abrasive metal finishing

EMPLOYEE HEALTH and SAFETY PRACTICES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Technical Services
Cincinnati, Ohio
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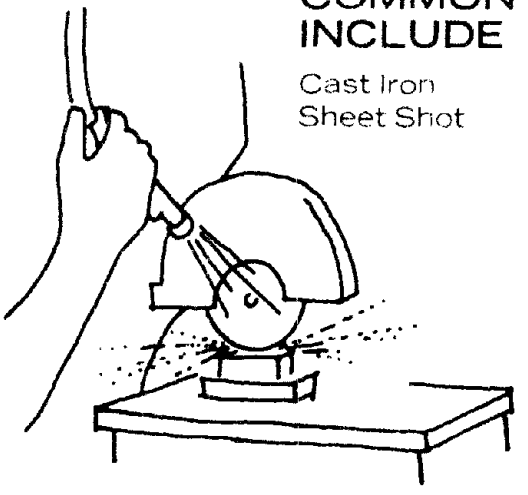
WHAT ARE ABRASIVES ?

They are Metals, Non-Metals, and Synthetics



COMMON METALS INCLUDE

Cast Iron
Sheet Shot

COMMON NON-METALS INCLUDE

Silica Sand
Quartz
Corn Husks
Nut Shells
Hardwood Dust
Flint
Dolomite
Garnet
Rice Hulls
Emery
Rye Husks

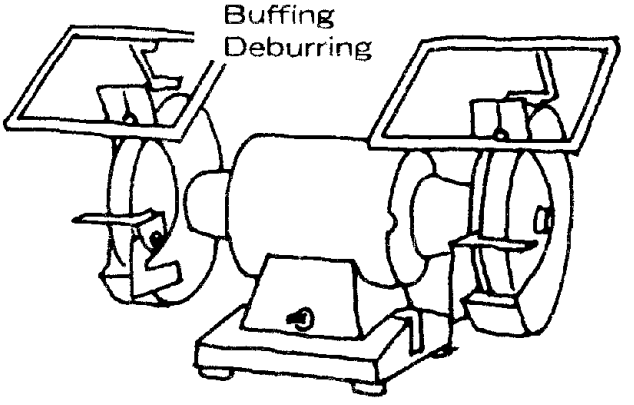
COMMON SYNTHETICS INCLUDE

Silicon Carbide
Aluminum Oxide
Boron Nitride

WHERE ARE ABRASIVES USED?

