

NEWFOUNDLAND
& LABRADOR
OCCUPATIONAL
HEALTH & SAFETY
ASSOCIATION

Conference 2016



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Right Choice Right Reason

A Safety Professional's Guide

Human Factors - Ergonomics

Ryan Piercey



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

Overview : What this is

- **This presentation is intended for the practicing Safety Professional**
- **It is an very general overview of the key focus points of Human Factors/Ergonomics (HFE)**
- **It is an examination and commentary on the role of the safety Professional in managing HFE risks**



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference2016

Overview : What this is *NOT*...

- This is *not* a highly technical based course on HFE
- This is *not* an International Ergonomics Association (IEA) or Association of Canadian Ergonomists (ACE) endorsed course
- This does *not* suffice as competency to evaluate complex ergonomic issues in the workplace



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Who am I?

- Ryan Piercey - BA, SET
- Locally educated – MUN, CNA
- Industrial Hygiene background
- Open pit mining background
- Health care background
- Heavy Construction background
- Petroleum refining background .



Newfoundland & Labrador
Occupational Health & Safety
Association




NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

What is Human Factors – Ergonomics?

-  it!!!
- The study of how humans behave physically and psychologically in relation to particular environments, products, or services
- Usability: How easy, comfortable, flexible, movable, possible, fitting a product is to its intended user
- Human Factors vs. Ergonomics



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference2016

What is Human Factors – Ergonomics?

- It is the practice of designing products, systems, or processes to take proper account of the interaction between them and the people who use them.
- IEA -The science concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

What is Human Factors – Ergonomics?

- 460-370 BC – Hippocrates gave an account in his works of how a surgeon lays out their tools for efficiency and ease of use
- Ancient Egyptians had similar practices
- WW II Fiasco...
- What about human and environmental factors???



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

What is Human Factors – Ergonomics?

- It gradually became clear that systems and products would have to be changed to take account of many human and environmental factors if they are to be used safely and effectively
- This awareness resulted on the discipline of



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference2016

HUMAN FACTORS



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

How is this for Human Factors – Engineering?



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Ergonomics for Dummies..

- **How many of you....**
- Are ergonomists or have an ergonomic background?
- Have been asked to fulfill the role of an ergonomic professional?
- Anticipate that your job will encompass some practice of ergonomic fundamentals at some point in your tenure?



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference2016

Human Factors - Ergonomics

- The only HSE-related discipline to actually mention the importance of not only risk management and mitigation in its definition; but the maintenance of productivity.
- **Best for SAFETY or Best for BUSINESS?**



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

The DNA of Human Factors

Dul, Bruder & Buckle explain that HFE has a unique combination of three (3) fundamental characteristics:

1. It takes a systems approach
2. It is design driven
3. Its focus is two-fold: performance and well being.



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

Safety vs. Human Factors

SAFETY	HUMAN FACTORS
<ul style="list-style-type: none">• Instantaneous in nature	<ul style="list-style-type: none">• Cumulative in nature
<ul style="list-style-type: none">• Causal factor(s) known	<ul style="list-style-type: none">• Causal factor(s) often unknown
<ul style="list-style-type: none">• <i>Trips/Falls</i>• <i>Burns</i>• <i>Cuts/Punctures</i>• <i>Vehicular accidents</i>• <i>Dropped loads</i>	<ul style="list-style-type: none">• <i>Back injuries</i>• <i>Sprains/Strains</i>• <i>Neck injuries</i>• <i>Repetitive motion injuries</i>• <i>Leg cramping</i>
PREVENTABLE...	PREVENTABLE...



A Safety Professional's Strategy for HFE Management

- Decision makers understand the “Well being” value of HFE
- They often don't understand the “Performance” value
- Missing the Performance value can have the greatest impact on the Well being value.



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference2016

Strategy : Step 1...

- **Identify your exposures**
- Review the facility
- Review work area design
- Review the work practices
- Review work injury stats



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

Strategy : Step 2...

- Increase HFE benefit (or value) awareness amongst powerful stakeholders through:
 - Education
 - Communication
 - Speak their language – Quantification of outcomes, cost-benefit analysis
 - Examples and success stories of high-quality HFE
 - Examples and stories of negative effects associated with mismanagement of HFE hazards



