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# Understanding Field Ergonomics

Danielle Lemay, M.Sc., CCPE

# About me

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## Education

- B.Sc. in Kinesiology
- M.Sc. in Kinesiology, specialization in Ergonomics/Human Factors

## Career Path

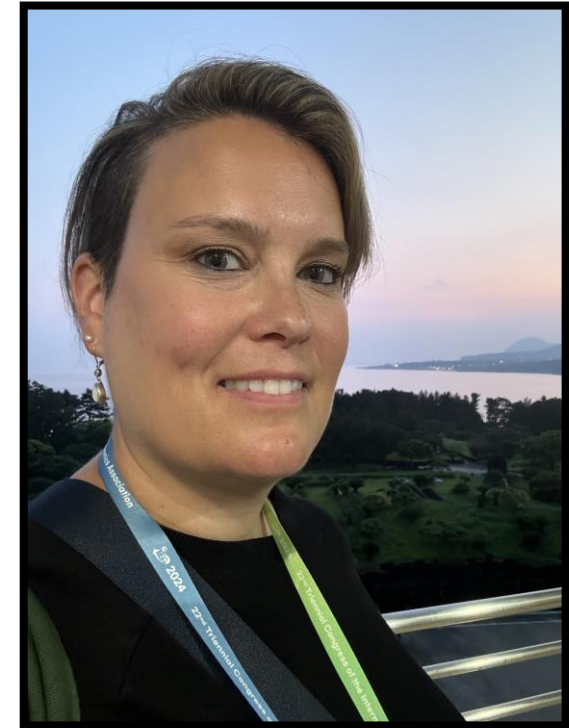
- CGI
- CHUS
- Pratt & Whitney Canada
- Suncor Energy
- Design For Performance

## Volunteering

- Association of Canadian Ergonomists
- École du Nouveau-Monde

## Certification

- Canadian Certified Professional Ergonomist (CCPE)



# Agenda

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- About Ergonomics/Human Factors (E/HF)
  - How it relates to Human & Organization Performance (HOP)
- Prevention of Musculoskeletal Disorders (MSDs)
- Overview of risk factors in Ergonomics
- Structure of a proper Ergonomics Management Program

# About Ergonomics/Human Factors

# About Ergonomics/Human Factors

“An applied scientific discipline and profession that:

- applies theory, principles, data and methods to understand **interactions** among humans and other **elements** of a system
- to optimize human well-being and overall **system** performance...”

**Reference:**

*International Ergonomics & Human Factors Association*



# E/HF in Canada

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Association of Canadian Ergonomists  
Association Canadienne d'Ergonomie



CANADIAN COLLEGE FOR THE CERTIFICATION  
OF PROFESSIONAL ERGONOMISTS

CONSEIL CANADIEN DE CERTIFICATION  
DES PRATICIENS EN ERGONOMIE



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# Examples of E/HF Applications

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## Areas of Practices

- Design of products, equipment, workstations, etc.
- Design of technology: software, applications, etc.
- Incident Investigations
- Research
- Prevention of Musculoskeletal Disorders
- Etc.

## Work Environments

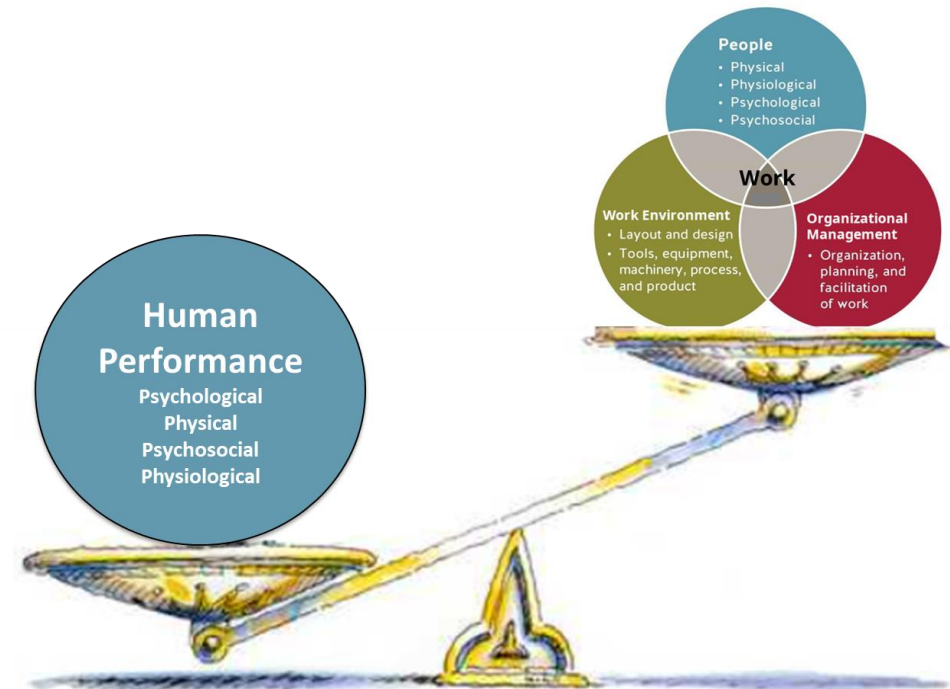
- Office
- Industrial
- Retail & Warehouse
- Manufacturing
- Health Care
- Vehicle
- Etc.