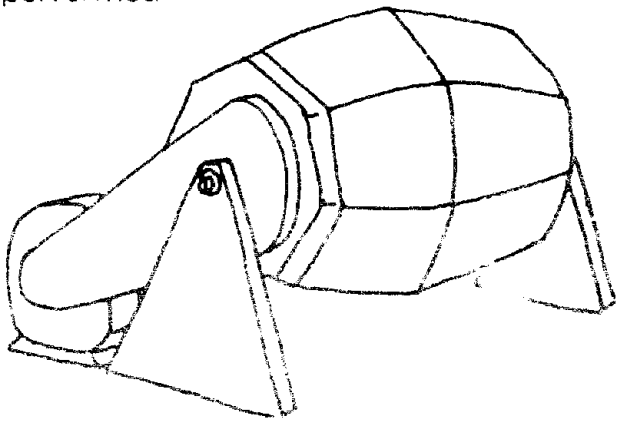
ON WHEELS FOR

Grinding
Polishing
Buffing
Deburring



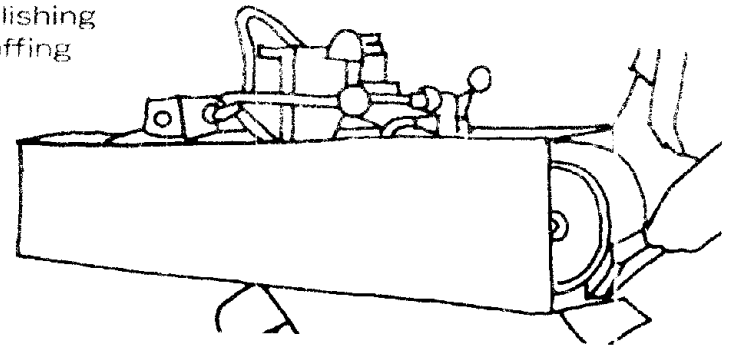
IN TUMBLE BARRELS

Where moderate quality surface finish is desired, and polishing performed

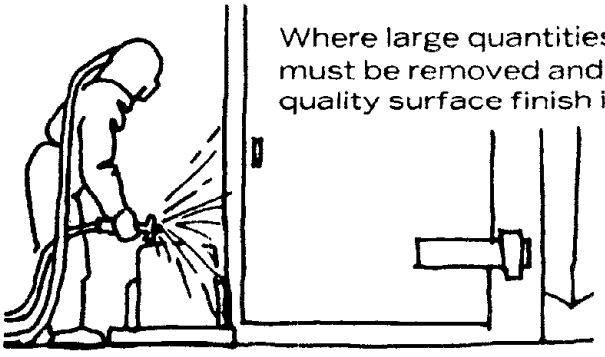


ON BELTS FOR

Grinding
Polishing
Buffing

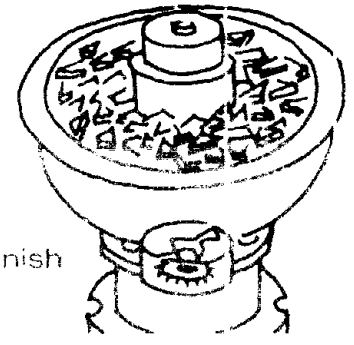


IN BLASTING ROOMS, TABLES, AND CABINETS



Where large quantities of metal must be removed and moderate quality surface finish is desired

AND TANKS IN VIBRATORY BOWLS



Where fine quality surface finish is desired, and burnishing is performed

HEALTH HAZARDS

How you can spot the health hazards

FIVE MAJOR HAZARDS ARE:

Lung Disease . . . results from breathing harmful dusts that come from either the abrasive material or work piece.

Poisoning . . . can occur from breathing or swallowing harmful materials such as lead, beryllium, or certain polishing and lubricating compounds.

Skin Disease . . . skin irritation (dermatitis) can result from contact with cutting or lubricating oils and certain metallic dusts.

Hearing Loss . . . can result from exposure to high noise levels for long periods of time.

Vibration Illness . . . can result from vibrating hand grinders, sanders, and polishers.

SYMPTOMS:

Loss of weight or appetite
Difficulty in breathing
Chest soreness
Frequent hard coughing
Quickly out of breath
Nose and throat irritation

Headache
Metallic taste in back of mouth
Weakness in hands, arms, and legs

Dry, cracked, itchy skin
Rashes on hands, forearms, and face

Ringing in ears (after leaving work)
Difficulty in hearing fellow employee talk at a distance of an arm's length (while working in a noisy area)

Numb fingers and hands

How you can spot the health hazards

1. LUNG DISEASE

Unhealthy Practices Conditions:

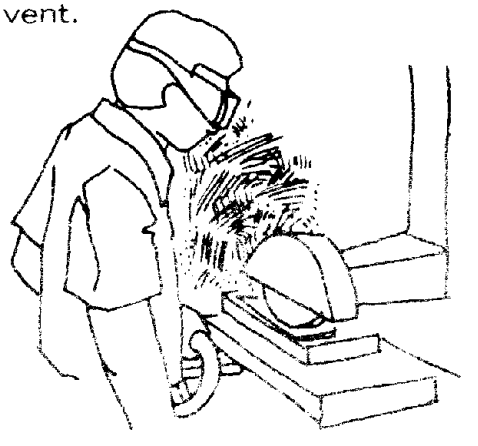
- Dust leaking from tumbling barrels and cabinets
- Dirty and worn respirators
- Improperly fitting respirators due to beards and eyeglasses
- Excessive dust from grinding, sanding, and polishing

