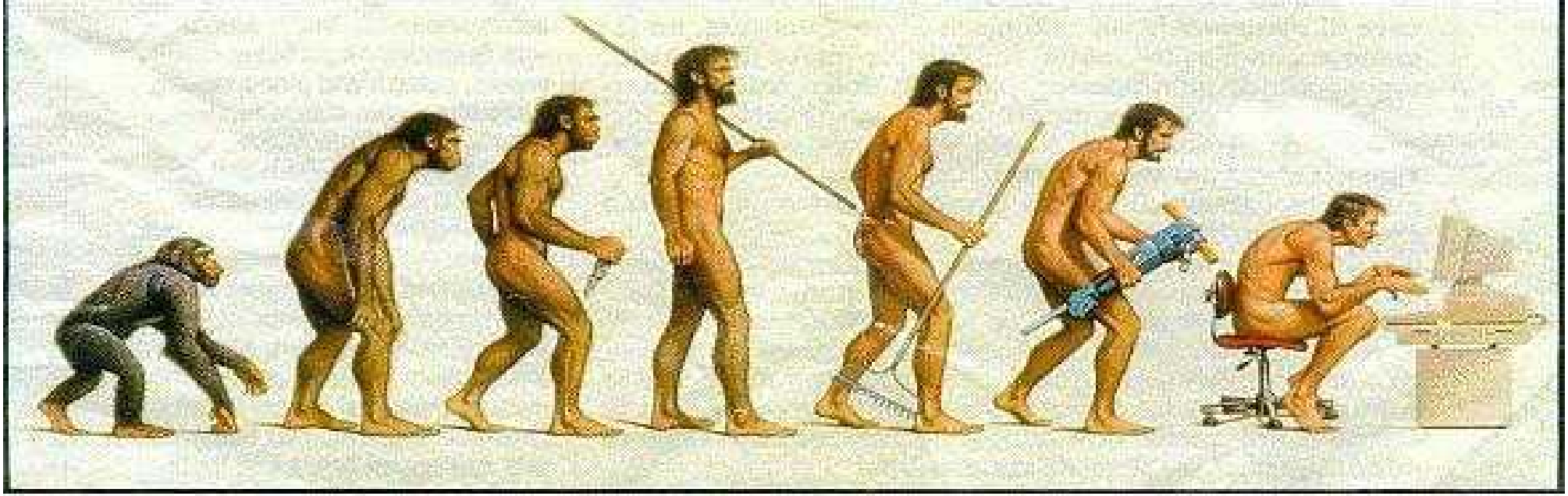

Somewhere, something went terribly wrong

Research to Public Health Intervention: Development & Implementation Challenges for OSHA and Washington State Ergonomics Rules

Barbara Silverstein
SHARP, Washington State Dept of Labor & Industries
www.lni.wa.gov/sharp

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Overview

- Public Policy Issues
- History and context
- Evidence
- Alternative regulatory approaches
- Washington State
  - Implementation
  - Evaluation
- Possibilities for the country

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Planned Change

Technical features: Hardware/software

- How complex in terms of scope & sophistication?

Implementation features: The more people affected, more required to change behavior, the greater the focus needs to be on implementation features

Power: How much do those required to change have?

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Why focus social policy on WMSDs

- High rates
- High direct workers compensation costs
- High indirect costs to employers
  - productivity
  - quality
  - training
- High personal and family costs

