Strains, Sprains, & Pains: Commercial Fishing Muscular/Skeletal injury prevention

Alaska Marine Safety Education Association - AMSEA
Jerry Dzugan- director@amsea.org
Prof. Don Bloswick, Univ. Utah- donbloswick@me.com
Ergonomics

Ergonomics is about adapting the workplace & tools to fit YOU better, so YOU have less strain.
So What? < 30, > 50

1. Reduces cost of chronic injury, pain, lost fish time

2. Increases work life-span

3. More efficiency = more $, less effort
Alaska Fishermen’s Fund @ 40% of claims due to strains, sprains, MSDs, and Carpal Tunnel Syndrome. (2009-2012)

North Carolina- 39% had a traumatic injury in 12 months. 50% strains, sprains, CTS; 70% due to lifting/moving; 18% said it limited work ability.

50% Swedish fishermen low back pain in 12 months. 2/3 of New Zealand fishermen have lower back problems.
Fishing is Hard Physical Work!

- Confined space
- Obstacles
- Cold/heat/wet
- Long hours
- Poor diet/sleep
- Work is home
- Repetitive motion
- Tools

A challenging ergonomic environment!
…plus need to work on…

- Electrical systems
- Mechanical systems
- Maintenance
- Refrigeration
- Carpentry
- Plumbing
- Welding
- Use of many types hand/power tools
Musculoskeletal Injuries

Section 1:

- Back (and shoulder)
- 19 BIG IDEAS!
The back muscle ("back strap") lifts weight of object AND body’s upper weight.
BIG IDEA # 1
Preserve the Curves- 4 in spine

Vertebrae
C1-C7
T1-T12
L1-L5
S1
More distance load is from body, greater stress on back
Compressive Force

- Assume Joe is 6’2”, weighs 185 pounds, and is picking up his pen.

- What do you think the force is on his back?

- ~585 pounds (assuming straight legs, torso at 90 degrees, and no arm support on knee).
Compressive Force

- How much does the box in the picture have to weigh to produce a back compressive force the same as when Joe was picking up his pencil?

Just over 80 pounds (assuming an upright posture).
Similar Compressive Force

- 80 lbs
Back Muscle Force

Contraction of muscle...

Puts pressure (force) on spinal disks
Is back straight?
Could table be better for back?
How to hold a heavy salmon

NOT like this

CORRECT way to hold
Better Lifting Strategies

Golfer’s Lift
Tripod Lift
Deep Squat Lift
Fatigue & hunched shoulders stresses the back
BIG IDEA # 2 Pushing is lower stress on back than pulling (generally)
BIG IDEA # 3

Move your feet – don’t twist your body while working using force.
**BIG IDEA # 4** Two-Person Lift

Hand Force = about 60% of load weight for each person.

(but people don’t cooperate perfectly.)
BIG IDEA # 5
Hands Behind Back Lift
BIG IDEA # 6 Lift end of Board

50% of board weight
BIG IDEA # 7
Standing better than sitting
Standing Mats

On hard floors, use mats to stand on.

Beveled or sloping edges to prevent slipping.
BIG IDEA # 8
Switch work duties
Big Idea # 9

Place heavy items mid torso height
8 Back Recommendations

1. Keep body upright (as much as possible)
2. Keep load/force close to body.
4. Don’t twist body.
5. Don’t jerk.
7. Make a “bridge”.
8. Tighten stomach, exhale when lifting.
BIG IDEA # 10
STRETCH BEFORE YOU CATCH

Why stretch?
- More blood & O2
- More flexibility & agility
- More mentally alert
- More productive!

When do you stretch?
- Before work/season
- During work
- After work
Stretching Considerations

1. Professionally assess posture / underlying issues.
2. If issue exists, get professional help.
3. Stretch slowly, no bouncing or pain/worsen condition.
4. No exercises if they will cause harm/pain!
5. Daily routine.
6. Goal- increase flexibility.
STRETCH BEFORE YOU CATCH

Before Work: Knees to Chest

1. Lie on back with knees bent.
2. Bring knees to chest using arms.
3. Do 2 sets, 3
STRETCH BEFORE YOU CATCH

Before Work: Knee to Chest Stretch

1. Hand behind knee, pull knee to chest until comfortable stretch felt in lower back /butt.

2. Relax back.

3. Hold 30”- Repeat 3x alternate legs.
STRETCH BEFORE YOU CATCH

Before Work: Back Adductor Stretch

1. Place ankle on opposite knee.
2. With hand push away on bent knee.
3. Hold 30”-
4. Alternate legs - Repeat 3x.
STRETCH BEFORE YOU CATCH

Before Work: Cat/Cow

1. Arch back 30” - sag back 30”
2. Do 2 sets of 3 reps
STRETCH BEFORE YOU CATCH
Before Work: Trunk Stretch

1. Reach arms out, elbows straight.
2. Gently sit back on heels.
3. Hold 30”
4. Do 2 sets, of 3 reps.
Design your own 2-5 minute warm-up before going on deck!