Ventilation problems can be suspected if:

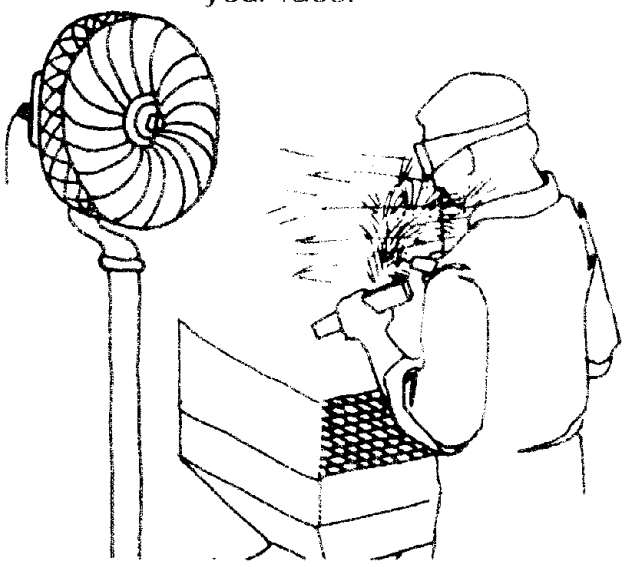
. . . There are large quantities of dust on the floor near grinding, sanding, and polishing operations.

. . . You see dust or mist in the air (especially near light sources).

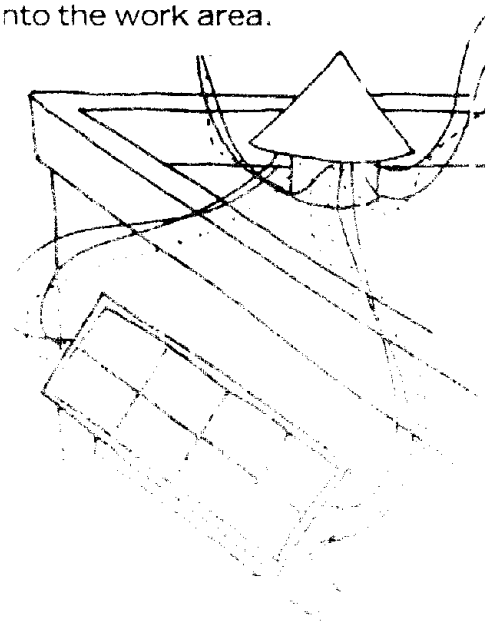
. . . Dust and mist given off from the operations are not completely pulled into the exhaust vent.



. . . Air from fans or other sources near you are blowing dust anc mists away from the exhaust vent and into your face.



. . . Contaminated air is being recirculated back into the work area.



2. POISONING

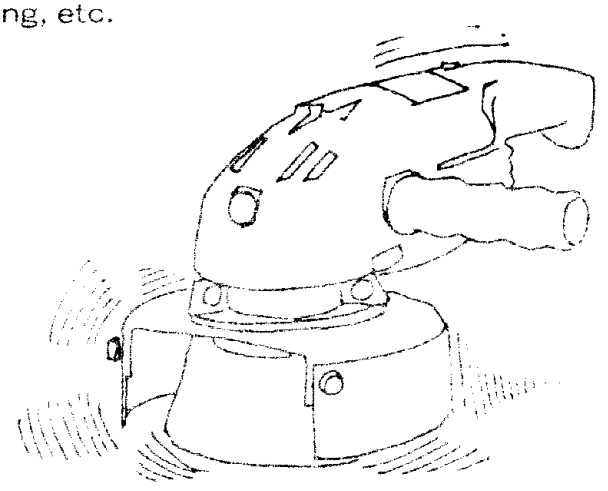
Unhealthy Practices/Conditions:

- Eating, smoking, or hand-mouth contact without washing hands in areas where hazardous materials (lead, beryllium, etc.) are present
- Wearing "contaminated" work clothes home from a job where toxic materials are used
- Laundering contaminated work clothes with family wash
- No carbon monoxide filter on air line respirator
- Proper respirators not available
- Improper ventilation

3. VIBRATION ILLNESS

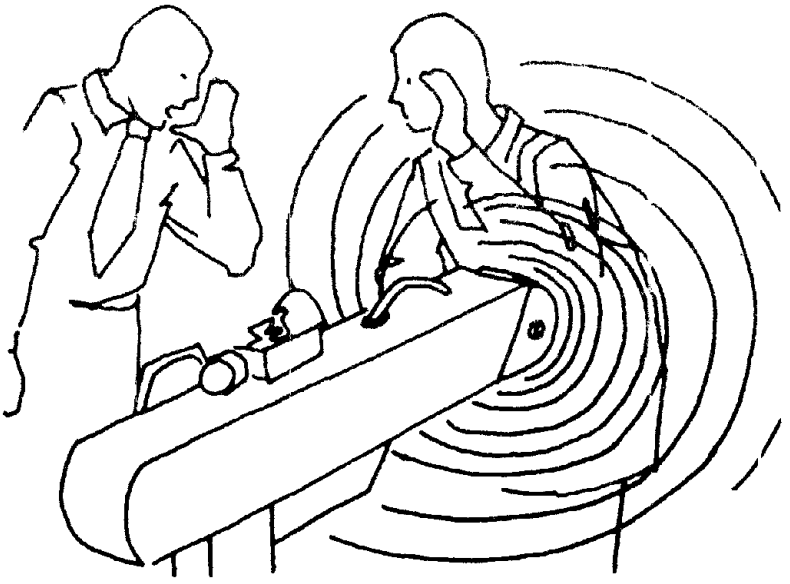
Unhealthy Practices/Conditions:

- Poorly balanced manual tools
- Work piece vibrating during grinding, etc.



4. HEARING LOSS

Unhealthy Practices Conditions:



- Work piece vibrating during grinding, etc.
- Not wearing ear plugs or muffs when required
- Extremely noisy motors, air compressors, air jets, and operations

5. SKIN DISEASE

Unhealthy Practices Conditions:

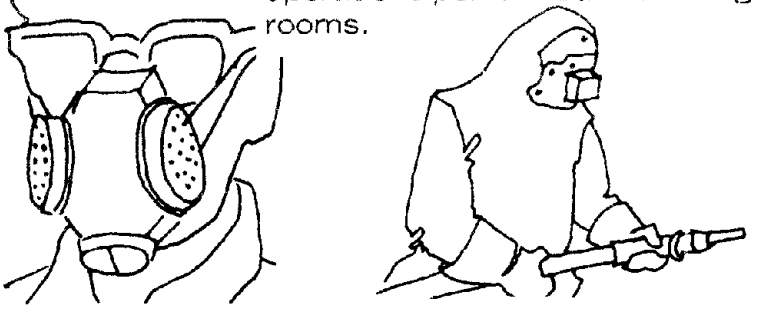
- Excessive dust (from metals such as nickel) and mist in the air
- Not using rubber gloves or protective creams where skin is exposed to irritants
- Lack of shields and ventilation on machines to prevent dust and mist from escaping

HOW YOU CAN PREVENT HEALTH HAZARDS

1. Always operate a hose or nozzle of a blasting cabinet from outside the cabinet.
2. Make sure seals on blasting rooms, cabinets, and tumbling barrels don't leak.
3. Use wheels and belts that are equipped with guards or enclosures so that released dust and mists will not be thrown into your face and body.
4. Always use ventilation when it is available.
5. When ventilation booths or hoods are provided, make every effort to grind, sand, or polish inside the booth or hood (keep work between you and the exhaust where possible).
6. Always check to make sure the ventilation system is turned on and properly connected before operating the equipment.
7. Always wear respirators when required.
8. Report potential health hazards you have spotted to your supervisor.