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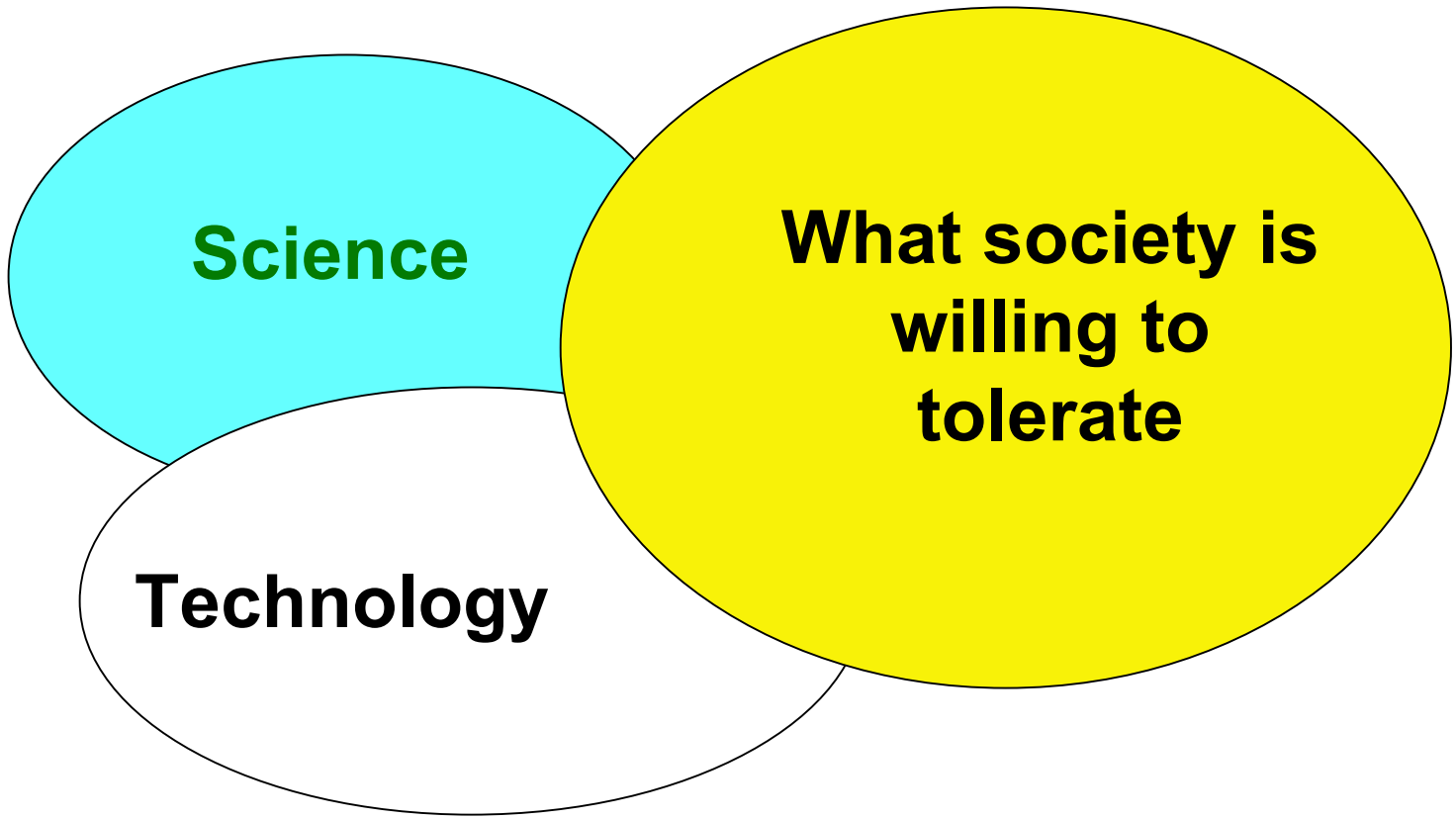
Public Policy

How is it determined?



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OSHA's Mandate-The Occupational Safety and Health Act (Sec (6)(b)(5))

The Secretary.. shall set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment to health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life.

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OSHA's Legal Requirement

- Significant risk of material impairment under current exposures
- Technological and economic feasibility
- Requirements can substantially reduce risk
- Quantitative risk assessment not required- but to extent possible

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Ergonomics Regulations: ***Policy Challenges***

- Need support from conflicting interests
- Broad scope of the problem
- Attribution
- Risk factors ubiquitous
- What is adverse health effect?
- Guarantees of success

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US History

- ***1970s*-first "ergonomics" citations**
- *1980s-many citations-to record keeping violations*
- *1990-red meat guidelines, sued by unions , intent for rulemaking*
- *1993-announce going forward with rule*
- *1995-informal draft on internet, congressional "rider"*
- *1996-rider temporarily lifted, CA ergo regulation*
- *1997-new rider, Pepperidge farm decision*
- *1998- 1st NAS study report*
- *2000- 2nd NAS study, WA state rule, OSHA standard*
- *2001-OSHA ergo rule thrown out by congress, president*

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The factors that once led to long-term improvements: undermined?

