

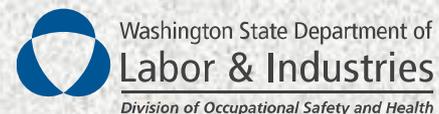
KEEPING IRONWORKERS HEALTHY: *ERGONOMICS AND WMSDs*



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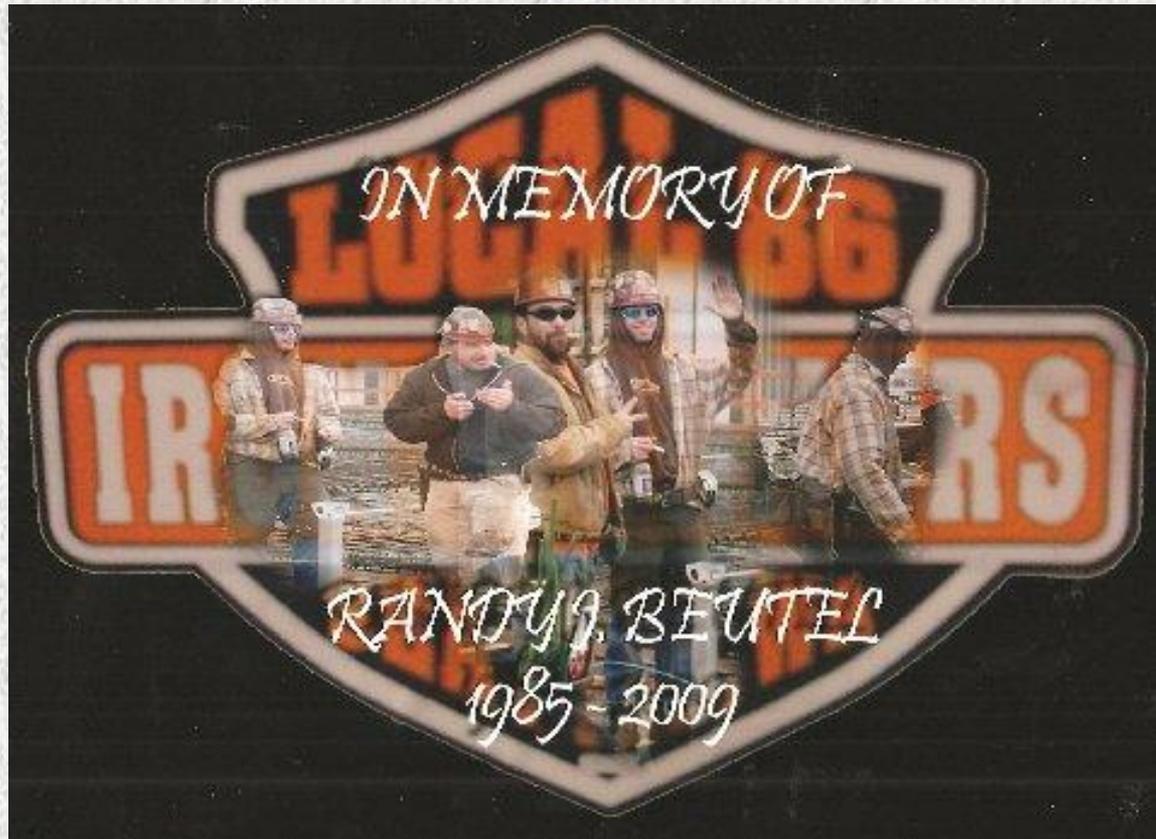


With
assistance
from:



WMSDs are preventable!

**This training is dedicated to
the memory of**



GOALS OF THIS CLASS

- **You will understand:**
 - What WMSDs are and
 - How they develop
- **You will recognize:**
 - WMSD hazards in Ironwork
 - The impact that WMSDs can have on your life



- *You will be able to:*
 - ✓ **Reduce your risk of developing WMSDs**

WMSDs

Some hazards in the workplace can lead to:

- Overexertion
- Strains and Sprains
- Repetitive Motion and Vibration Injuries

which are also called...

Work-related Musculoskeletal Disorders

or

WMSDs



WMSDs

WMSDs are occupational disorders of the soft tissues such as:

- muscles
- tendons
- ligaments
- joints
- blood vessels
- nerves

Tennis/Golfer's Elbow
(Epicondylitis)