# HOP & E/HF

## Human & Organizational Performance Principles

- Mistakes Happen
- Blames Solves Nothing
- Context Matters
- Leaders Response Matters
- Learning is Vital

## E/HF System Focus





# Prevention of Musculoskeletal Disorders

# Why MSDs prevention?

## World Health Organization

(2022)

- Approximately 1.71 billion people have MSDs worldwide
- MSDs are the leading contributor to disability worldwide
- MSDs significantly limit mobility and dexterity, leading to early retirement from work, lower levels of well-being and reduced ability to participate in society

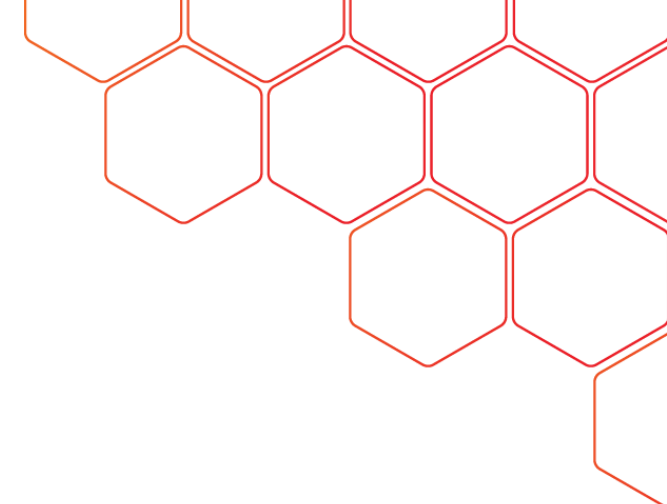
## Workers' Compensation Boards of Canada:

There were 10,211 accepted lost-time injuries due to MDSs in Canada in 2022

# Musculoskeletal Systems

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- Muscles
- Tendons
- Ligaments
- Nerves
- Blood vessels



# Signs & Symptoms of MSDs

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## Signs

Are visible – Can be observed:

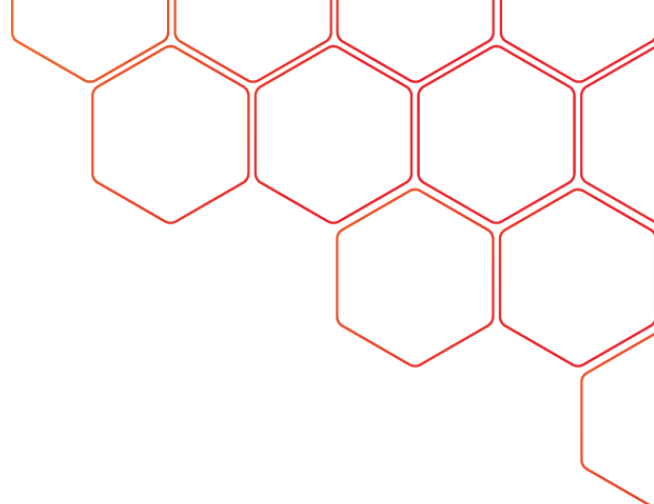
- Swelling
- Redness
- Reduced range of motion
- Etc.