- Plant managers- short tenure
- Hostile takeovers
- Decline in unions
- Outsourcing

US Business decisions going global

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The factors that once led to long-term improvements: *undermined*

- changes in communication technology - global production process
- shareholder demands-quarterly
- management incentives-tied to value of stocks
- *deregulation -- institutional power of mutual fund managers*

Speculate in global financial markets rather than invest in new economy based on advanced technology

US Business decisions going global

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Evidence for Rulemaking :**Sources of Information**

- Animal studies looking at tissue level responses to physical loading
- Laboratory cadaver and living human studies: Effect of loading on CT pressure, performance, discomfort, fatigue, acceptability
- Biomechanical studies predicting torque on joints and loads on muscles compared to population estimates
- Epidemiologic studies of working populations
- Surveys
- Clinical case series
- Critical reviews

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NIOSH Review of WMSD Epidemiological Evidence 1997

	Repetition	Force	Posture	Vibration	Combo
Neck/shld	++	++	+++	+/-	
Shoulder	++	+/-	++	+/-	
Elbow	+/-	++	++		+++
Hand/wrist					
CTS	++	++	+/-	++	+++
Teno	++	++	++		+++
HAVS				+++	

+++strong, ++evidence, +/- insufficient

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NIOSH Review of Back WMSD Epidemiological Evidence 1997

Lifting/forceful movement	+++
Awkward posture	++
Heavy physical work	++
Whole body vibration	+++
Static work postures	+/-

+++strong, ++evidence, +/- insufficient

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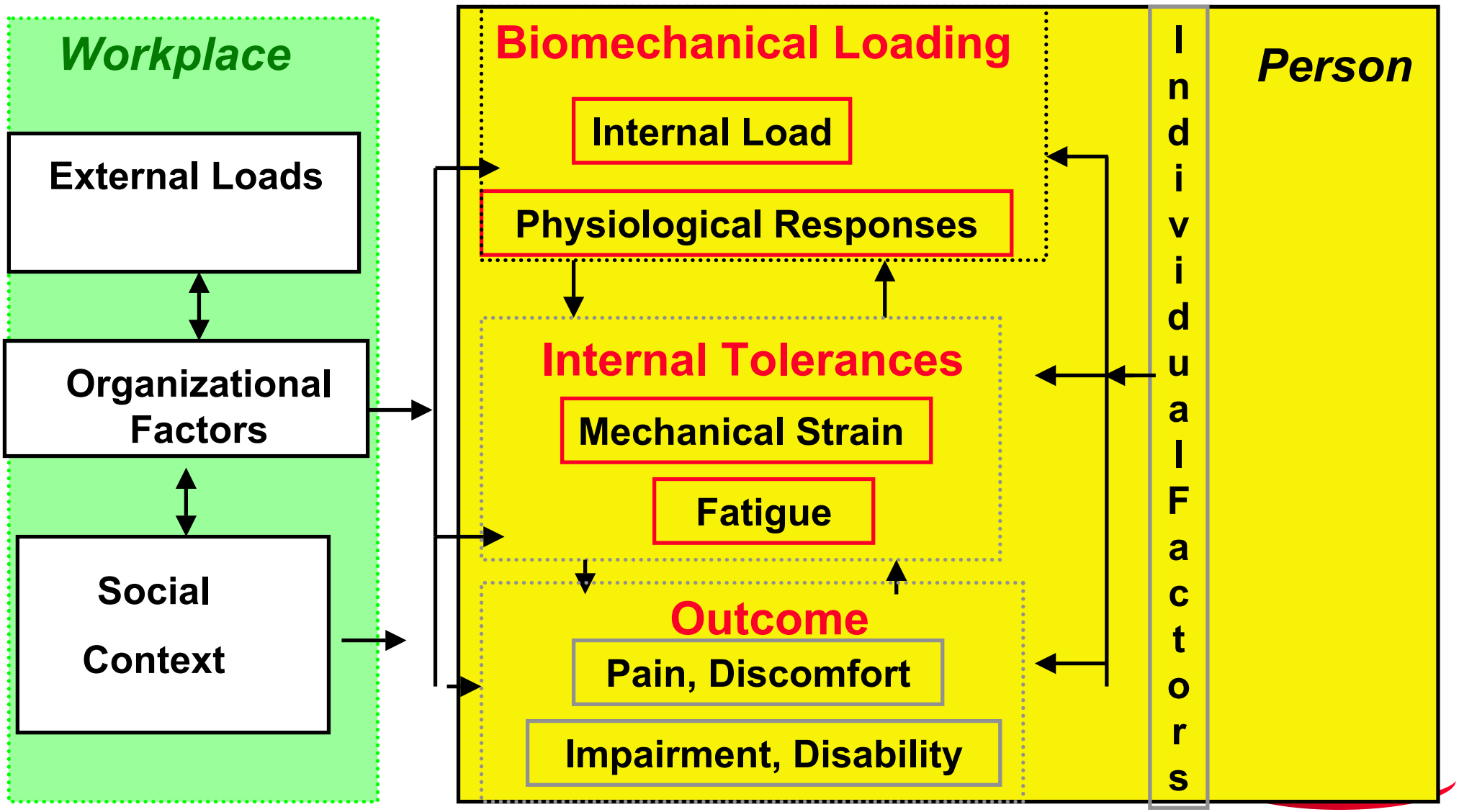
Conceptual Model of Contributors to Musculoskeletal Disorders *(NAS, 2001)*