Carpal Tunnel
Syndrome

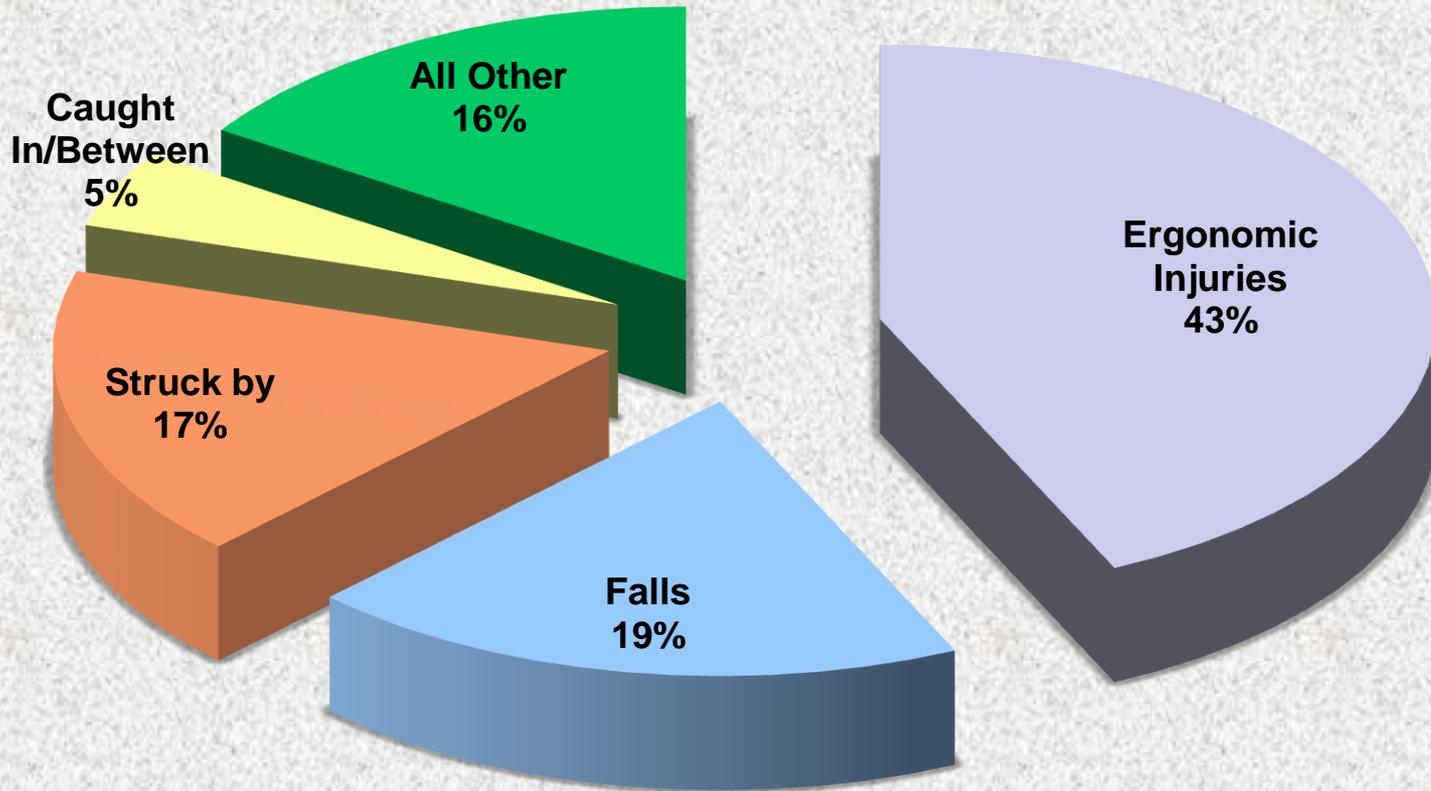
Pitcher's Shoulder
(Rotator Cuff
Tendinitis) Bursitis

Low Back Pain

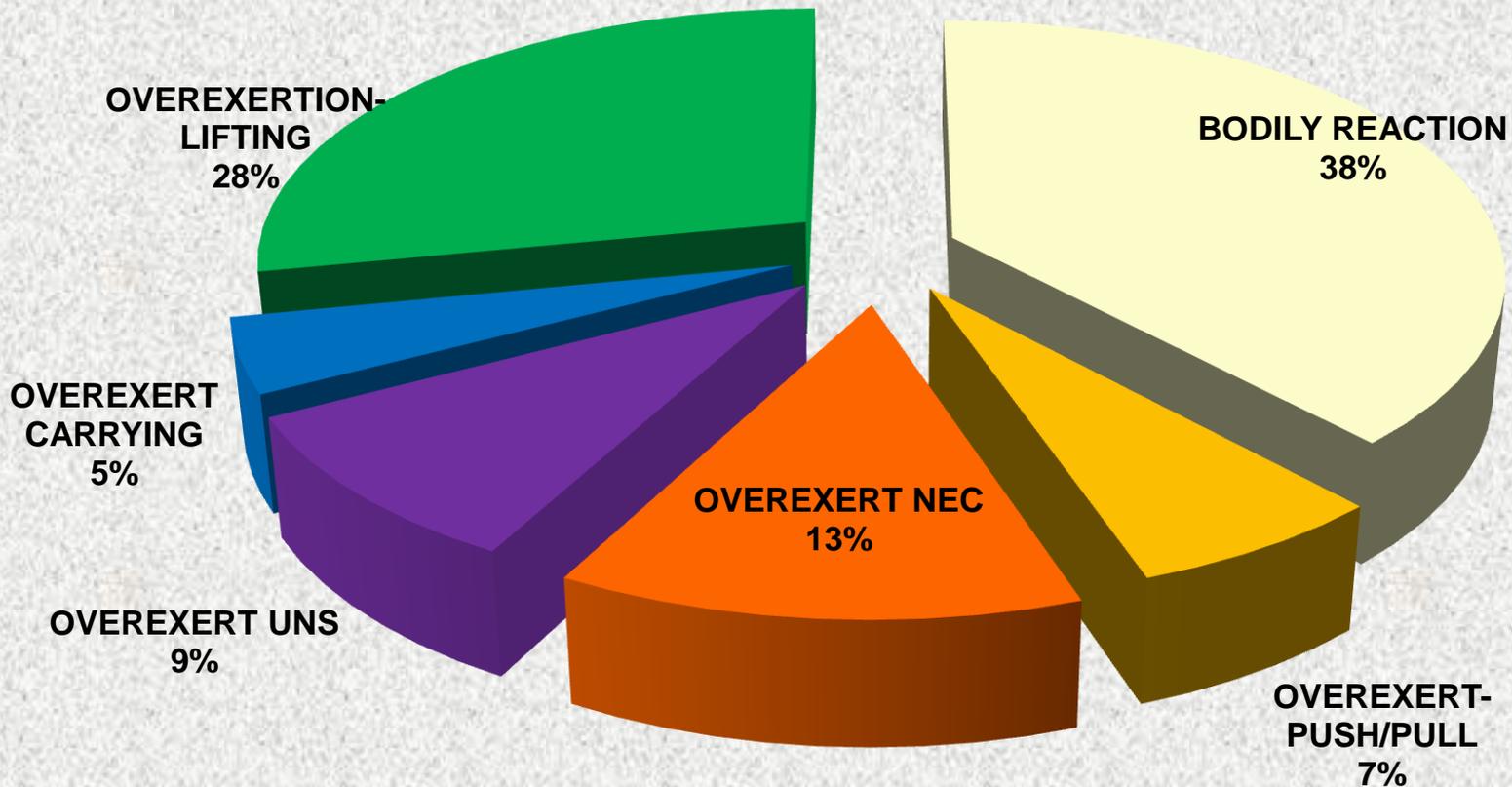
Carpet Layer's
Knee (Bursitis)



