

Ergonomics for Residential Construction

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Purpose

to help you apply ergonomics principles to your everyday activities...

- so you can go home from work without aching
- so you can finish your career without wearing out your body

Ergonomics

- deals with the “fit” between people and their work.
- takes into account capabilities and limitations of people.

Goals of ergonomics

- Prevent WMSDs
- Improve the worker-to-work “fit” so that the work is easier and safer to do.

**WMSDs are work-related musculoskeletal disorders*

WMSDs

Injuries that involve soft tissues such as:

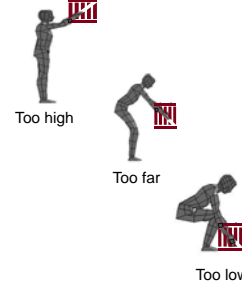
- muscles
- tendons
- ligaments
- joints
- blood vessels and nerves



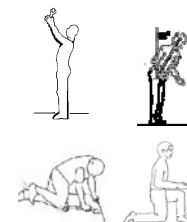
(sprains, strains, pains...)

Risk Factors for WMSDs:

Heavy or awkward lifting



Awkward postures



Higher risk for injury with more than 1 risk factor:



Design jobs to minimize risk factors

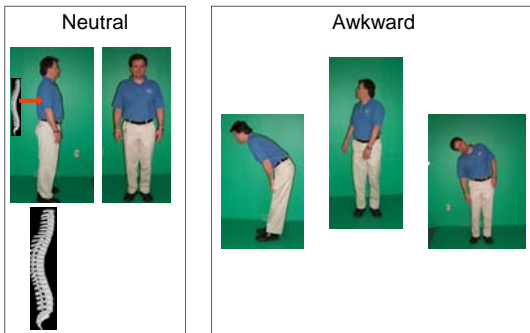
Risk factor exposure

What matters:

- duration – how long?
 - Frequency – how often?
 - intensity or severity (weight, force, posture)
- } Can you decrease any of these?

Try to work in neutral postures:

Back Postures

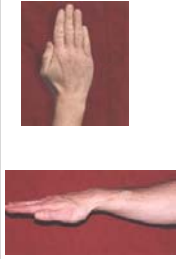


Arm Postures



Wrist Postures

Neutral



Awkward



Neck Postures

Neutral

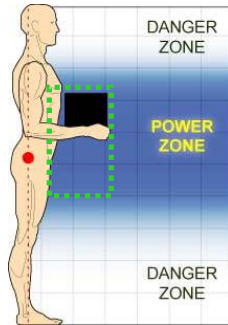


Awkward



Power Zone

- 1. Close to the body
 - 2. Below mid-chest
 - 3. Above mid-thigh height
- ("Strike Zone")



Ergonomics principles to reduce risk:

- Use mechanical assist devices
- Extend the tool
- Raise the work
- Decrease the weight
- Raise the worker
- Slide or push instead of lift or carry
- Lower the work
- Lower the worker

Raise the work



Raise the worker



Better, but hands are still overhead

Extend the tool for reaching high

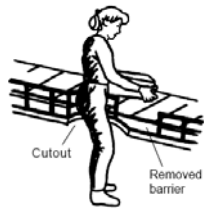


Better - in the power zone

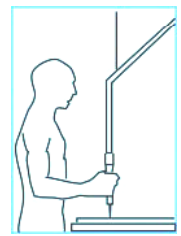
How can you lower the work?



Remove barriers or obstacles



Choose best handle orientation for the job



Bit extension shafts for drills and screw guns



For overhead drilling



www.uml.edu/college/she/WE/cohp/Publications/Bright_Ideas/BI8.pdf
www.me.berkeley.edu/eroo/home.html

Spring-assisted wallboard finishing tool



Pneumatic wallboard finishing system



Can you break it up into smaller or lighter units?



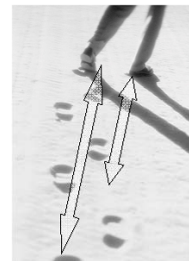
Are you working harder than necessary?

- Carrying (wearing) more tools than you need to in tool belts



Are you working harder than necessary?

- Carrying materials longer distances than necessary



Longer vs. shorter carrying distance

Placement matters (materials, truck, point of use)



- Poor placement of material resulting in awkward lifts (later)



Choose the best slump

- When possible, use higher slump concrete vs. lower slump

Example:
3" slump vs. 1" slump

Less force
Less bending



Can you stand up?

- Long handled tool for screeding
- Bull float for finishing



*Planning and Scheduling: mechanical assist equipment with POU



Possible solutions:

- Unloading truck bed

<http://www.loadhandler.com>

<http://www.cargogear.com/OneItemInfo.aspx?partnum=LH3000>

http://www.truckaddons.com/Catalog/subpages/load_handler.htm



Use wheels instead of carrying:



Long handles

Regular screw gun



Auto-feed screw gun with an extension



Raising walls

- Use a crane
- Use a crank lift or wall jack
- Manual lift?
Make sure you have enough people



Dry weights (wet will weigh more)

Item	Length	Approximate dry weight	If 50 lb limit
2 x 4's	92 5/8" long	9 lbs	5
11 7/8" microlam	10 ft	50 lbs	1
Typical 9' x 15' wall made from 2 x 4s with (2) three ft windows		465 lbs	Tipping wall up 5 people
2 x 4		1.28 lbs/linear ft	39 linear ft
2 x 6		2 lbs/linear ft	25 linear ft
OSB 1/2" thickness		47 lbs/sheet	1
Microlam: 11 7/8" x 1/2" thick		5.3 lbs/linear ft	9 linear ft

Resource links: