

# PREVENTING HAND INJURIES



# How important are your hands?

The hand is one of the most complex parts of your body - the movement of the tendons, bones, tissues and nerves allows you to grip and do a wide variety of complex jobs

Without your hands it would be extremely difficult to do routine simple tasks, such as opening doors, using a fork, or tying your shoes

Your hands make you a skilled, valuable worker

The improper use or misuse of hand tools cause minor to serious hand injuries

Hand injuries are likely when the wrong tool is used or the right tool is used improperly

# How Important Are Hands?

## Practical Exercise

1. Tuck your thumbs into the palms of your hands
2. Now tie your shoes

It's not so easy is it?

# Hand Injuries

- Hand injuries can be associated with working with machinery or equipment
- The materials being used or the job process might be hazardous
- Hand tools or powered hand tools may be faulty or improperly used

# Hand Injuries

The most common causes of hand injuries are:

- Carelessness
- Lack of awareness
- Boredom
- Disregard for safety procedures
- Distractions

# Hand Injuries

- Hand injuries are difficult to repair because of the complexity of the hand
- After a hand injury, the hand may not function as it did before the injury due to loss of:
  - Motion
  - Dexterity
  - Grip
  - Ability to complete the simplest of tasks

# Hand Injuries

To avoid hand injuries:

- Know the hazards and dangers in the job to be done
- Be aware of pinch points
- Be aware of hot areas
- Be aware of rotating or moving surfaces
- Automated machinery may be controlled by remote control, or delayed timing devices that cause the machine to start automatically
- Loose clothing and jewelry may be caught up in moving machinery
- Never remove machine safeguards or operate machinery with safeguards removed

# Injury Statistics

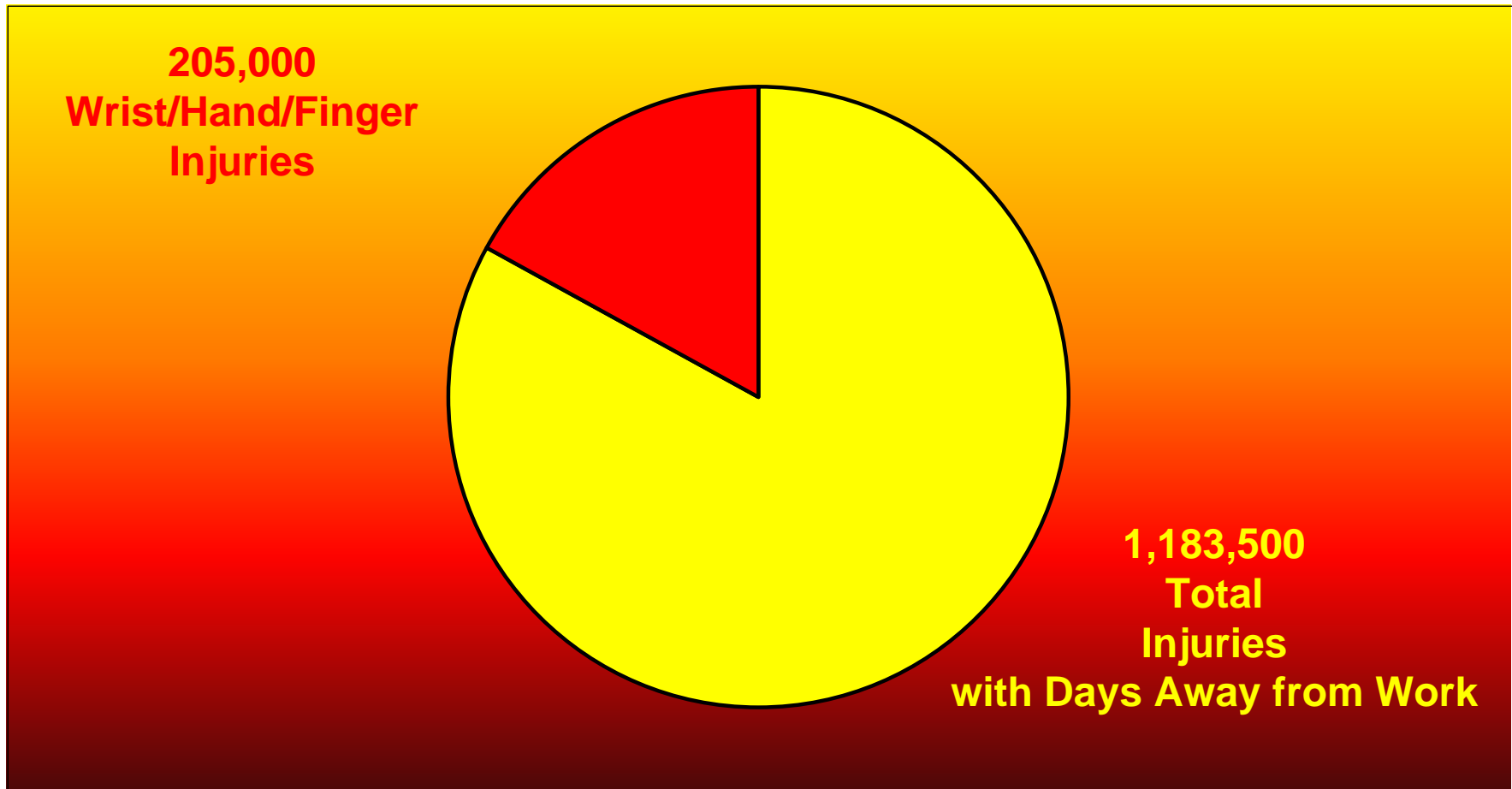
(Bureau of Labor Statistics 2006)

- Nearly 205,000 injuries and illnesses to the wrists/hands/fingers involving days away from work in 2006– 27% of the total for that year.
- Incidence rate/10,000 full-time workers:
  - All private industry = 29.6
  - Manufacturing = 65.6
  - Construction = 71.4



# Injury Statistics

(Bureau of Labor Statistics 2006)



# Hand Protection

Addressed in OSHA Regulation  
29 CFR 1910.138 – Hand protection



## 29 CFR 1910.138

- States that employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as:
  - Skin absorption of harmful substances
  - Severe cuts or lacerations
  - Severe abrasions
  - Punctures
  - Chemical burns
  - Thermal burns
  - Harmful temperature extremes

# Other OSHA Regulations Related to Hand Safety

- Hand and Portable Powered Tools and Equipment (29 CFR 1910.242)



- Control of Hazardous Energy – Lockout/ Tagout (29 CFR 1910.147)



- Machinery and Machine Guarding (29 CFR 1910 Subpart O)



# Hand Hazards



Bee stings



Chemicals



Punctures



Blood-borne pathogen



Insect bites



Rotating equipment



Extreme temperatures



Pinch points



Cuts

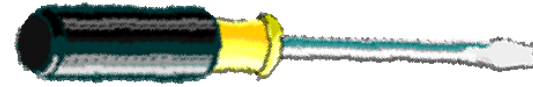


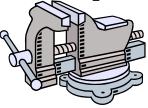
Vibrating equipment

# Lines of Defense

- Awareness of Hazards and Prevention Measures
- Personal Protective Equipment (PPE)
- Good Hygiene and First Aid

# Screwdrivers



- When using screwdrivers, place the object on a flat surface or in a  Don't hold it in your hand!
- Don't use screwdrivers as chisels or pry bars
- Use the correct size driver for the screw
- Don't use screwdrivers with chipped tips

# Knives

- Use safety knives whenever possible
- Keep knife blades sharp
- Cut away from your body
- Do not use knife blades as screwdrivers
- Avoid working on the same object when a co-worker is using a knife



Safety Knives





# Hammers



- Never use a hammer with a splintered, cracked, or loose handle
- Don't use hammers with rounded striking faces
- Use the correct hammer for the job
- Don't strike a hammer face with another hammer
- Don't use nail hammer claws as a pry bar





# Hand Saws



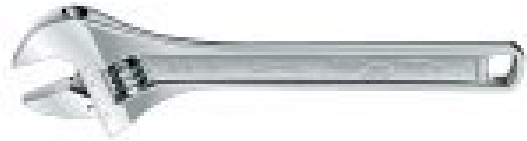
- Use moderate pressure on hack saws to prevent blade failure
- Spray saw blades lightly with lubricant prior to use
- Keep blades sharp

# Chisels

- When possible use a safety chisel
- Don't use chisels with mushroomed heads
- Use the correct chisel for the job
- Don't use chisels as pry bars



Safety chisel



# Wrenches

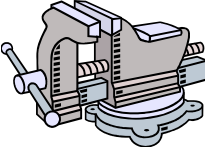


- Use the correct sized wrench for the job
- Don't use pliers with worn grooves or crescent wrenches with worn or sprung jaws
- Don't use pliers or crescent wrenches on over-tight bolts and nuts
- Pull on wrenches rather than pushing them
- Never use a cheater bar on a wrench





# Portable Power Tools

- Disconnect power tools when not in use and before changing bits, blades, and other accessories
- If a power tool binds **STOP!** and reassess the job
- Wear anti-vibration gloves when using power tools that vibrate excessively
- Never remove guards!
- Ground power tools unless double insulated
- Don't wear gloves if they can get caught on rotating parts
- Secure work in a  or on a bench - Don't hold it in your hand!





# Shop Tools



- Use a push stick to cut small pieces
- Unplug or Lockout tools before changing blades
- Keep tools sharp
- Never remove guards
- Use a drill press vise when drilling – Don't hold parts with your hands!



Drill press vise

# Bench Grinders

- Don't wear gloves when operating bench grinders
- Never remove guards!
- Maintain proper clearances on tool rests and tongue guards
- Use vice grips when grinding small parts

Maintain tongue guard  
within  
 $\frac{1}{4}$ " of the wheel



Maintain tool rest  
within  
 $\frac{1}{8}$ " of the wheel

Don't use grinders on aluminum unless the wheel is specifically intended for use with aluminum!

# Extreme Temperatures

- Use tongs or high-temperature gloves to handle hot or cold parts and equipment







# Bites and Stings



- Use caution when moving debris piles or equipment which has been sitting for a long time
- Don't stick your hands in holes, crevasses and other secluded places, including work boots which have been sitting for awhile
- Avoid areas where insects nest or congregate (garbage cans, stagnant pools of water, uncovered foods and areas where flowers are blooming)
- Avoid dressing in clothing with bright colors
- Don't use scented soaps, perfumes or hair sprays



Brown Recluse



# Sharps Disposal



Never dispose of used razor blades, broken glass, or other sharp objects in regular trash cans! Keep a metal can specifically for disposal of sharp objects.

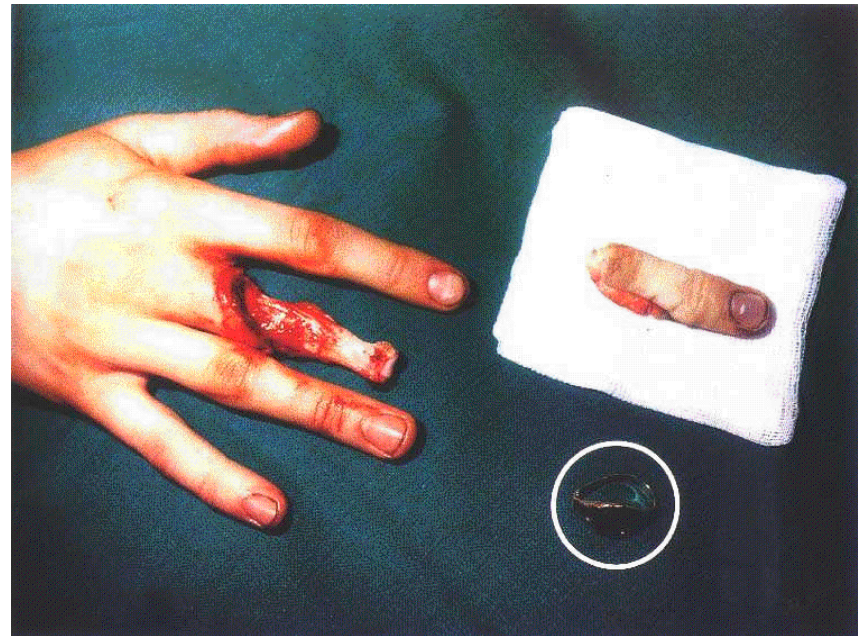
# Equipment Handling



- Use tag lines
- Wear leather gloves
- Never place your hand on top of the load or between the load and a fixed object
- Inspect hooks and chain slings before use
- Never hang load from the hook tip, unless it is designed for that

# Jewelry

- Remove jewelry before using power tools or working on machines
- Keep sleeves buttoned



# PPE - Many Gloves for Different Applications



**Natural Rubber**



**Polyvinyl Alcohol (PVC)**



**Nitrile**



**Neoprene**



**Polyvinyl Chloride (PVC)**



**Cotton**



**Wire mesh**



**Kevlar**



**Welding**



**Leather**



**Anti-vibration**

# Which Glove is Best?

Glove	Uses
Cotton	Light duty material handling and cleanup work
Leather	Equipment handling, general construction, heavy cleanup, welding, moderately hot or cold material handling
Shock absorbing	Operating rotary hammers and other vibrating equipment
Kevlar or Wire mesh	Work with sheet metal, glass, or heavy cutting <b>These gloves Do Not provide puncture protection</b>
Rubber, nitrile, neoprene, PVC, PVA and other synthetics	Chemical gloves must be chosen for the specific chemical being used
Insulated	Extreme high and low temperatures

# Chemical Glove Selection



# General Guidelines for Select Chemical Resistant Glove Materials

Glove material	Generally resistant to:
Viton	Chlorinated and aromatic solvents
Butyl rubber	Aldehydes, ketones, and esters
Neoprene	Solvents, acids, caustics, and alcohols
Natural rubber (Latex)	Acids and caustics
Polyvinyl chloride	Acids, but not solvents

Consult your Safety Department and Manufacturer data for specific applications!