Recent Longitudinal Studies

- Neck- and Back- Finnish Muskeli- forest products industry, construction
- Neck, Shoulder & Back-Dutch mixed industry SMASH
- Upper limb-Punnett US Auto industry
- Upper limb-Danish PRIM mixed industry
- Shoulder-Leclerc French mixed industry
- Back- (CC)- Canadian Auto Industry

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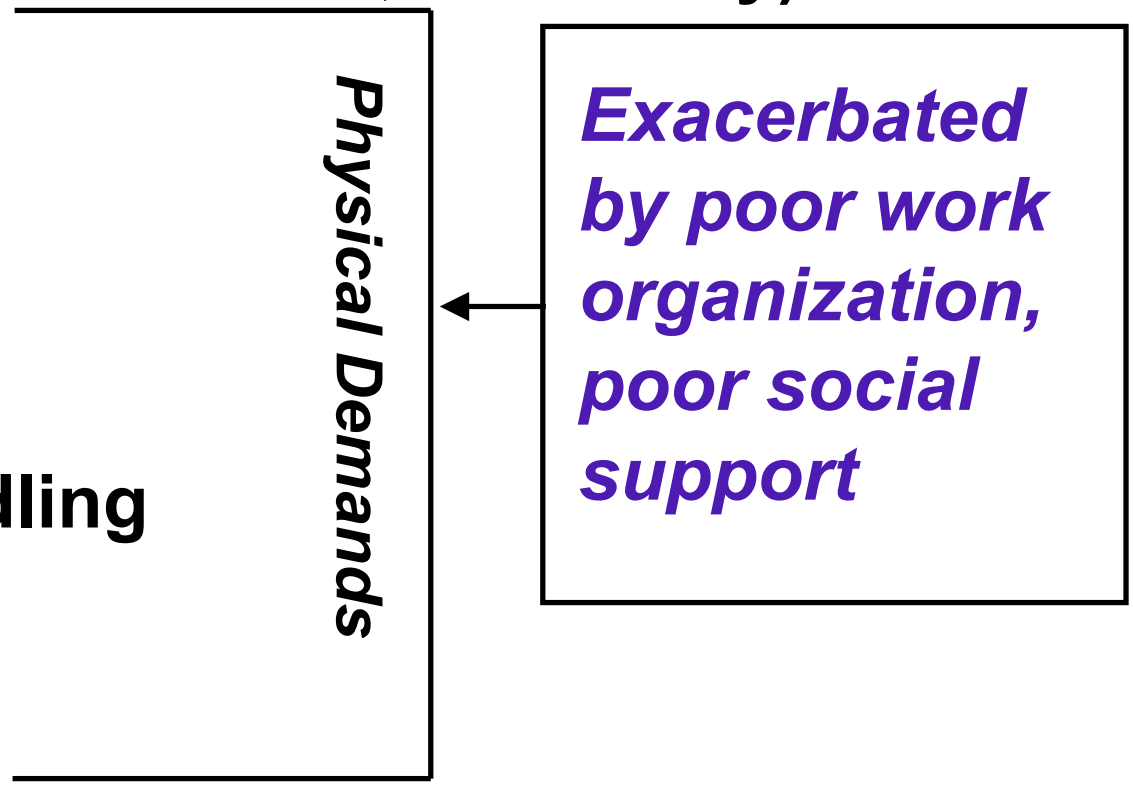
Work-Related Risk Factors