IRON WORKERS INJURIES 2006 - 2008

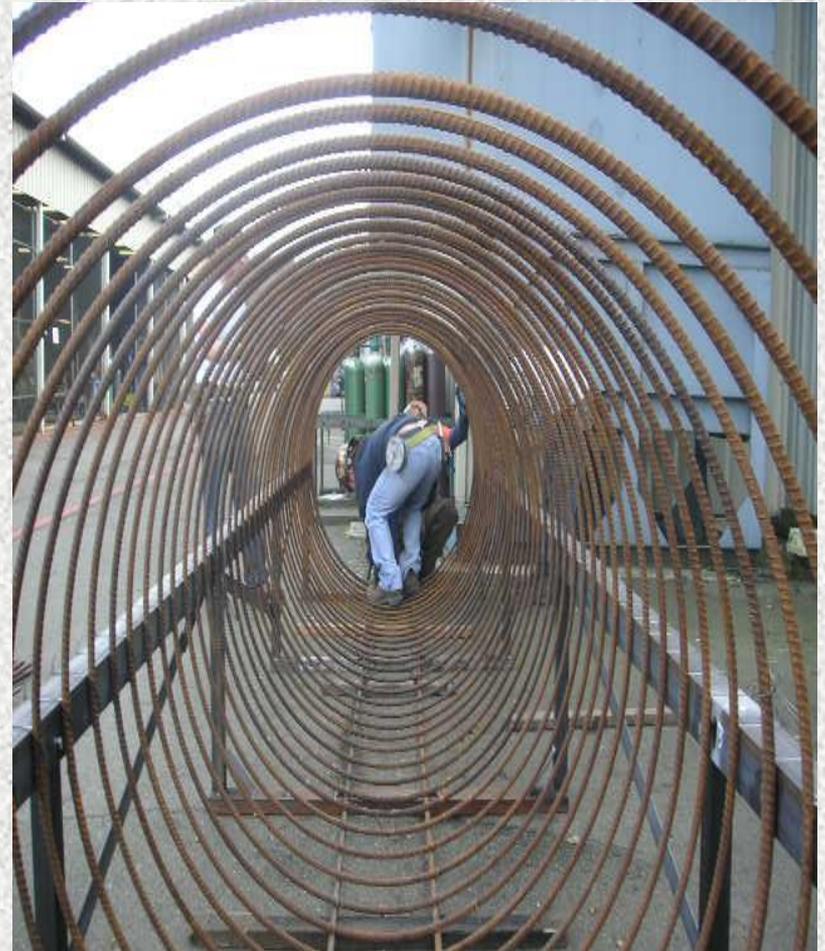


IRONWORKERS ERGONOMIC INJURIES 2006 - 2008



WHAT YOU NEED TO KNOW AND DO TO LAST IN THIS PROFESSION

- Proper body mechanics for iron work
- The importance of your own fitness
- How working as team improves your safety
- Knowing your physical limits

