Using Activity and Job Task Preparation to Drive Ergonomic Risk Reduction

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About Me

• Stratford, CT
• B.S. Exercise Science – Sacred Heart University
  – Gold Medal of Excellence
• M.S. Exercise Science, Human Performance
  – Southern Connecticut State University (Dec. 2016)
  – Biomechanics Research
• Areas of Interest: Applied Biomechanics, Physiology, Injury Prevention, Injury Epidemiology
Sikorsky, a Lockheed Martin Company

• Design and manufacture military and commercial helicopters
• All 5 branches of United States Armed Forces
  – Military services and commercial operators in 40 nations
• 1929 – Stratford, CT
• "We pioneer flight solutions that bring people home everywhere...every time™."
• 2 million lives saved since first helicopter rescue in 1944
How Do We Protect Our Workers?

Hierarchy of Controls

1. **Elimination**: Physically remove the hazard
2. **Substitution**: Replace the hazard
3. **Engineering Controls**: Isolate people from the hazard
4. **Administrative Controls**: Change the way people work
5. **PPE**: Protect the worker with Personal Protective Equipment

The hierarchy indicates the order of effectiveness, with elimination being the most effective and PPE being the least effective.
What is the Missing Piece?
Process vs. Individual Improvement

• First we look at how we can improve the process but when that does not work there may be opportunity to improve the individuals exposed to the process hazards.

• How can we improve the capabilities of the employees exposed to the risks our work presents?
  – Job Rotation?
  – Pulling employees off certain jobs?
  – What about “job task preparation”?
How Do Others Who Are Exposed to Injury Prepare?
Needs Analysis

• Analysis of Job Tasks
• Analysis of Injury Metrics
• Analysis of Employees
• Feasibility of Programs
  – Time?
  – Location?
  – Sustainability?
Targeted Personal Exercise Program

• Product Center Specific
• Train the Trainer
• Voluntary Participation
• What does “Targeted” mean?
The Targeted Stretching & Strengthening Program is a newly packaged and more job specific version of Progressive P.E.P. This program will be designed to your department’s job specific tasks and will not be a generalized program that all Sikorsky employees will receive; it is specific to the demands of YOUR jobs & departmental needs! While there is some similarity to the existing P.E.P. program, this program will better prepare you for the muscular demands your job entails.

**Benefits Include:**
- Reduction in sprain and strain injuries
- Increase in strength, flexibility, balance and cardiovascular function
- Decrease in stress
- Improvement in blood circulation
- Reduction in fatigue

**Assembly & Flight Operations Breakdown**
Each specific part of CAFO will receive their own specific program:
1. Final Assembly
2. Hangar
3. Paint Shop

**CAUTION:** If you have an injury or any type of reoccurring discomforts, you should immediately report your injury/symptoms and obtain a medical evaluation.
Why This Program Is Needed

[Diagram showing the relationship between intrinsic and extrinsic risk factors and injury threshold.]

Adapted from Mesine et al. 1991.
Why Targeted?

Specificity Principle

• Training or preparation needs to match the requirements of the activity

• To improve ability in a particular task, engage in activities that are functionally and biomechanically similar to the tasks in question
  – Overhead work and shoulder/neck exercise
  – Leaning forward into small areas and lower back exercise
Wolff’s Law

• Connective Tissues (muscle, bone, ligaments, tendons) respond to the stressors (or lack of) put on them
  – Loading = Osteoblast activity and Muscle Remodeling
  – No Loading = Osteoclast activity and Muscle Degradation
Overuse/Ergonomic Injuries

Model for Overuse Injuries

Increased training effort → Increased stress to tissues → Microscopic tissue damage → Tissue remodeling

- Rate of remodeling > Rate of continued tissue damage → Stronger tissue
- Rate of remodeling < Rate of continued tissue damage → Overuse injury

Decrease training effort
Stress Continuum

Pathologic underload zone

Physiologic loading zone

Physiologic training zone

Pathologic overload zone

Low

Stress continuum

High

Distress and increased injury risk

Eustress

Distress (injury)
Outcomes & Sustainability

• Reduction of Ergonomic Injuries
  – 50% Reduction in Assembly & Flight Operations
• Improved Strength
• Improved Flexibility
  – “Feeling more prepared and capable of doing my job”
• Improved Morale
  – “We feel the company is concerned with our safety”
• Employees see the decrease in injuries amongst peers
• Rewards for active participation
  – “Let us help you help yourselves”
How Do These Outcomes Help Us?

PRODUCTIVITY
Thank You