- Repetition (velocity, acceleration,%recovery)
- High force
- Awkward postures
- Vibration
- Contact stress
- Manual materials handling
  - lift, push/pull/carry



RISK is a function of frequency, duration, intensity of exposure

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Approaches to WMSD related Regulations

Find & fix hazards

UK Manual handling

Sweden: Working postures & movements

Victoria Manual Handling

British Columbia MSI

WA State Ergonomics

Program: Report Injury-> find and fix hazards

Cal-OSHA RMI

OSHA Ergonomics 2000 (medical management, WRP)

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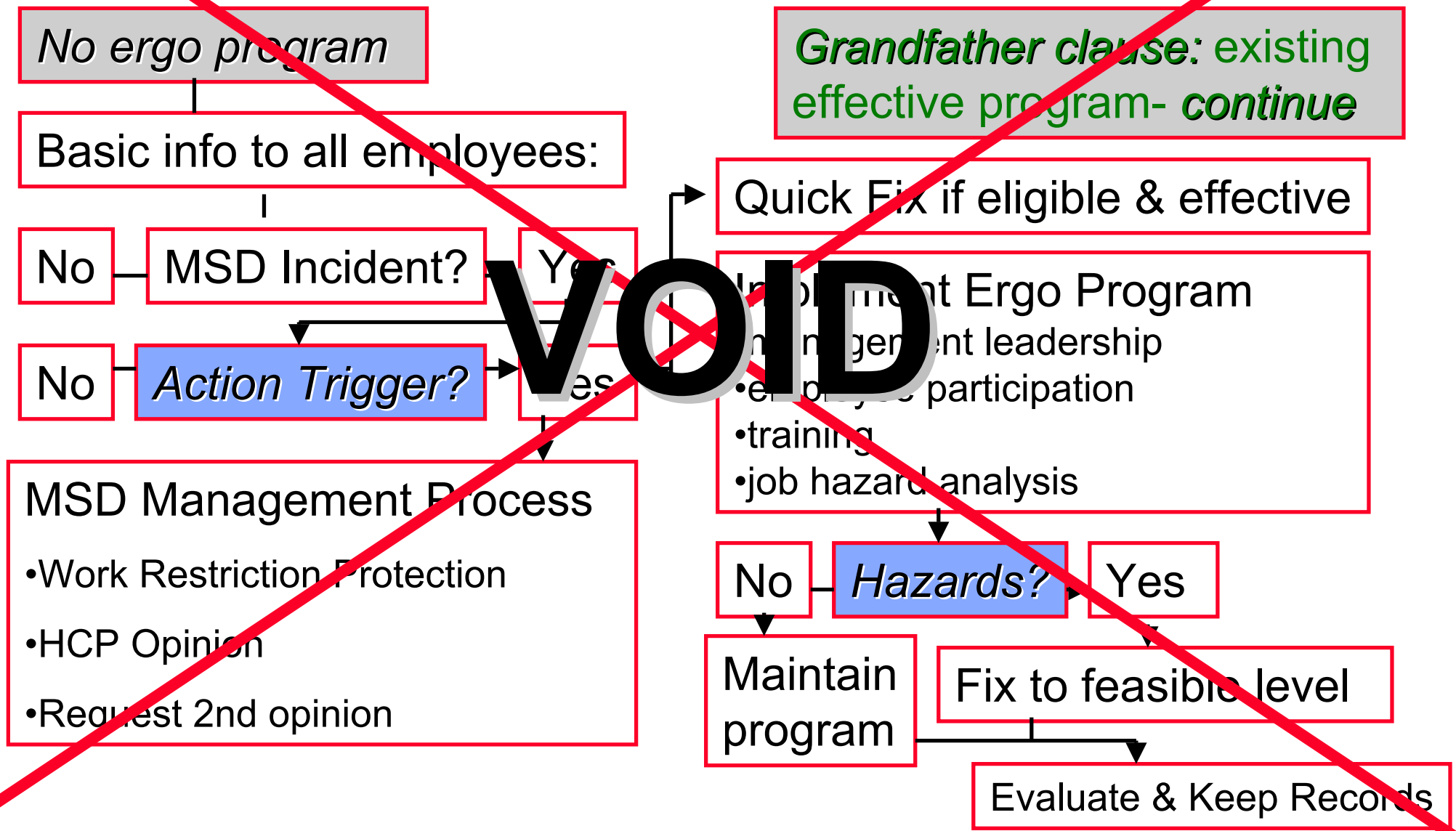
2000 OSHA Ergonomics Program Standard (1910.900) [General Industry]