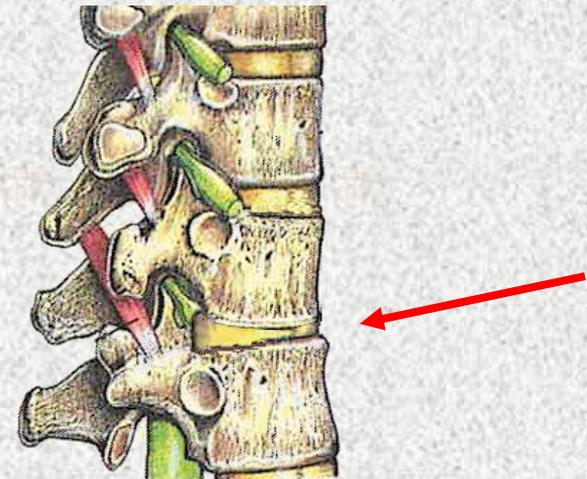
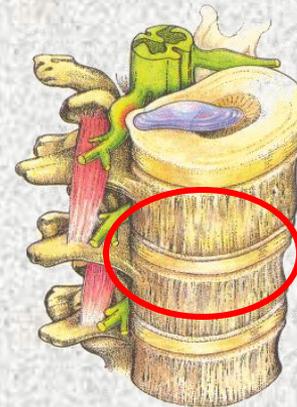
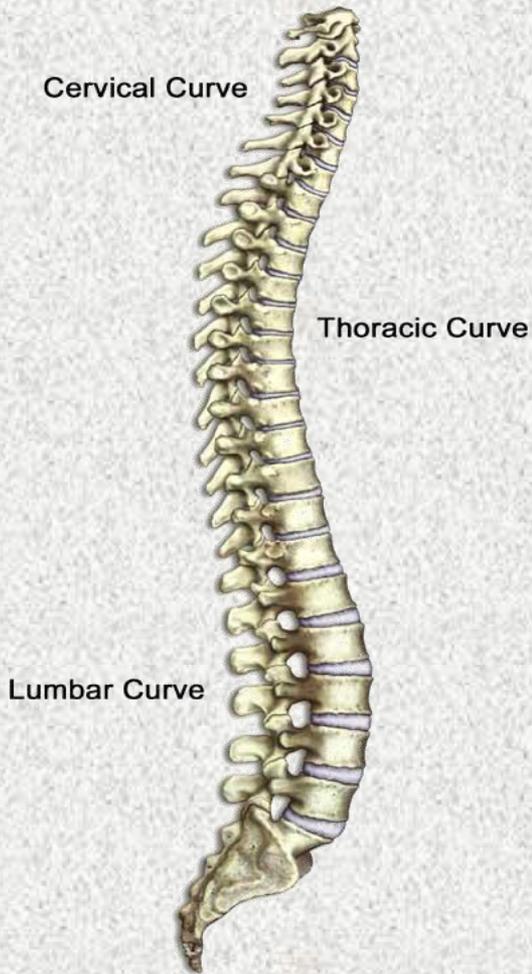


TESTIMONIALS

BY PEOPLE WHO HAVE HAD TO LEAVE THE PROFESSION DUE TO SERIOUS INJURY (WMSD)



