ERGONOMIC PROGRAMS

Basics of Ergonomics
• Basics of ergonomics
• Ergonomic Assessments
• Office Ergonomics
• Lifting techniques
• Jobrotation
• Design for ergonomics
• Prevention Early Intervention
The Mission Statement

JCI AE is committed to the reduction of injuries due to cumulative trauma:

- by continuous improvement of products and processes
- by team education at appropriate levels for empowered improvement
- by the creation of an ergonomics culture
What is ERGONOMICS?

- Fit the job to the person
- Work smarter, not harder
- Make work user-friendly
- Improve quality and safety
The Beginning of Ergonomics ...

“Certain Violent and irregular motions and unnatural postures of the body, by reason of which, the natural structure of the vital machine is so impaired that serious diseases gradually develop therefrom…”

1717, Ramazini
Design to fit the worker

Worker Capacity

Job Demands

Training
Motivation
Fitness Level

Management Controls
Engineering Controls
The Challenge

People...

- Are different
- Have limitations
- Have predictable reactions
Common CTD’s =
“Mechanical Problems”

**Definition of a Work Related Cumulative Trauma Disorder (CTD)**

a CTD (Cumulative Trauma Disorder) can be defined as a collective group of *illnesses* that affects the *musculoskeletal system*.

- Work related CTDs are the result of the mismatch between the physical requirements of the job and the physical capacity of the human body.
- CTD’s are often referred to as MSD (musculoskeletal disorders) and / or RSI’s (Repetitive Stress Injury).
Common CTD’s =
“Mechanical Problems”

**Characteristics of a CTD**
- *Occurs through a gradual overuse of the soft tissue rather than an instantaneous event.*
- Disorder of the muscle, nerves, tendons, ligaments, joints, cartilage, or spinal discs.
CTDs and where they occur on the body …
Hand & Wrist problems

- Tendinitis
- Tensosynovitis
- White Finger /
  Raynaud’s
- Bursitis
Some definitions

**Tendinitis** is an inflammation of the tendons. It is caused by rapid, repetitive movements especially when they are combined with high force or twisting of the joint(s), this can cause damage to tendons over time. Tendinitis has a slow healing time due to low blood supply of the tendons. Tendinitis is the most commonly occurring CTD at Johnson Controls this is partially due to the fact that it also occurs at other joints of the body as will be discussed shortly.

**Tensosynovitis** is an inflammation of the tendon sheath, a protective cover on the tendons, (called the synovium) which is commonly known as “trigger finger”. The result is a restriction of the capacity of the tendon to move within the sheath causing jerking or snapping motion as well as “locking”.

**White Finger / Raynaud’s** is due to a constant vibration over time which causes damage to the blood vessels. The fingers may turn white and becomes numb, also there is an increased sensitivity to temperature and pain or sores may develop on the fingertips. If exposure to vibration continues, a chronic form of Raynaud’s Disease with permanent disability may result. The only way to “cure” white finger is to eliminate exposure to vibration early on.

**Bursitis** occurs in the bursa (a small protective sac around joints and where ligaments and tendons pass over bones). These protective cushions can swell & deteriorate as a result of excessive pressure or repeated jolts to the joint. It results in pain (much like tendinitis), and restricted movement of the joint.
Wrist Problems

Carpal Tunnel Syndrome
Elbow problems

- Tendinitis
- Epicondylitis
CTD symptoms

- Joint movement / stiffness resulting in pain / soreness
- Numbness or tingling sensations, typically in the hands and fingers
- Redness, swelling and local warmth around the affected area
- Joints “Popping” or “Cracking”
- Reduced range of motion compared to normal ability
The need for speed
Cost of CTD’s

Direct Costs
- Medical Expenses

Indirect Costs
- Internal Medical Expenses
- Absenteeism
- Added Insurance Premiums & Legal Fees
- Lost Time By Supervision
- Training Costs for New Workers
- Lost Productivity & Efficiency
Caution Flags

Repetition

- Refers to the number of times or amount of time a muscle group is active during a task.
- Performing the same acts or motions over and over again.

Force

- The amount of physical effort required to perform an action or movement. It is usually expressed in pounds or kilograms.
- Exertion performed to overcome weight, resistance, or inertia of the body or work object.
Caution Flags

Posture

- Positions of the body that require more effort than others or result in compression or stretching in or around the joints.

- Refers to the position of a body limb or body segment when performing an action.
Caution Flags

- Contact Stresses
- Rheumatoid arthritis
- Endocrinological disorders (e.g., diabetes)
- Acute Trauma (e.g., bruises, lacerations)
- Gender
- Pregnancy
- Gynecological Surgery
- Personal Factors
- Vibration / Cold Temperatures
Anthropometry

95th Percentile Male

28.1 Inches

73.0 Inches

60.4 Inches

46.5 Inches
Some important anthropometric dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>5 th percentile Female (cm)</th>
<th>95 th percentile Male (cm)</th>
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<tbody>
<tr>
<td>Stature</td>
<td>152</td>
<td>186,7</td>
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<td>Forward Functional Reach</td>
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<td>Elbow Height</td>
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<td>Knuckle Height</td>
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<td>Standing Overhead Reach</td>
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<tr>
<td>Elbow to Fingertip</td>
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<td>50,8</td>
</tr>
<tr>
<td>Eye Height</td>
<td>142,2</td>
<td>174</td>
</tr>
</tbody>
</table>
the “Target Work Area”

Target Work Envelope
Work within the target area

- Products, parts, and tools that are frequently needed within easy reach.
- Long reaches often cause you to twist, bend and strain, which in turn makes work more difficult.
Recommended heights of benches for standing work. The reference line is the height of the elbows above the floor, which averages 1050 mm for men and 980 mm for women.
Thank You
Questions ?

Questions are guaranteed in life; Answers aren't.