## Symptoms

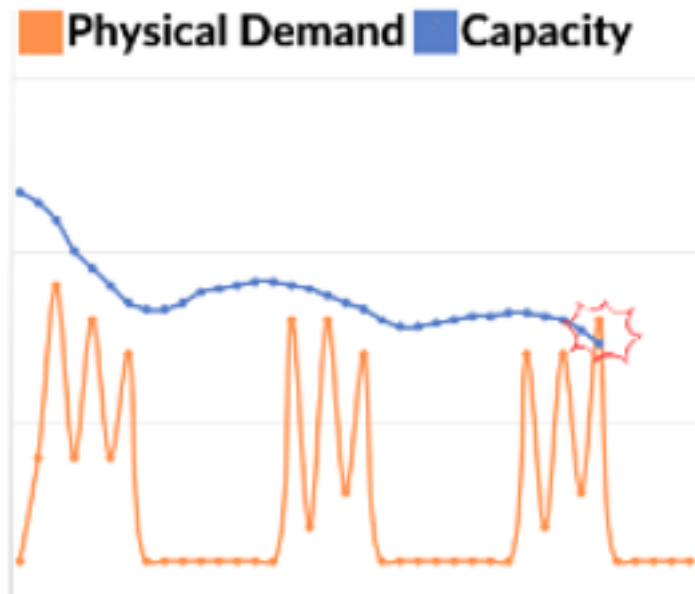
Are invisible – Are felt:

- Discomfort/Fatigue
- Numbness
- Tingling
- Burning sensation
- Stiffness
- Etc.

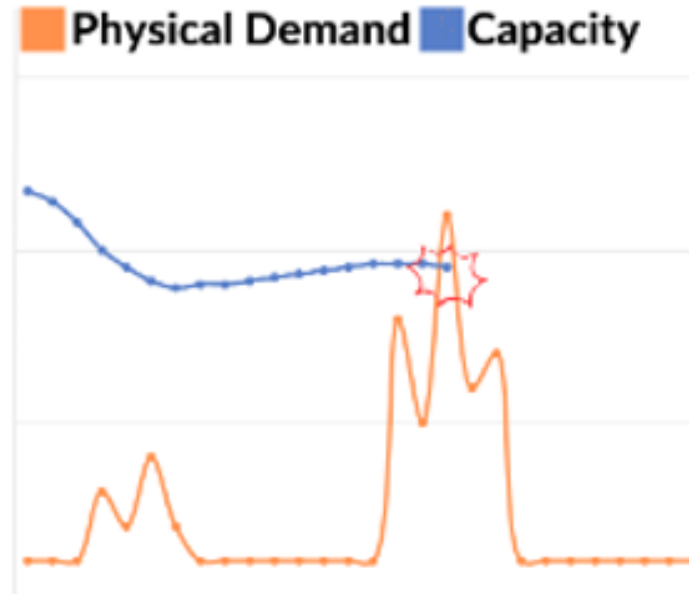
# Mechanisms of Injuries



## Cumulative



## Acute



# Spectrum of MSDs



No Ache

Aching & Tiredness

Aching & Tiredness

Aching & Fatigue

Occur during work shift

Occur early in the shift

Weakness persist at rest

Disappear at night

Persist at night

Inability to sleep

Optimal work performance

No reduction in work performance

Reduced capacity for repetitive work

Inability to perform light duties

**Reference:**

*Canadian Centre for Occupational Health and Safety*



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# Overview of Risk Factors in Ergonomics

# Risk Factors in E/HF

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- Awkward Postures
- Force & Effort
- Static Work
- Contact Stress
- Vibration
- Shock & Impact
- Environmental Conditions
- Organizational Conditions





# Risk Factors in E/HF

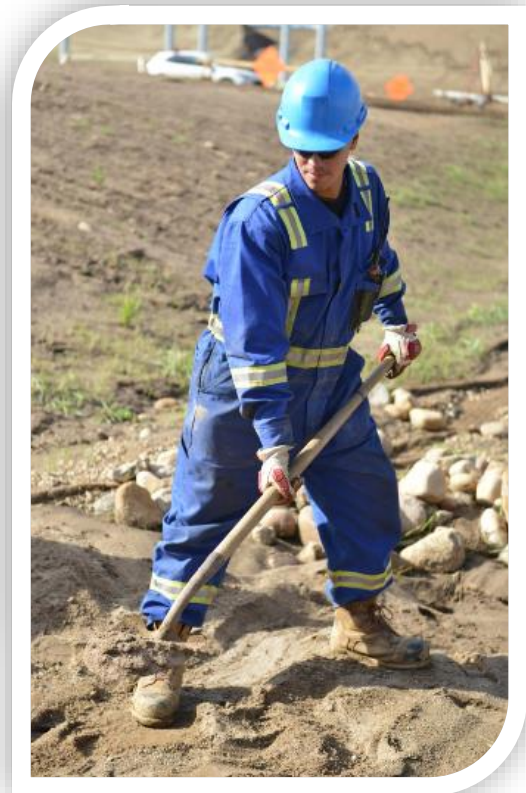
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## Awkward Postures