THIS IS THE MOST *USED AND ABUSED* TOOL YOU HAVE



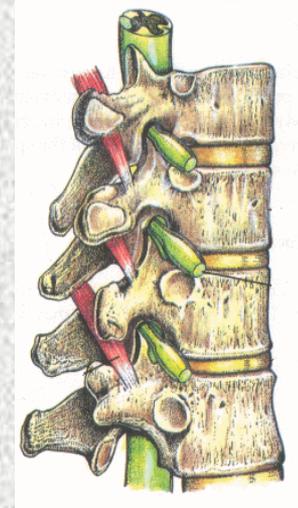
FORCES ON THE SPINE



Shear

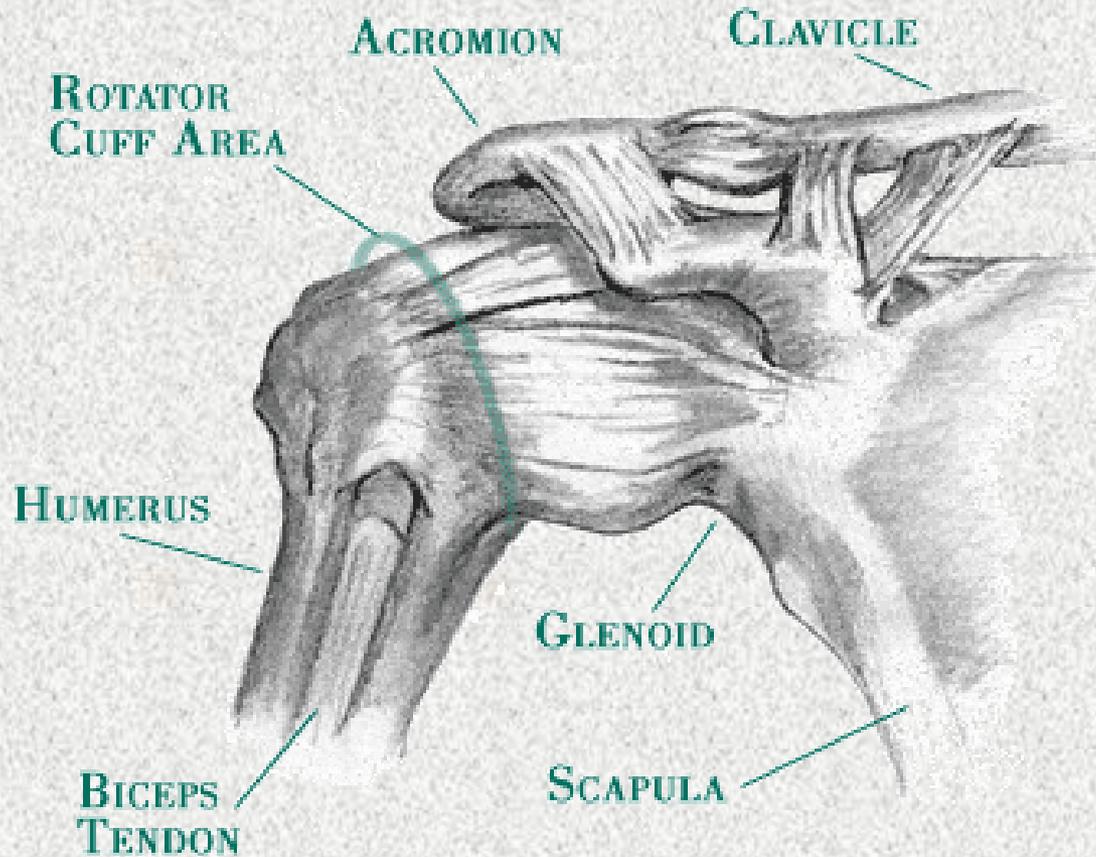


Torque
(twisting)



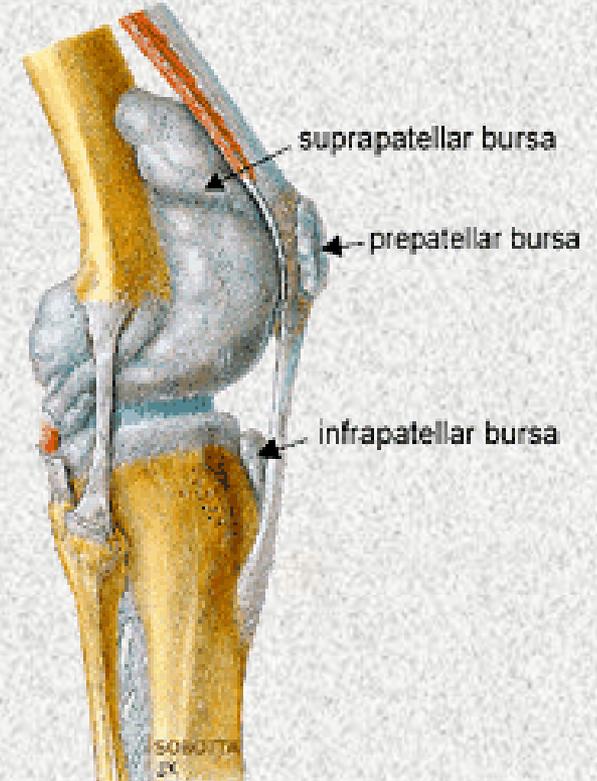
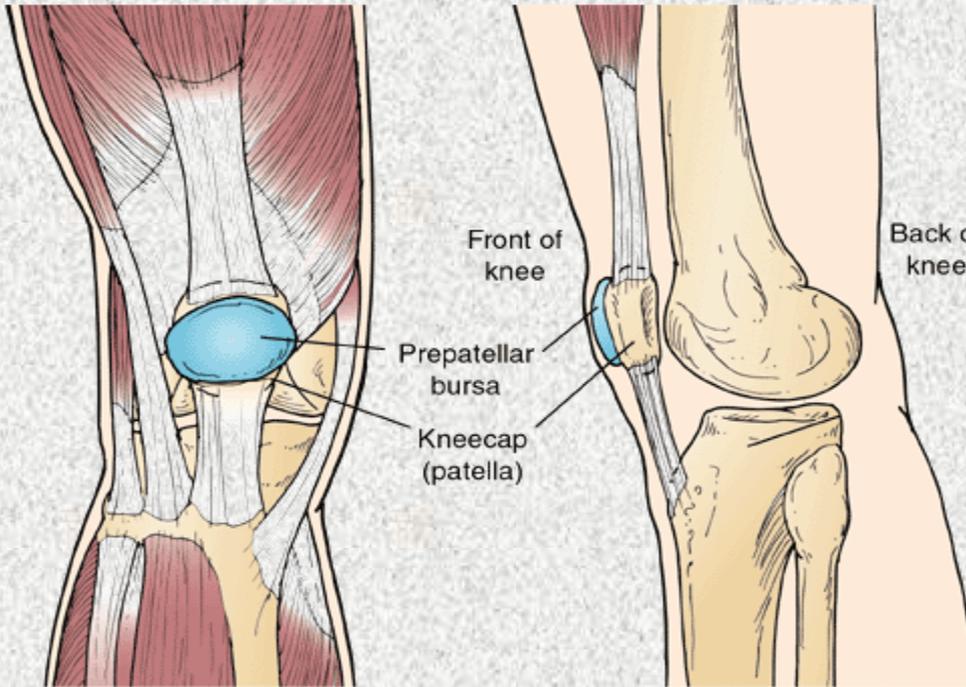
Compression