# How Chemicals Get In!

- Permeation - Diffusion of a chemical through a material on a molecular basis
- Penetration – Chemical enters through zippers, punctures, or seams
- Degradation – Chemical causes a change in the physical properties of the material

# Not all Chemical Gloves are Created Equal!

I Chemical	Glove Material								
	Butyl Rubber	Natural Rubber	Neoprene	Nitrile	Polyvinyl Alcohol	Polyvinyl Chloride			
Benzene	Red	Red	Red	Red	Blue	Red			
Diesel	Red	Red	White	Blue	White	White			
Gasoline, unleaded	Red	Red	Red	Green	Green	Red			
Kerosene	Red	Red	Green	Blue	Green	Green			
Hydrochloric Acid (37%)	Blue	Green	Green	Green	Red	Green			
Sulfuric Acid (30-70%)	Blue	Blue	Blue	Yellow	Red	Blue			
Not Recommended		Caution (1-4 hours)		Recommended (>4 hours)		Recommended (>8 hours)		Not Tested	

Table adapted from: Forsberg, K. & Mansdorf, S.Z. Quick Selection Guide to Chemical Protective Clothing. 2<sup>nd</sup> Ed. Van Nostrand Reinhold, NY, NY

# Chemical Glove Selection Exercise

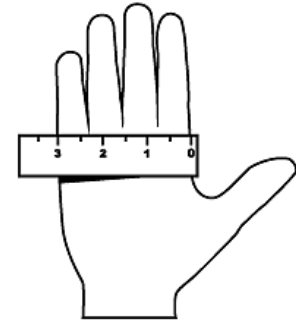
From the previous slide, select a glove for the following situations

- A glove that provide good protection for benzene
- What chemicals is a butyl rubber glove good for?
- Glove(s) that would be good choices for diesel, gasoline, and kerosene

# Glove Care

- Inspect gloves before use for tears, excessive wear, and punctures
- Store in a clean, dry location
- Discard leather and cloth gloves if they become saturated with oil or other chemicals
- Leak test chemical gloves by sealing the wrist and filling the glove with air
  - Use a clean plastic tube or low pressure air line – not your mouth!

# Glove Sizing



With a ruler, start at index finger and measure the width of your hand in the knuckle area

Distance	Size	
2 to 2½"	6	X Small
2½ to 3"	7	Small
3 to 3½"	8	Medium
3½ to 4"	9	Large
4 to 4½"	10	X Large
4½ to 5"	11	XX Large

# Hand Care

- Avoid washing your hands with solvents, harsh soaps, or abrasives
- Clean and bandage all cuts and abrasions
- Immediately remove any imbedded foreign materials
- Wash immediately after using any chemical – Even if you did not detect leakage
- Pay attention to skin rashes—get an immediate medical evaluation
- Wear cotton gloves under rubber gloves to reduce sweating

# Types of Injuries

- Cuts, fractures, punctures and amputations
  - Cuts or lacerations – May sever nerves, tendons or muscle or become infected
  - Fractures can damage nearby tissue and be difficult to repair
- Dermatitis and burns are caused by direct contact with chemicals, detergents, metals, or very hot or cold objects
  - Dermatitis may show up immediately after contact with a chemical causing the skin to become red, swollen, itchy, or burning, and may develop blisters
  - Dermatitis may develop after several contacts with chemicals known as sensitizers - Nothing happens initially, later contacts with the chemical produce an allergic reaction
- Carpal tunnel syndrome results from prolonged repetitive work with the hands - This condition can be disabling and can have a variety of temporary symptoms like swelling, tingling, numbness, and pain in the hands or fingers

# First Aid

- Cuts: Apply direct pressure to a large or bleeding cut and elevate the hand above the shoulder - Clean a small cut with soap and warm water and cover it with a sterile bandage
- Burns: Immerse in cool water or run cool water over the burned area
- Broken bones: Keep the hand still and get professional help
- Amputations: Apply pressure to the injured area immediately - Preserve the amputated part in a plastic bag and put it in ice water or ice, but Do Not allow the amputated part to come in contact with the ice!
- Sprains: Apply cold compresses to reduce pain and swelling
- Chemical burns: Rinse with running water for at least 15 minutes
- Heat burns: Soak minor burns in cold water, then apply a sterile bandage - A burn that is charred or blistered requires medical attention



# Hand Exercises

- *Doing a few simple exercises before work and between tasks will build hand strength and provide a rest from repetitive motions*
- Exercises:
  - Stretch fingers by spreading them wide apart for a few seconds (Repeat 3 times with each hand)
  - Stretch your thumb by holding it down gently for five seconds (Repeat 3 times with each hand)
  - Stretch your wrist by making circles with your hands (Repeat 10 times for each hand)

# This could be you!



ADAM.

# So watch out!!!