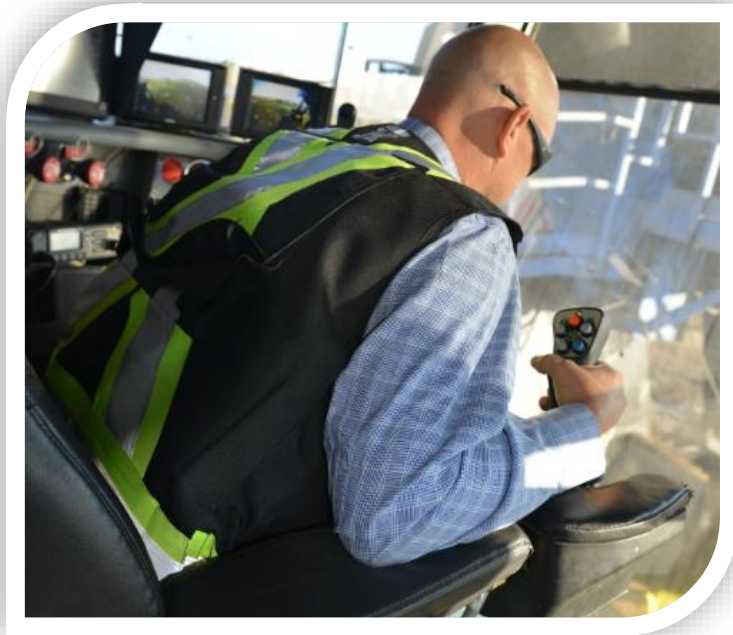
## Force & Effort



# Risk Factors in E/HF

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## Static Work



## Contact Stress



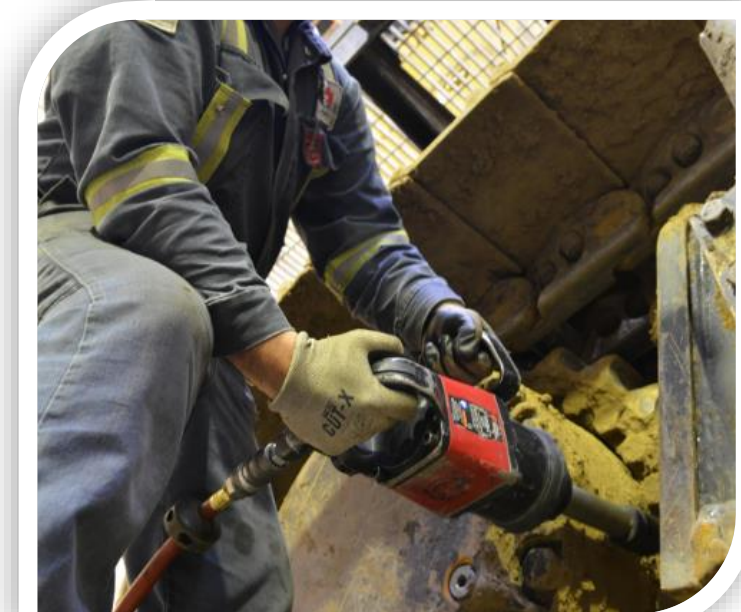
# Risk Factors in E/HF

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## Vibration



## Shock & Impact





# Risk Factors in E/HF

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## Environmental Conditions



# Risk Factors in E/HF

## Organizational Conditions



# Quantifying Risk Levels

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## Modulators

- Force
- Duration
- Repetition



# Structure of a proper Ergonomics Management Program





# Ergonomics Management Program

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## Risk Assessment

### Proactive

- Identify highest risk tasks
- Allow to prioritize mitigation actions

### Reactive

- Address situations where:
  - Injuries happened
  - At-risk tasks have been reported



# Ergonomics Management Program

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## Design

E/HF embedded into processes:

- Engineering Project Management
  - Industrial
  - Control Room
  - Facilities
- Acquisition of Tools, Machinery & Equipment

## Training



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# Ergonomics Management Program

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## Manual Material Handling

### Lifting Guidelines

### Weight Identification System

- Mechanical Aid Available Accordingly

### Training



# Ergonomics Management Program

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## Education

- Field Employees/Leaders
- Office Employees/Leaders
- Engineers in Design
- OHS Professionals
- Medical & Disability Management Team Members
- Participatory Ergonomics Team Members