THIS IS THE SECOND MOST ABUSED TOOL YOU HAVE



THIS ONE TAKES A LOT OF ABUSE, TOO

Prepatellar Bursa



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THE **BIG THREE** RISK FACTORS

- **Awkward Posture**

- Kneeling
- Squatting
- Neck bending > 30°
- Back bending > 30°
- Wrist bending
- Hands above head
- Elbows above shoulders

- **High Force**

- Gripping
- Pinching

- **High Repetition**

- Driving pins with beater
- Driving pins with 90 (Rivet gun)
- Driving screws
- Drilling
- Grinding
- Shooting studs
- Tying rebar

EXPOSURE TO RISK FACTORS

Risk of injury depends upon:

❖ **Duration** of exposure

(how **long**)

❖ **Frequency** of exposure

(how **often often**
often)

❖ **Intensity** of exposure

(how **MUCH**)

❖ **Combinations** of risk factors

+ **+** **+**

AWKWARD POSTURES

Kneeling



Neck or back bent forward

HIGH FORCE: THREADING & TIEING



HIGH FORCE: WELDING



AWKWARD POSTURE AND HIGH FORCE



WMSDs are preventable!

AWKWARD POSTURE AND HIGH FORCE



Shoulder and elbow fully extended



Cramped spaces

WMSDs are preventable!

HIGH FORCE AND HIGH VIBRATION



Work involving power hand tools often combines several WMSD risk factors, including vibration, force, posture, contact stress, and repetitive motion

WMSDs are preventable!

HIGH HAND & ARM VIBRATION



WMSDs are preventable!

HIGH REPETITION



THE **BIG THREE** RISK FACTOR REVIEW

- **Awkward Posture**

- Kneeling
- Squatting
- Neck posture
- Back Posture
- Wrist Posture
- Hands above head
- Elbows above shoulders

- **High Force**

- Gripping
- Pinching

- **High Repetition**

- Driving Pins with beater
- Driving pins with 90 (rivet gun)
- Driving screws
- Drilling
- Grinding
- Shooting studs
- Tying rebar

LIFTING

- HEAVY LIFTING
- FREQUENT LIFTING
- AWKWARD LIFTING



LIFTING IS REALLY CUMULATIVE TRAUMA

From the time you begin lifting and moving materials as a child (making forts, building snowmen, carrying puppies around, wearing backpacks to school), you are building up wear and tear on your back.

Then, each time you

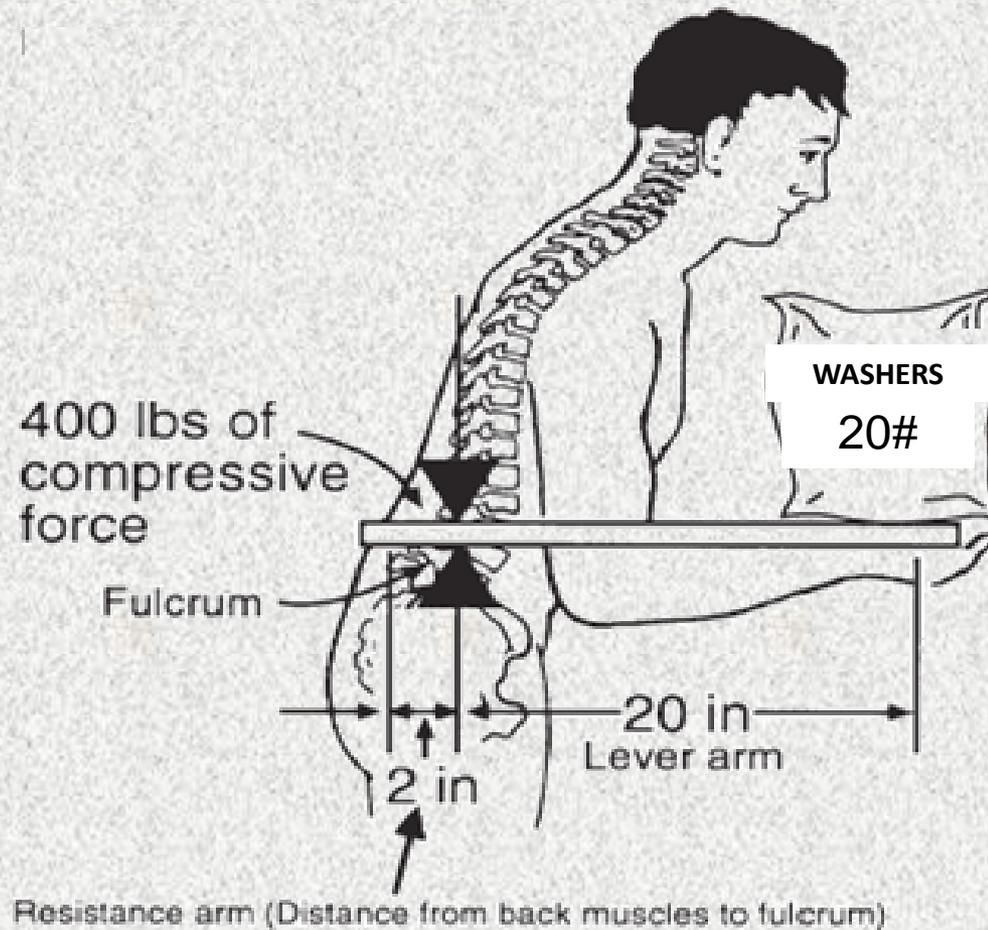
- bend to lift a bundle of rods or spool of welding wire,
- bend and twist,
- help your neighbors move their piano

you provide trauma to the back --
and *it adds up over time*



Rod work at Miller Brewing Block House, circa 1950

BIOMECHANICS OF LIFTING



HEAVY LIFTING

- Iron and rebar and decking – all the materials of iron work are heavy and the forces generated in working with them are significant.