Assessing Repetitive Work *(Swedish regulation on working movements and postures, 1998)*

Work Cycle	**Several/min**	**Several/hr**	**Some/hr**
Posture & Movement	**Fixed or uncomfortable**	**Few alternatives**	**Able to vary**
Freedom of Action	**External control**	**Limited influence**	**able to fit work to self**
Content	**Isolated**	**# of tasks**	**Include planning**
Learning	**short training**	**Rotate/train**	**Continuous training**

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Ergonomics (MSI) Regulation WCB-BC 1998: part of core requirements

- Risk factor identification
- Risk assessment
  - physical demands of work
  - aspects of layout and conditions
  - characteristics of objects handled
  - environmental conditions
  - work organization
- Risk control, eliminate/minimize risk
- Education & training
- Evaluation
- Consultation: H&S committee at every step

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Victoria Australia Manual Handling Regulations (Revised 1999)

- Includes lifting, pushing, pulling, holding, carrying, throwing; repetitive tasks such as packing, typing, assembling, cleaning and sorting, using hand-tools, operating machinery and equipment
- Specific duties for employers, employees, designers, manufacturers, importers & suppliers of "plant"
- plant: hand operated tools or equipment, power tools, equipment designed to move and lift people or materials, furniture, forklifts, steps, etc.
- Eliminate or control risk to the extent practicable
- Employee involvement