- There are many exercises available.
- Determine which address your needs.
- Stretch! Regularly!
Section 2:

- Upper Extremity (shoulder, elbow, wrist, hand)

9 BIG IDEAS!
BIG IDEA # 1
Avoid lifting above shoulders
Risk Factors - Posture
Risk Factors - Posture
BIG IDEA # 2 - Working heights

- 4” above elbow
- Just below elbow
- 4” - 6” below elbow

Different Tasks Require Different Work Surface Heights - (NIOSH)
BIG IDEA # 3 - Use risers

(Slip or stumble hazard- bevel the edges)
Shoulder Problem Prevention

1. Avoid work at or above shoulders.
2. Get help with overhead work.
4. Exercise shoulders and mid back.
BIG IDEA # 4

Shoulder Stretches-

1. Elbows bend to 90°.
2. Pinch shoulder blades together.
3. Rotate arms out.
   repeat 10-30x/set
Shoulder Stretches - Shoulder Shrug

Shrug shoulders up and backward. 20-30x/day. Every few hours.
Shoulder Stretches - Wall Clock Stretch

1. Hands outstretch, palms up - hold 30”.
2. Raise arms 45°. Hold 30”.
3. Raise arms upright, thumbs facing back.
Elbow – Hand bend

1. Move hand against fixed resistance.
2. Hold 3 seconds, 10x
Elbow – Hand Press

1. Move wrist back against fixed resistance.
2. Hold 3 seconds, 10x
BIG IDEA # 5
Wrist/Hand – Maintain neutral posture

High forces and bent wrist cause tendonitis (inflammation of the tendons.)
Put the bend in the tool - Not the hand

A. Wrist Bent/Tool not
B. Wrist Not Bent/Tool Bent

Hand position A or B better for wrist & hand?
BIG IDEA # 6

Keep warm
Cold =harder grip on tools=
More stress on muscles.
Use gloves, wristers
BIG IDEA # 7
Get a grip on it!

Proper diameter handle
Non slip handle/gloves
Wrist neutral

Use full force grip

NOT pinch grip
Contact Trauma
BIG IDEA # 8

Use padding

Problem ➔

Simple solution ➔
Carpal Tunnel Syndrome

CTS SYMPTOMS

1. Pain, tingling, cramping.
2. Numbness in thumb, pointer, middle, inside of ring finger.
3. Weak grip, clumsiness.
4. Burning pain (worse at night).
5. Tendency to find affected hand with bent wrist when at rest.
CTS TREATMENT

1. Stop activity- it only gets worse - rotate jobs.
2. Keep wrist neutral position.
3. Wear splints (not where it interferes with work).
4. Keep warm.
5. Cortisone shots.
6. Vitamin B-6 has mild effect.
7. Anti-inflammatories before, during, after activity. (ibuprofen, aspirin etc.)
8. Surgery – generally very effective.
BIG IDEA # 9
Carpal Tunnel Syndrome - Exercises

Do BEFORE it hurts!

1. Fingers straight.
2. Bend knuckles & middle joint.
3. Touch fingertips to palm.
4. Repeat 10x, 1-2x/day
Recommendations

• Tool and work design to decrease hand force.
• Improve friction/grip.
• Tool grip diameter (@ 2 inches).
• Power grip, no pinch grip.
• Minimize wrist/shoulder deviation.
• - exertion time (+ recovery time.)
• Alternate hands.
• Less repetition through job variety.
• Use Personal Protective Equipment.
• Pad to reduce contact stress.
• *Pocket Guide to Ergonomics – free*
  [www.amsea.org/videos&info](http://www.amsea.org/videos&info)
  >ergo info for comm fish
Fish Smarter, not Harder:
What changes can you make?
Gillnetter fish chute

Use gravity whenever possible!
Gillnetter with flush hatches/rail
Do ladder steps have to be round?
Non slip tools and gloves
Use Full Force Grip

NOT Pinch Grip!
Adapt Ergo Principles for your Fishery! (salmon troll example)

- Analysis to make job easier - analyze each step in process.
- THINK about how to make work more comfortable.
- THINK about how to be more efficient in YOUR work space.
- Develop the ATTITUDE that you can make better changes.
Handholds

- Provide a brace when moving (make-a-bridge).
- Help spread body stresses.
- Also prevent injury/MOB.
- One hold per step.
Assess Body Movements
Minimize Fish Handling

- Hatch lifted with pulley from cockpit

Bleeding tray swivels to face fish hold
Benefits-

- Less strain/pain
- More productivity
- Better quality fish
- Better price
Questions? Comments? Ergo ideas?

www.amsea.org
907-747-3287

Thanks to:
Don Bloswick, PhD., P.E.
Univ. Utah