Washington State Department of
Labor & Industries

Ergonomic Rulemaking Advisory Committee

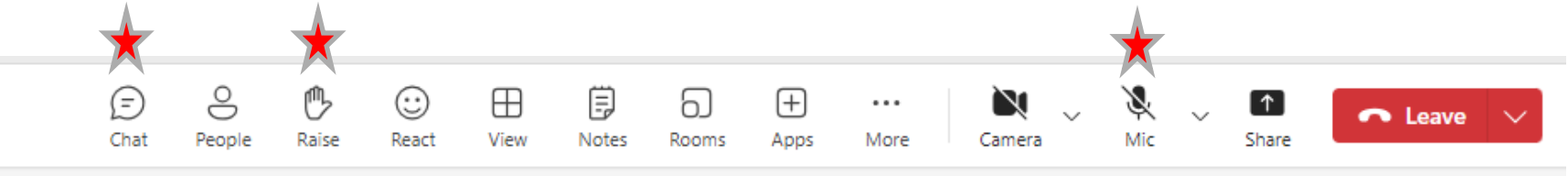
October 28, 2025

10:00 a.m. to Noon

Agenda

- Welcome
- Old business follow up
- Review of background information
- Rule elements overview - risk identification, risk assessment, and risk control
- Rule Concept for risk rule elements
- Rule Concept example: baggage carts and ULDs
- Next steps
- Closing

Teams Meeting Information



- **Online**
  - Controls at the top of the Teams screen
  - Chat feature: Teams/general information
  - Please keep camera off unless presenting or called upon to ask question.
  - Please remain muted unless asking a question.
  - Raise Hand Option: For live questions and comments during/at the end of the presentation.

- **Phone**
  - To raise/lower hand use *5
  - To mute/unmute use *6
  - Please remain muted unless asking a question.

Old Business

Review - 3+ risk factors for WMSD

Force

- Whole body efforts: lifting and lowering, carrying, and pushing and pulling
- Hand and arm efforts: gripping, pinching, and pressing

Awkward Posture

- Bending, twisting, reaching, kneeling and squatting

Repetition

- Repeating the same or similar motion: frequent lifting, assembly work, hand tool use, sorting and packing

Additional risk factors

- Vibration, contact stress, and static postures

Contributing factors:

- Cold temperatures, psychosocial factors

Review - rulemaking framework

- The Ergonomic Rulemaking Framework outlines the approach for rulemaking across industries and risk classes
  - Principles for rule development across industries/risk classes
  - Preliminary scoping questions to help understand how the rules can be tailored to an industry/risk class
  - Standard rule elements for ergonomic rules, which can be tailored to industry/risk class

Review - ergonomic framework principles

Key excerpts:

Rules will be tailored to the specific industry/risk class where possible and appropriate, balancing where consistency increases effectiveness or reduces burdens for employers who might be covered by more than one rule.

- Where identifiable, the rule should target the known causes of WSMDs in the specific industry or the risk class.
- Where possible and appropriate, the rules should include requirements for known hazards in an industry or risk class, rather than generic requirements for WMSD risk identification, assessment, and control.
- Consideration for how similar work is performed to work performed in other industries/risk classes, as well as whether the industry/risk class is a subset of a larger industry sector.

The rules should be clear and easy to understand so that employers will know what compliance looks like and employees will know what their protections are.

Review – standard rule elements

- Scope
- Risk Identification
- Risk Assessment
- Risk Reduction
- Evaluation of Effectiveness
- Involving Employees
- Training
- Recordkeeping

Review - standard rule elements - risk

RULE ELEMENT	PURPOSE	EXAMPLES OF TAILORING TO THE INDUSTRY/RISK CLASS
Risk Identification	Screening step to identify WMSD risks in the employer's workplace needing further analysis.	Risk identification may not be needed for known WMSD risks
Risk Assessment	Evaluation of identified WMSDs risks in the employer's workplace to determine degree of risk, need for risk reduction, and prioritization of risk reduction efforts.	Risk assessment may not be needed or may be streamlined for known WMSD risks
Risk Reduction	Identification and implementation of required actions an employer must take to reduce WMSD risks in their workplaces. Use the hierarchy of controls to implement the most effective controls to eliminate or reduce the WMSD risk. • Effectiveness of controls are supported by evidence. • Consideration is given to economic and technological feasibility of controls, as well as overall prioritization of WMSD risk.	Where there are know controls for high-risk hazards in the industry or risk class, such as engineering controls

Risk Identification

- Multiple ways to identify WMSD risks
  - Observations of work activities for WMSD risk factors (manual lifting, carrying, etc.)
  - Asking employees about their work and potential risks
  - Investigating reports of sprain and strain symptoms and injuries to find root causes
  - Reviewing injury records and workers' compensation claims to find tasks and trends related to sprain and strain injuries