Newfoundland & Labrador
Occupational Health & Safety
Association

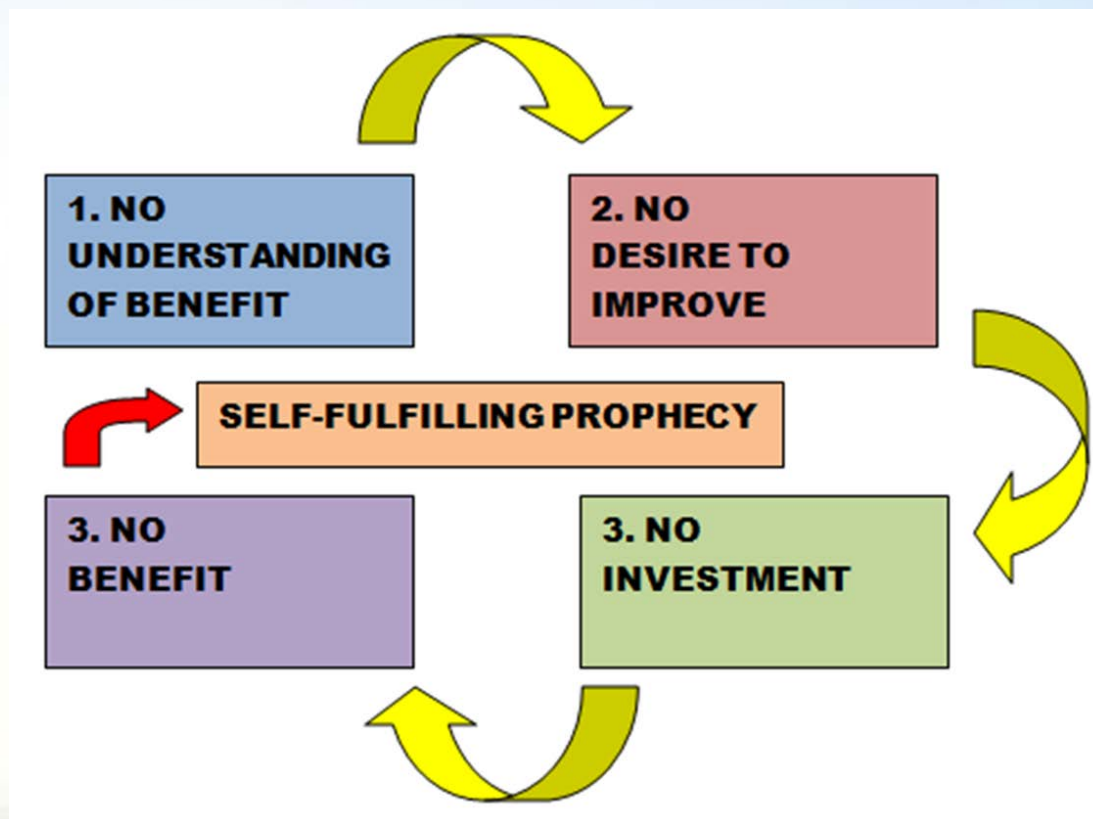


NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

The Theory of 'Buy In' ...



The 'BIG SELL' ...

- **Better Productivity** by reduced time for performing work tasks (i.e. Optimization of work equipment, work flow and/or worker usability)
- **Better quality** and reliability of production processes and services
- **Lower operating costs** from less accidents, health problems, absenteeism, and productivity loss



Newfoundland & Labrador
Occupational Health & Safety
Association



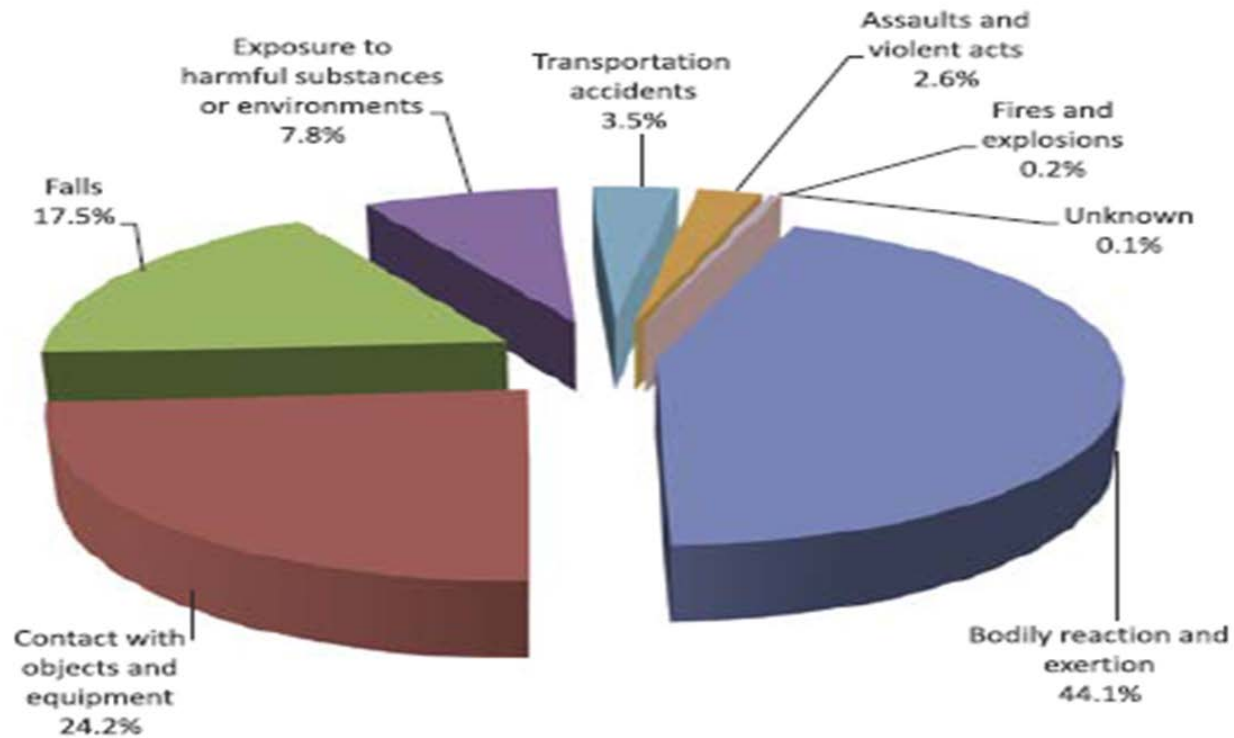
NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Injuries in Newfoundland ...