RESPIRATORS

Always required—NIOSH U.S. BUREAU OF MINES approved supplied air respirators (helmets) are required for blasting operations performed in blasting rooms.



May be required—NIOSH/U.S. BUREAU OF MINES approved mechanical respirators may be required for grinding, sanding, and polishing operations which are not properly controlled by exhaust ventilation.

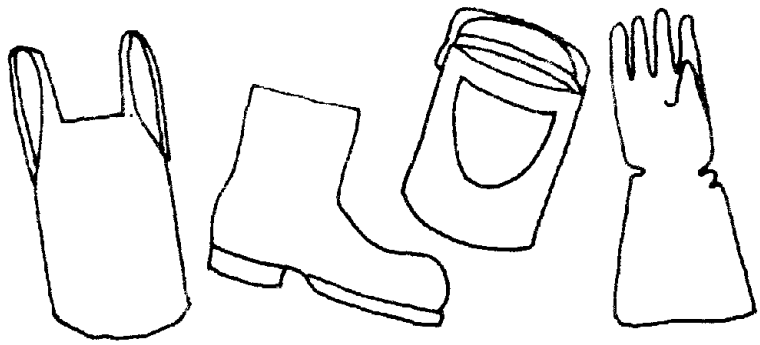
NOTE:

1. Make sure the air supply line to your abrasive blasting helmet has a carbon monoxide warning device and filter.
2. Make sure your respirator is clean, fits properly, and is in good repair.
3. Always store your respirators so they will be protected against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals.
4. Make sure the filters are approved for protection against your particular exposure(s). (This information can be found on the box the filter comes in.)

HOW YOU CAN PREVENT HEALTH HAZARDS

PROTECTIVE CLOTHES, GLOVES, FACE SHIELDS, AND CREAMS

Protective clothes, gloves, face shields, and creams may be necessary to prevent skin contact with cutting and lubricating chemicals and certain metallic dusts.



EAR PLUGS AND MUFFS

Ear plugs or muffs must be properly fitted and worn in areas where you are exposed to excessive noise levels. These devices must be worn until the noise levels are reduced to safe levels.

PADDED MITTENS

May be necessary to prevent hands and fingers from becoming numb while operating vibrating hand grinders, sanders, and polishers.

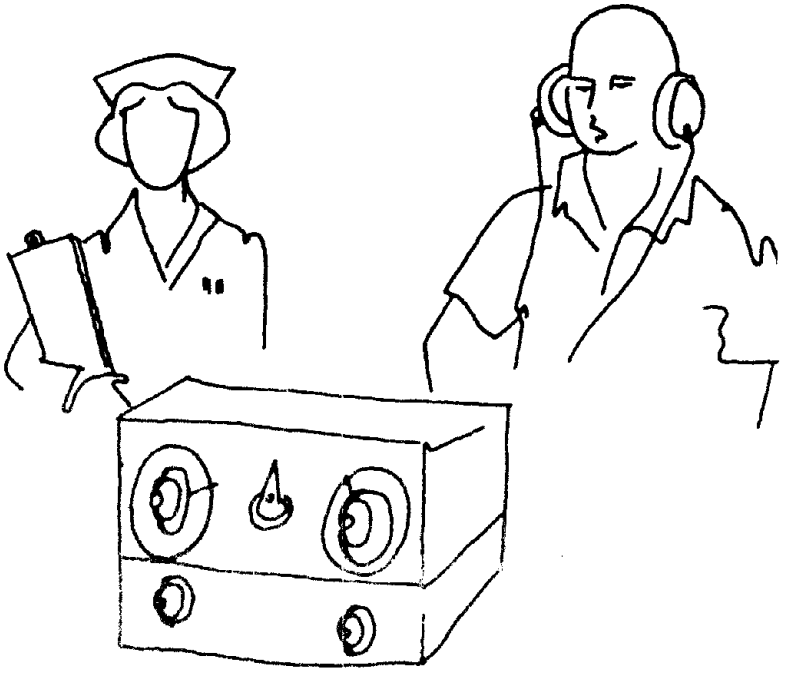
DON'T MISS PERIODIC MEDICAL EXAMINATIONS

These might include:

X-rays taken to determine possible lung injury from breathing dusts and mists.