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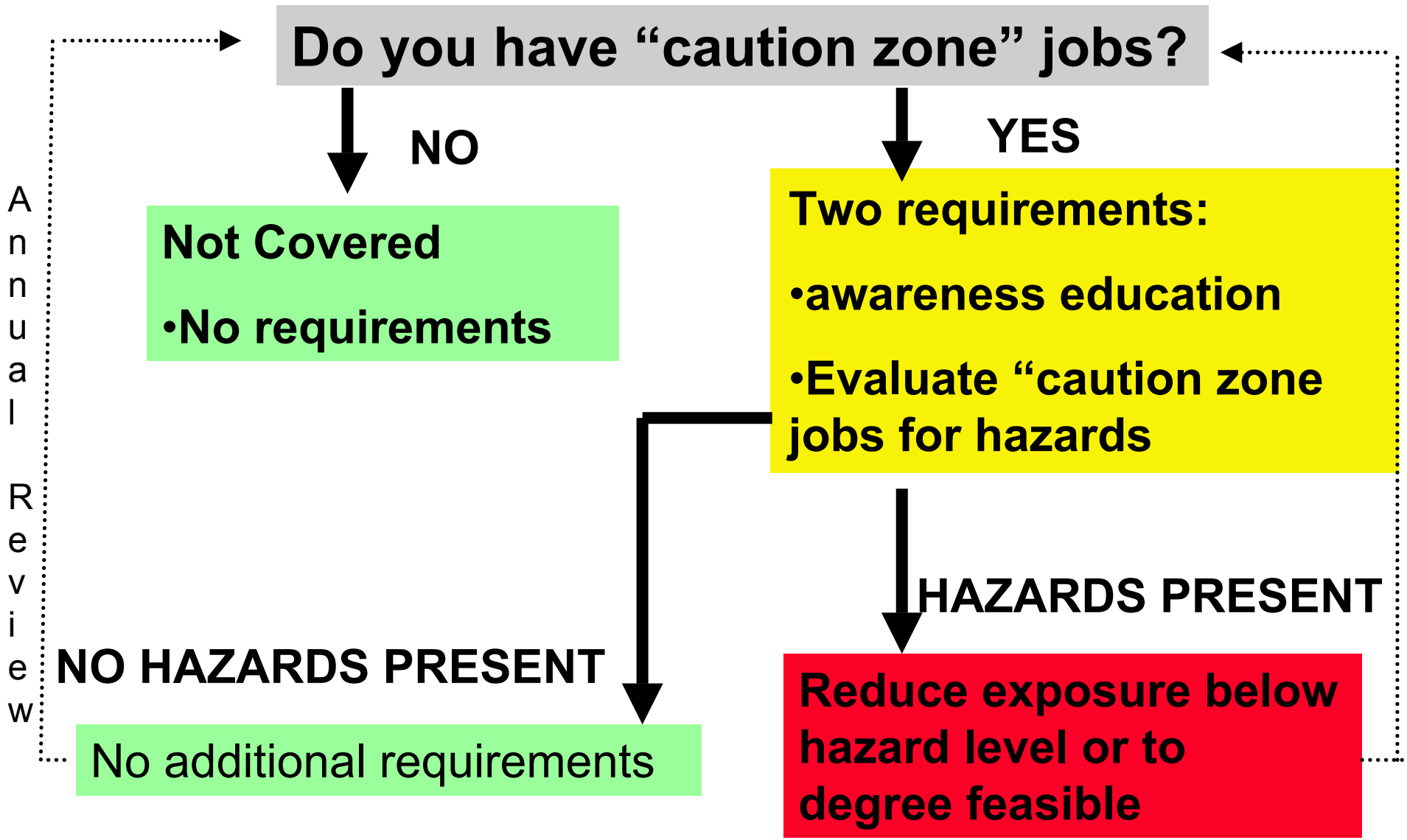
Washington State Ergonomics Rule, May 2000



Www.lni.wa.gov/wisha/ergo

www.lni.wa.gov/wisha/ergo

Ergonomics Awareness Education

For employees in caution zone jobs
and their supervisors

Department of LABOR AND INDUSTRIES

1-800-4-BE-SAFE

WA State Caution Zone: Duration or Frequency

• Awkward postures	Overhead work, neck, back or wrist >30°, squat/kneel >2hr
• High Hand Forces	Pinch 2#, pinch force>4#, grip force>10# >2hr
• Highly Repetitive Motion	Upper limb every few seconds> 2hr, intensive keying >4hr
• Repeated Impact	Hand/knee as hammer 10/hr >2hr
• Lift heavy,frequent or awkward	75#>1/day, 55#>10/day, >10# 2/min>2hr, 25# above/below>25x
• Mod-Hi Vibration,	Hi (jack hammer/chainsaw >30min Mod (grinders) > 2hr (>5m/s2 8hequiv)

Kneeling or squatting

For more than 2 hours per day

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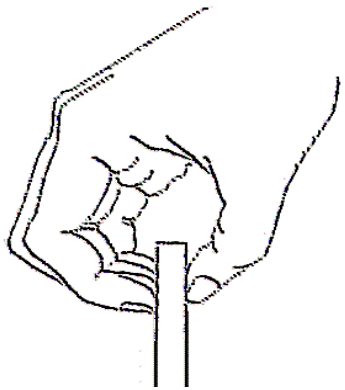
Problems:

Bent wrist, twisted elbow, extended reach

Pinching with the fingertips

2 lbs. of weight or 4 lbs. of force for more than 2 hours per day



Caution Zone

Repetitive Motions every few seconds more than 2 hours

Repetitive exertions, contact stress

Heavy lifting

- Lifting 75 lbs. once per day
- Lifting 55 lbs. more than 10 times per day

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Frequent lifting

- Lifting more than 10 lbs., more than twice per minute, for more than 2 hours per day