TYPES OF ACCIDENTS IN THE WORKPLACE 2010 - 2014



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Risk Assessment and Mitigation : Step 3...

- **Workplace:**

Can the area be laid out differently to ensure there are minimal awkward, static postures and/or high force applications?

- **Equipment:**

Are tools increasing hand or arm vibration? Can tools be used to reduce the required force of a task? Are the tools ergonomically designed?

- **Workers:**

Are workers trained to recognize and avoid the ergonomic hazards of their jobs?



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Risk Assessment and Mitigation : Step 3...

- **Work Task:**

Reduce physical demands of the work by decreasing:

- Amount of force required
- Repetitions
- Awkward postures
- Vibration

- **Work Management:**

Implement safe systems of work.

- Divide work amongst workers in order to reduce repetitive motions, forceful exertions, bending and twisting, awkward positioning



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Risk Assessment and Mitigation : Step 3...

- **Organization:**

This could include job rotation, staggering breaks, implementing work to rest ratios to reduce fatigue.



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

Musculoskeletal Disorders



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Musculoskeletal Disorders

- Musculoskeletal disorders (MSDs) are minor physical disabilities. MSDs are a wide range of conditions that affect the muscles, bones, and joints.
- Severity of the MSD can vary. Pain and discomfort may interfere with everyday activities.
- MSDs are extremely common, and your risk increases with age.



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

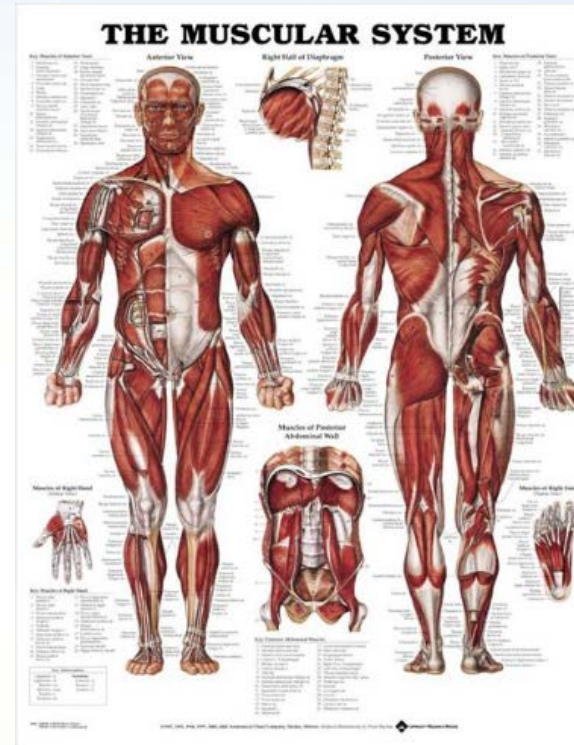
Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Musculoskeletal Disorders

MSDs can affect all major areas of the body including the:

- **Neck**
- **Shoulders**
- **Wrists**
- **Back**
- **Hips**
- **Legs**
- **Knees**
- **Feet**



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

MSD Risk Factors

The below factors play a large role in the development of MSDs:

- Work postures and movements.
- Repetitiveness and pace of work.
- Force of movements.
- Vibration.
- Temperature.
- Increase pressure (e.g., to produce more).
- Monotonous tasks.



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference2016

MSD Risk Factors

Positioning: There are two issues here...

Extremes of range of movement

Fixed positioning

Repetitiveness: The same motion too often, too quickly and for too long

Force of Movement: Amount of effort our bodies must do to lift objects, to use tools, or to move



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

MSD Risk Factor Controls

Positioning: Proper lifting techniques and work area/job design

Repetitiveness: Micro breaks, worker rotation, work/rest ratios

Force of Movement: New/sharp tools, mechanical force



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016

Summary...

- **Start** to look at Human Factors within the workplace as a credible risk
- **Promote** ergonomic risk control and get employer buy in
- **You** don't need to be the expert....but know when to get one!



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association

Conference 2016

Human Factors – Ergonomics

Questions?



Newfoundland & Labrador
Occupational Health & Safety
Association



NLOHSA
NEWFOUNDLAND AND LABRADOR
OCCUPATIONAL HEALTH & SAFETY ASSOCIATION
CELEBRATING 60 YEARS

Newfoundland & Labrador
Occupational Health & Safety Association
Conference 2016