Risk Assessment

- Where the WMSD risk is obvious with simple corrections, a detailed risk assessment is not needed
- For other WMSD risks requiring a more careful analysis, there are a number of evaluation tools
  - Quantitative tools use data to calculate WMSD risk depending on WMSD risk factor and/or body region.
  - Examples:
    - Revised NIOSH Lifting Equation
    - Liberty Mutual Manual Materials Handling Analysis Tool

Revised NIOSH Lifting Equation

- Calculates the risk for back injuries from lifting tasks
- Thoroughly validated
- Widely used
- Freely available
- Appropriate for variable lifting tasks
- Calculates a Recommended Weight Limit (RWL)
- Dividing the actual weight lifted by the RWL provides a Lifting Index (LI)

Revised NIOSH Lifting Equation

- Variables considered:
  - **Weight** of the object being lifted
  - **Horizontal Location** of the hands away from the mid-point between the ankles
  - **Vertical Location** of the hands above the floor
  - **Vertical Travel Distance** of the hands between the origin and destination of the lift
  - **Asymmetry Angle** of how far the object is displaced from the front of the body
  - **Frequency** of the lifting task
  - **Duration** of all lifting tasks and rest time in an 8-hour workday
  - **Coupling** quality of gripping or grasping the object while lifting

Liberty Mutual Manual Handling Analysis Tool

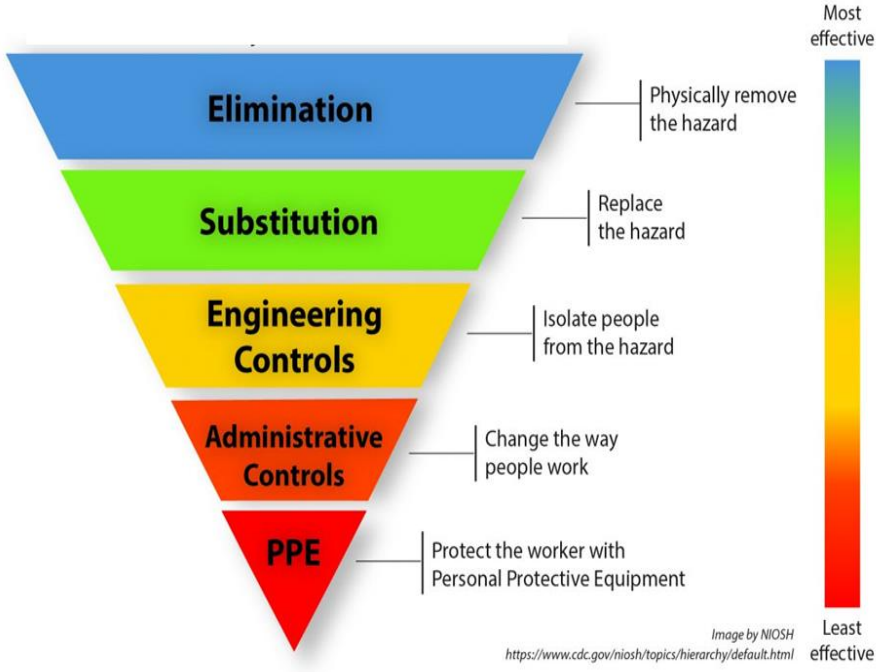
- Assesses the safety of manual handling tasks including pushing and pulling
- Freely available
- Well-known
- Provides percentages of male and female populations that can perform the push/pull tasks without reporting overexertion

Liberty Mutual Push/Pull Calculator

- Variables considered that contribute to the risk:
  - **Initial force** – peak force need to get the object to start moving
  - **Sustained force** - average force needed to keep the object moving
  - **Vertical hand height** - above the ground
  - **Horizontal distance** - distance that the object is pushed/pulled
  - **Frequency** – how often pushing or pulling occurs per minute or per hour
- Factors that impact force include:
  - Weight of the object being pushed/pulled
  - Wheel type and condition
  - Handle design, if any
  - Environmental and surface factors
    - Floor surface friction and incline, surface condition, obstacles and transitions, temperature
- Force is measured using a force gauge

Risk Correction - Hierarchy of Controls

- **Eliminate** – use conveyer to move items instead of carrying
- **Substitution** - Order two 25-lb boxes instead if one 50-lb box
- **Engineering Controls** - Use a scissor-lift cart to raise load for lifting or sliding
- **Administrative Controls** - Team lift large or awkward items
- **PPE** – Wear kneepads when kneeling on hard or rough surfaces



Rule Concept - risk rule elements

Specific requirements	• Develop specific rule requirements for job positions and/or specific WMSD risks
Alternative option	• Include an alternative option for employer to elect to conduct own assessment using specific validated tools
Universal requirements	• Identify some requirements that would apply independent of the compliance option the employer chooses, such as tagging heavy bags.

