Industrial Establishments (Reg. 851);

Section 66: A compressed air or other compressed gas blowing device shall not be used for blowing dust or other substances:

a) from clothing worn by a worker except where the device limits increase in pressure when the nozzle is blocked

b) in such a manner as to endanger the safety of any worker

Note: IAPA recommends that compressed air **never** be used to blow dust, etc., from clothes, body and/or work surfaces. Use a vacuum cleaner or brush instead.

Sections 79 - 86: Use of personal protective equipment or clothing.

Tool Inspection Checklist

This sample checklist may be used as a pre-shift check, a maintenance check, or a department check. Adapt it to suit your own needs.

Department: ✓ **Acceptable** × **Unacceptable**	**Dates of Inspection**											
Tool guards in place and functional?												
Safety chain operative?												
Tool parts not broken or prematurely worn (e.g., teeth, gears)?												
Bits and tools properly sharpened?												
Tool spindle turns freely?												
Tool properly lubricated?												
Throttle (trigger) functioning correctly?												
Motor runs freely?												
Pistons running correctly?												
Speed regulator/governor properly maintained?												
Hose and couplings in good condition?												
Air flows freely from exhaust?												
Motor vanes in good repair?												
Air motor and throttle valve free of dirt?												
No air leaks at or in tool?												
Air pressure rating clearly marked (if not 90 psig)?												
Noise level of tool controlled?												
Vibration of tool controlled?												
Operating manual and written work procedures available to operator?												
Proper tool storage facilities provided?												
Maintenance and repair records kept?												

Revised: May 2006

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