Urine and blood tests to find out how much harmful material you may have breathed or swallowed.

Hearing tests to see if you have a hearing loss.

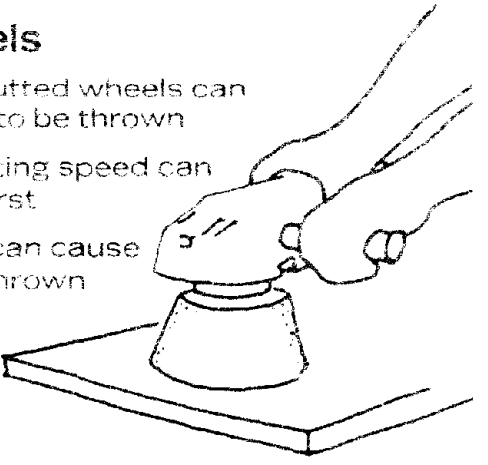


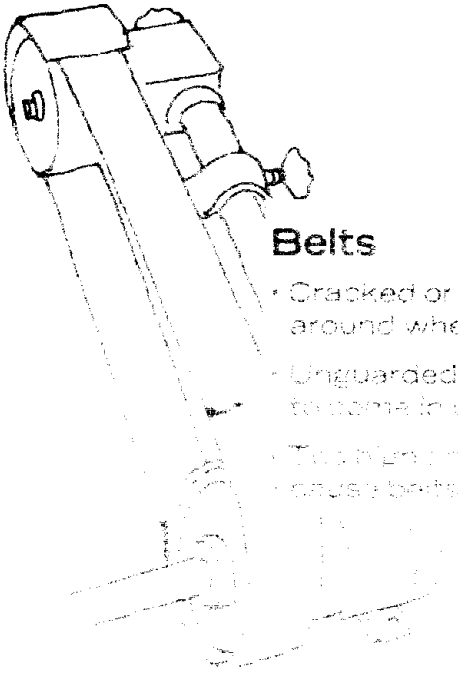
SAFETY HAZARDS — HOW THEY CAN INJURE YOU

EQUIPMENT HAZARDS

Grinding Wheels

- Unbalanced and rutted wheels can cause work piece to be thrown
- Too high an operating speed can cause wheel to burst
- Worn center hole can cause work piece to be thrown



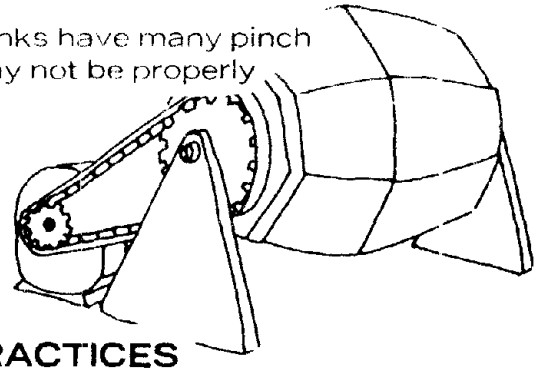


Belts

- Cracked or torn belts can whip around when broken
- Unguarded belts can allow you to come in contact with the belt
- [illegible] operating speed can cause belts to break

Barrels and Vibratory Tanks

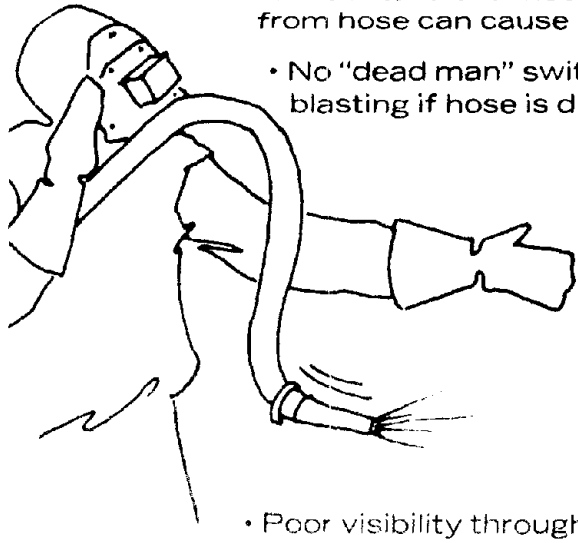
- Barrels and tanks can be accidentally turned on during loading unless they have a lockout device
- Barrels and tanks have many pinch points that may not be properly guarded