FREQUENT LIFTING

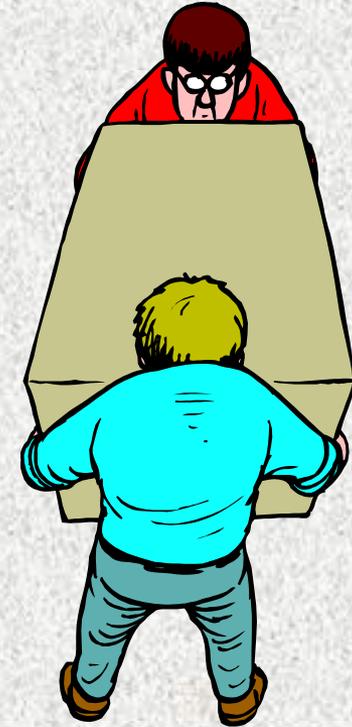


HEAVY LIFTING: USING TOOLS AND EQUIPMENT



BETTER LIFTING

- Use wheels
- Lighten the load
- Provide handles and change shapes (so the load can be carried close to the body)
- Move things closer to you



- Share the load

MOVING MATERIALS: HOW

- *Plan the lift*

- **Do I need to lift it?**
- Can I use a cart or machine to move it?
- How much am I lifting?
- Where is it going?
- What is in the way?
- What is the surface like between me and my destination

- *Get as close to the load as possible*

- Objects put more load on your back the farther they get from your spine

- *Face the load*

- *Bend your knees whenever possible*

- *Avoid twisting your back*



Ask for help if the load is too heavy or bulky.

The size and shape of what you lift can be as important as the weight of the object

After heavy lifting, take a mini-break. Pause a few seconds to straighten your back and s t r e t c h.

LIFTING AND MOVING MATERIALS REVIEW

Planning A Lift:

Do I need to lift it?

Can I use a cart or machine to move it?

Do I need help to lift it safely?

How much am I lifting?

Where is it going?

What is in the way?

What is the surface like between where I am and where I'm going?

Moving Materials:

Reach for the load by bending, reaching, or squatting

Lift the load

Transfer the weight of the load to a carrying position

Carry the load to the needed location

Deposit the load by lowering it to the ground, throwing it, or handing it to another iron worker

AWKWARD POSTURES

- Postures that strain the neck, shoulders, elbows, wrists, hands, or back.
- Bending, stooping, twisting, and reaching, are examples of awkward postures.



AWKWARD POSITION TASKS

PULLING





AWKWARD POSTURES



KNEELING

SQUATTING



AWKWARD POSTURES: Climbing and Clinging



AWKWARD POSTURES



WMSDs are preventable!

AWKWARD POSTURES



AWKWARD POSTURES

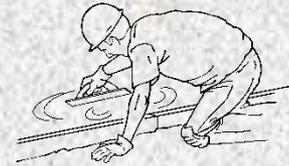


WMSDs are preventable!

REVIEW: POSITION HAZARDS



Back bending



Kneeling



Wrist Flexion



Extension



Wrist side deviation

WHAT YOU CAN DO

- **PLAN YOUR WORK**

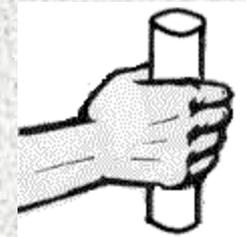
Bring all the tools and materials you will need for the work to your site before you begin



- **CUSTOMIZE YOUR TOOLS**

CONSIDER YOUR ALL YOUR TOOLS

Power Grip: The hand grip that provides maximum hand power for high force tasks. All the fingers wrap around the handle.



Contact Pressure: Pressure on any part of the body from a hard surface, point or edge

Pinch Grip: The hand grip that provides control for precision and accuracy. The tool is gripped between the thumb and fingertips.



Single-handle Tools: Tube-like tools, measured by handle length and diameter.

Double-handle Tools: Plier-like tools, measured by handle length and ***grip span*** (the distance between the thumb and forefinger when the tool jaws are open or closed)



WHAT YOU CAN DO: ROTATE TASKS



Different tasks that can be rotated?

WMSDs are preventable!

WHAT YOU CAN DO: REST WHEN YOU NEED TO



Even a short break can help

WMSDs are preventable!