Rule Concept - specific requirements

- Set requirements that provide protections for the risk factors that most contribute to the WMSD risk and the most common situations
  - Consideration of variability in the performance of the tasks/activities (frequency and duration, infrastructure, equipment, etc.)
  - Information used in developing requirements can include injury and illness information, assessments in research, modeling of exposure assessments, and industry best practices
  - Rule should consider the impact of future changes, such as changes in technology

Rule Concept - specific requirements

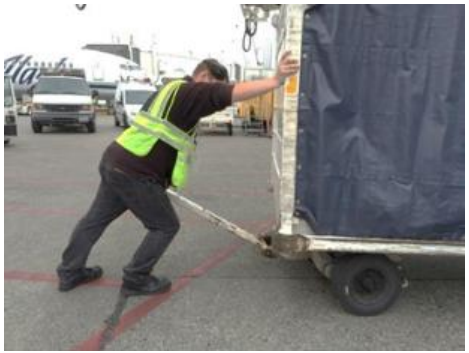
- If needed and appropriate, incorporate consideration of hierarchy of controls and feasibility considerations into rule
  - Rule identifies first order requirement – such as requiring an engineering control, followed by second order requirement where the first order requirement is not feasible, such as administrative controls
    - Example: Use a conveyer to move items instead of carrying, if not feasible team lifts must be used.
  - Involve employees in determination of feasibility

Rule Concept - alternative option

- Rule identifies appropriate assessment tools for different risk factors
- Other considerations include:
  - What is a representative sample of the work activity and the variables?
  - Who conducts the assessment?
  - How often the assessment is needed.
  - How to involve employees in the assessment, the review of the results, and the determination of appropriate and feasible controls.

Rule Concept Example – carts and ULDs

- Example of possible approach for requirements specific to the push/pull risks of using baggage carts and ULDs
  - Does not address other risk factors for lifting and lowering, which would be addressed in other requirements
- Use of baggage carts and ULDs occurs in several different steps of the process flow



Rule Concept Example – carts and ULDs

Specific requirements	• Set requirements for when more than one worker is needed or when mechanical devices are required

Alternative option	• Employer to conduct assessment of push/pull of cart
	  • For example, require the use of the Liberty Mutual Push/Pull Calculator and involve employees in the assessment
	  • Consider options for streamlining analysis

Universal requirements	• Requirement for regular inspections of carts/wheels and implement a process to red tag carts when employees identify they become difficult to move • Others?

Carts and ULDs – specific requirement data

Data to inform requirements could include:

- Pushing/pulling information in injury/illness data shows it is a significant risk factor
- Pushing/pulling carts information in peer reviewed research
  - For example, a study referenced in the Preliminary Scoping Assessment – Study found that pushing and pulling baggage carts by one worker was acceptable when empty but exceeded recommended limits when loaded
- Best practices recommend the use of powered equipment to move carts whenever possible
- Exposure modeling

Liberty Mutual Equation

Manual Materials Handling Analysis Tool

Task Type

Push

System of Units(SI)

Imperial Units

Frequency Pushes / Minute

1

Initial Force (lb)

50

Sustained Force (lb)

20

Horizontal Distance (ft)

75

Vertical Hand Height (in)

39

Calculate

Population Percentage

MALE: **Initial: 86%, Sustain: >90%**

FEMALE: **Initial: 30%, Sustain: 68%**

Population Percentage

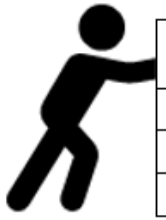
MALE: **Initial: 86%, Sustain: >90%**

FEMALE: **Initial: 30%, Sustain: 68%**

- Ensure that forces required to push or pull baggage carts or ULDs are within acceptable limits based on the table provided.
- Marginal force levels require active surveillance and periodic measuring of forces.
- Unacceptable forces require that pushing or pulling be done with additional personnel or mechanical equipment.

OR

- Forces used to push or pull baggage carts or ULDs must be at or below 60 pounds of initial force and 35 pounds of sustained force per person.



Hand height	Acceptable force level	Marginal force level	Unacceptable force level
51" – 55"	53 lbs or less	54 – 55 lbs	56 lbs or more
46" – 50"	60 lbs or less	61 – 62 lbs	63 lbs or more
35" – 45"	64 lbs or less	65 – 66 lbs	67 lbs or more

Note: These numbers are for illustrative purposes and subject to change based on further analysis/rule development discussions

Next Steps

- Focus on developing specific requirements
  - Recommend we continue discussions on requirements for carts/ULDs
    - L&I can create a detailed option for discussions at a future committee meeting
  - Work on identifying tasks/activities to develop specific requirements

Thank you!