UNSAFE PRACTICES

ABRASIVE BLASTING

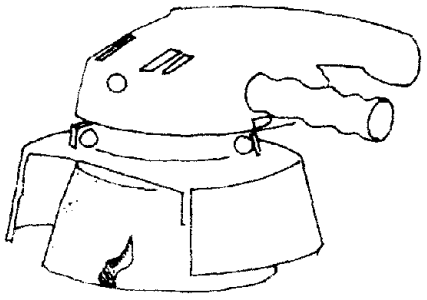
- Accidental disconnection of nozzle from hose can cause hose to whip
- No "dead man" switch to turn off blasting if hose is dropped



- Poor visibility through blasting helmet window due to dirty or scratched glass
- Excessive wear of hose can cause hose to break

UNSAFE PRACTICES

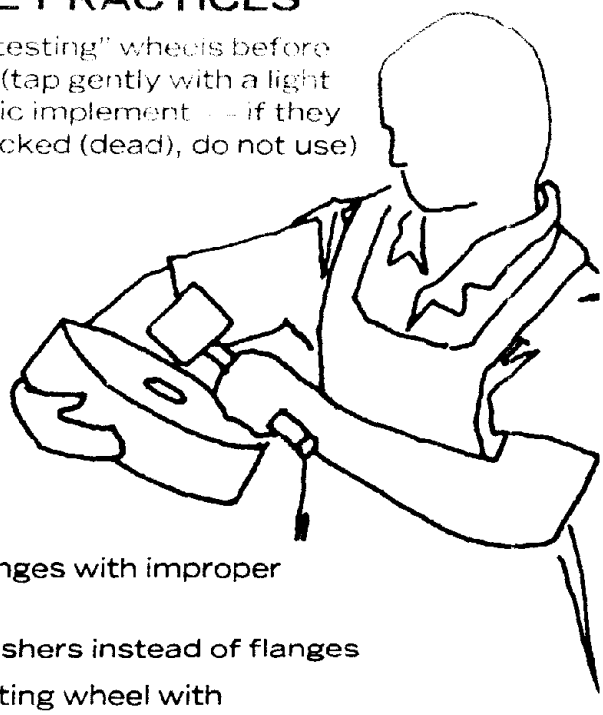
- Holding the work piece or equipment incorrectly
- Using the wrong type of wheel or belt
- Wearing contact lenses in the work area
- Not wearing protective equipment
- Not inspecting equipment before use
- Taking too large a cut
- Horseplay
- Not properly dressing wheels
- Using a cracked or chipped wheel



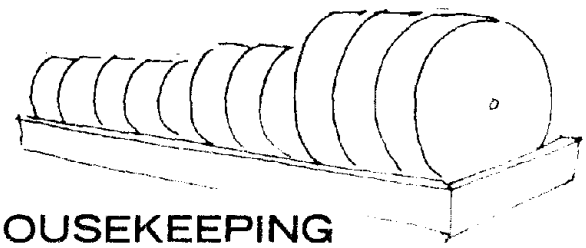
- Poorly clamping work piece
- Not holding manual equipment with two hands
- Using portable electric grinders that are not effectively grounded or double-insulated
- Using work rests on bench or pedestal grinders that are not properly adjusted to within 1/8" of the grinding wheel

UNSAFE PRACTICES

- Not "ring-testing" wheels before mounting (tap gently with a light nonmetallic implement – if they sound cracked (dead), do not use)