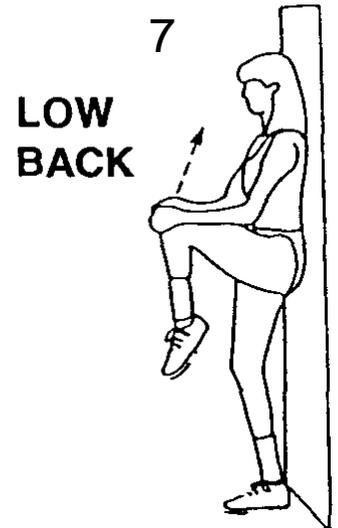
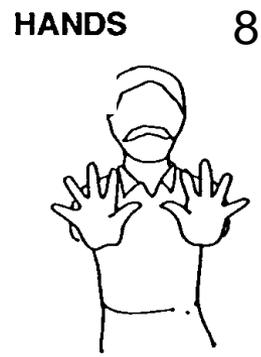
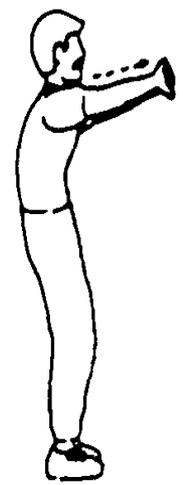
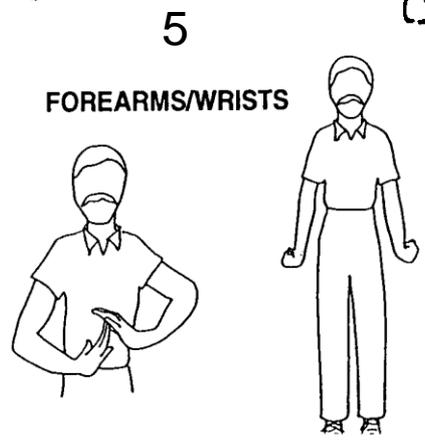
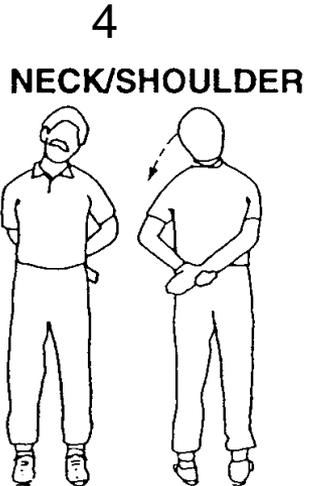
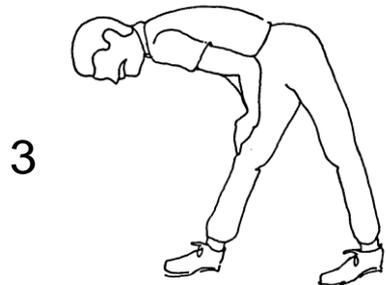
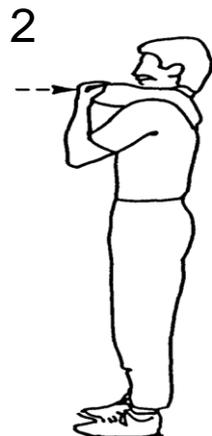
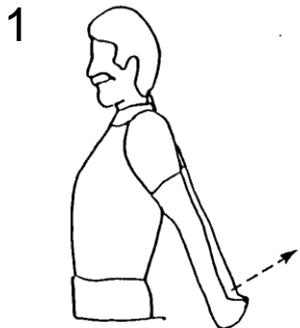
WHAT YOU CAN DO: USE PROPER BODY MECHANICS



TRIPODING

WMSDs are preventable!

WHAT YOU CAN DO: STRETCH!



WHAT YOU CAN DO: *HELP EACH OTHER*



SHARE THE LOAD!

WMSDs are preventable!

WHAT YOU CAN DO: Move your materials to YOU



Materials should be placed where they are conveniently within reach so body movements are natural.

WHAT YOU CAN DO: RAISE YOUR MATERIAL



Simple **support stands** can be used to raise material and equipment from ground level, making lifting and working easier and increasing the weight that can be lifted.

WMSDs are preventable!

PPE

- Boots that fit
 - with insoles
- Well-fitting gloves
- Knee Pads



IMPROVE YOUR PRACTICE



Avoid raising or extending your elbows when working with heavy tools or materials or repetitively.



IMPROVE YOUR PRACTICE

- Avoid reaching more than 15 in. in front of the body for materials.
- Avoid repeatedly reaching above shoulder height, below waist level, or behind the body to minimize shoulder disorders.
- Avoid repetitive work that requires full arm extension (i.e., the elbow held straight and the arm extended).



IMPROVE YOUR PRACTICE

- Avoid bending or rotating your wrist. Try bent-handle tools.
- Avoid tools that use a precision finger grip in favor of a full-hand power grip.
 - *Finger (pinch) grip is 5 times more stressful than power grip.*



YOU MAY HAVE A PROBLEM IF YOU HAVE ANY OF THESE SYMPTOMS:

- Tingling
- Swelling in the joints
- Decreased ability to move limbs and joints
- Decreased grip strength
- Pain from movement, pressure, or exposure to cold or vibration
- Continual muscle fatigue
- Sore muscles
- Numbness (especially when sleeping)
- Change in the skin color of your hands or fingertips