# Ergonomics Management Program

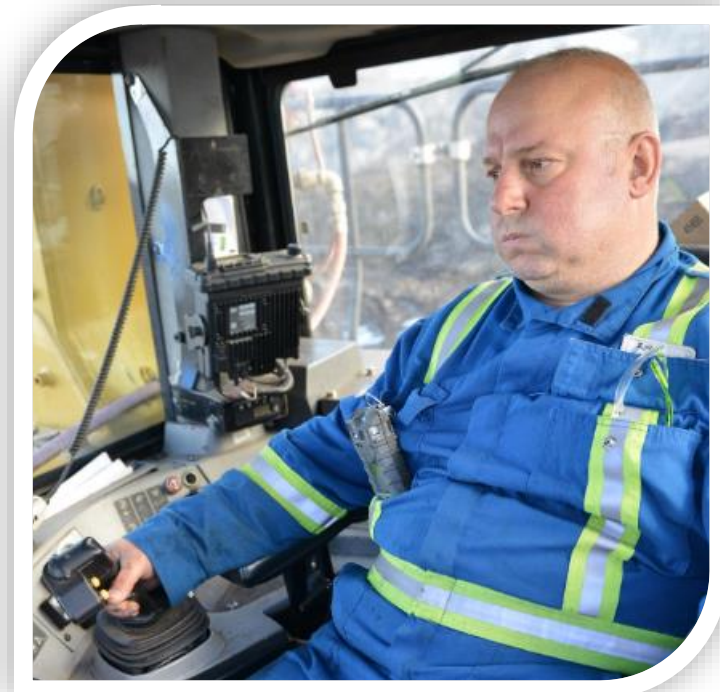
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## Medical Case Management

Processes to support:

- Disability Management for MSDs
- Return to Work
- Temporary Assignment
- Acquisition of non standard equipment

Training



# Ergonomics Management Program

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## Communications

### Tasks and Workstations Level of risk

- Medium & High
- Control Measures

### Continuous Education

- H&S Meetings
- Toolbox Talks
- Safety Moments
- Etc.





# Wrap up

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## Prevention of Musculoskeletal Disorders

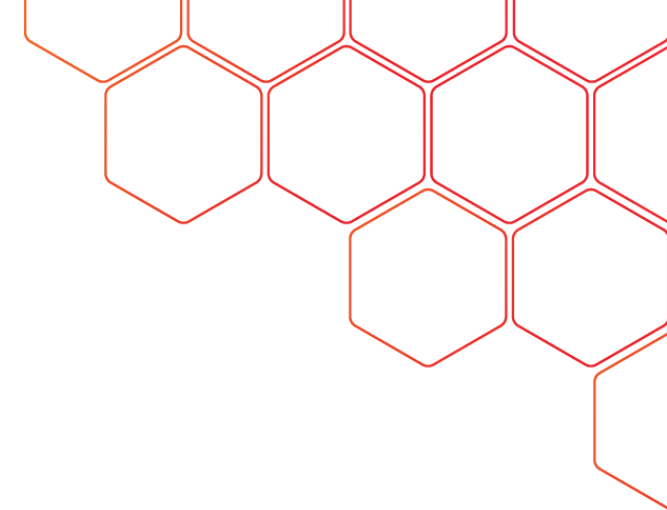
- Encourage/Adopt early reporting of signs & symptoms

## Risk Assessment

- Proactive assessments are the best way to manage risks

## Ergonomics Management Program

- Starting points
  - Risk assessment process
  - Education processes for Field, office and OHS personnel
  - Medical Cases Management Process



# Call to Action

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## Risk Assessment

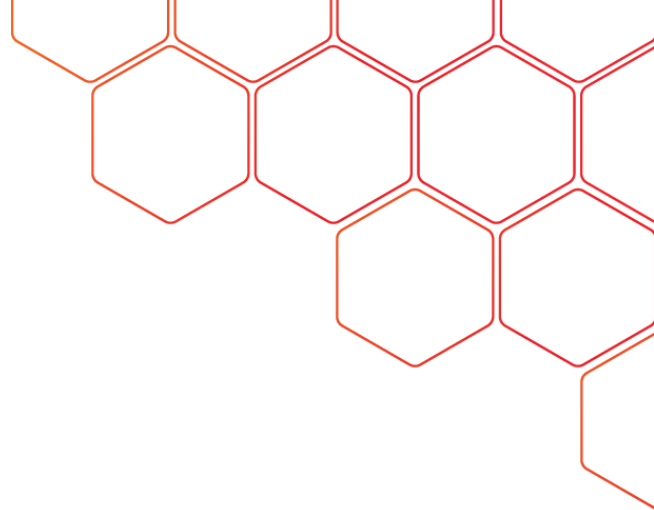
- Select one task
- Try to identify the Ergonomics risk factors

## Ergonomics Management Program

- Identify one element that is *well* managed
- Identify one element that is not managed, but should be

## Field Ergonomics Training

- Complete the online training from Energy Safety Canada





# Thank you!



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