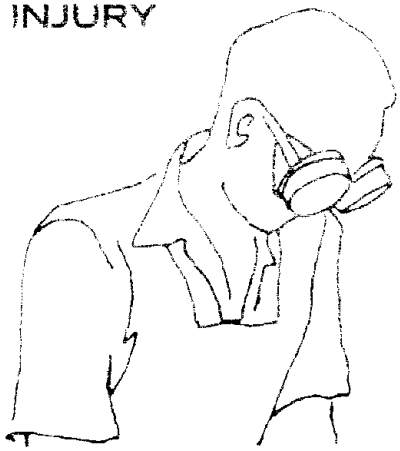
- Use of flanges with improper diameter
- Use of washers instead of flanges
- Not mounting wheel with blotters next to flange



POOR HOUSEKEEPING

- Slippery areas near wet grinders
- Tripping hazards from hoses and cords
- Placing dust collection bags near an ignition source
- Improperly storing wheels and belts causing accidental breaking of wheels and kinking of belts

HOW YOU CAN PREVENT INJURY



HOW YOU CAN PREVENT INJURY

- Be aware of "Equipment Hazards"
- Watch out for "Unsafe Practices"
- Prevent "Poor Housekeeping"
- Use Protective Equipment such as:

—eye protection—for protection against flying abrasives or metals, goggles or safety glasses should be worn.

—hand, foot, arm, and leg protection.

—heavy canvas gloves for holding work piece on wheel.

—canvas apron or blasting suit when working in blasting rooms.

—safety shoes where heavy materials are handled.

EMERGENCY PROCEDURES

NOTE:

You should know where emergency phone numbers are posted and the location of emergency equipment and supplies.

ACTIONS YOU CAN TAKE IN THE EVENT OF:

Skin Injury

Cuts, scrapes, and burns may result from metal filings and sparks in grinding, sanding, and blasting. You should get medical assistance and in the meantime . . .

1. Wash with mild soap and water all cuts and scrapes.
2. Completely cleanse metal dust from the skin.
3. Cover cuts, scrapes, abrasions, and any embedded slivers with a dry sterile dressing. Do not remove any slivers.
4. Immerse mild burns in cold water to relieve pain.

Eye Injury

Get medical assistance and in the meantime . . .

1. Don't rub the eye.
2. Flush the eye thoroughly with running water for at least 15 minutes.
3. Do not use boric acid ointments or any other chemicals in the eyes; they may increase the extent of the injury.
4. Do not remove any slivers, filings, or dust from the eyes yourself—get medical aid.
5. Apply a dry protective dressing.

EMERGENCY PROCEDURES

Breathing – Hazardous Materials

1. If you find the air you are breathing is irritating to your nose, throat, or lungs, seek fresh air and report the condition to your supervisor.
2. Don't forget your periodic physical exams and be aware of various signs and symptoms that can result from prolonged exposure to silica dust. For example, difficulty in breathing, chest soreness, coughing, and occasional slight fever.
3. Prolonged inhalation of oil mists from cutting fluids may cause nose and throat irritation, and extended exposures might lead to lung disease. Report any symptoms to your supervisor.
4. If a co-worker is overcome by carbon monoxide or other fumes, remove him promptly to fresh air. If breathing has stopped, start artificial respiration immediately. Oxygen should be given only by a qualified person.

Swallowing – Hazardous Materials

1. Immediate illnesses from swallowing silica and metal dusts and oil mists are extremely rare; however, long exposures to some metal dusts can lead to serious diseases.
2. Be aware of signs and symptoms that may result from swallowing of metal dust. For example, loss of appetite, headache, occasional dizziness, or constipation.

WHO TO CONTACT FOR HELP

If you feel hazardous conditions exist in your workplace . . .

First—report the conditions that you feel are hazardous to your supervisor.

If you are unsuccessful in getting the conditions corrected, contact your union steward (if a union shop).

Last, if all attempts for corrective action within the organization fail, contact OSHA.