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Awkward lifting

- Lifting more than 25 lbs. above the shoulders, below the knees or at arms' length more than 25 times per day

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Vibration

Moderate levels of vibration for 2 hours per day

High levels of vibration for **30 minutes** per day

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Identify Hazardous Jobs & Fix

Existing Effective Program

Other Assessment Tools-Examples

- UAW/GM
- RULA
- HAL
- Strain Index
- NIOSH Lifting Equation

Appendix B

- Duration based on Combinations of Force/ Repetition/ Postures
- Lifting Index of 2
- Vibration 8hr energy equivalent 5m/s^2

ACGIH TLV for Hand Activity Level, 2001

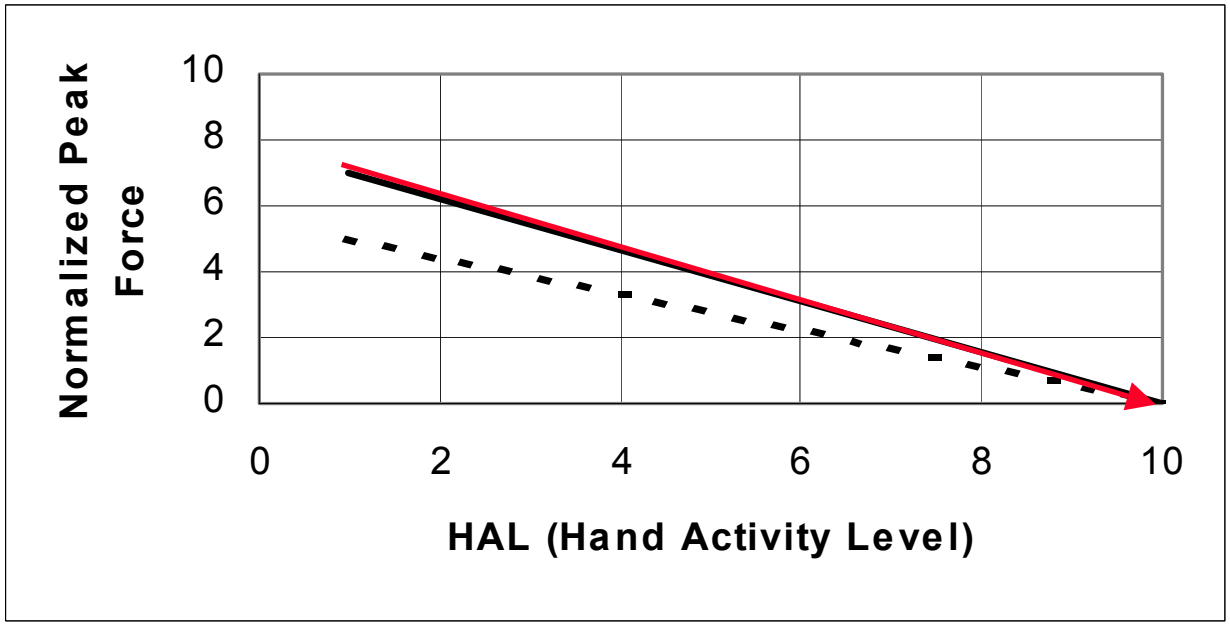

Figure 1: Hand, wrist, and forearm TLV (solid line) and Action Limit (dashed line) recommended for administrative and engineering controls.

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Lifting TLV-NIE 2001: Table 1: Lifting <2 hrs or > 2 hrs with <12 lifts/hr

	Close <30cm mid ankle	Intermediate: 30-60 cm	Extended >60-80 cm
Reach limit: 30 cm + to 8 cm - shldr	16 kg	7 kg	No known safe limit for repetitive lift
Knuckle-below shoulder	32 kg	16 kg	9 kg
Mid shin-knuckle	18 kg	14 kg	7 kg
Floor-mid shin	14 kg	No known safe limit for repetitive lift	No known safe limit for repetitive lift

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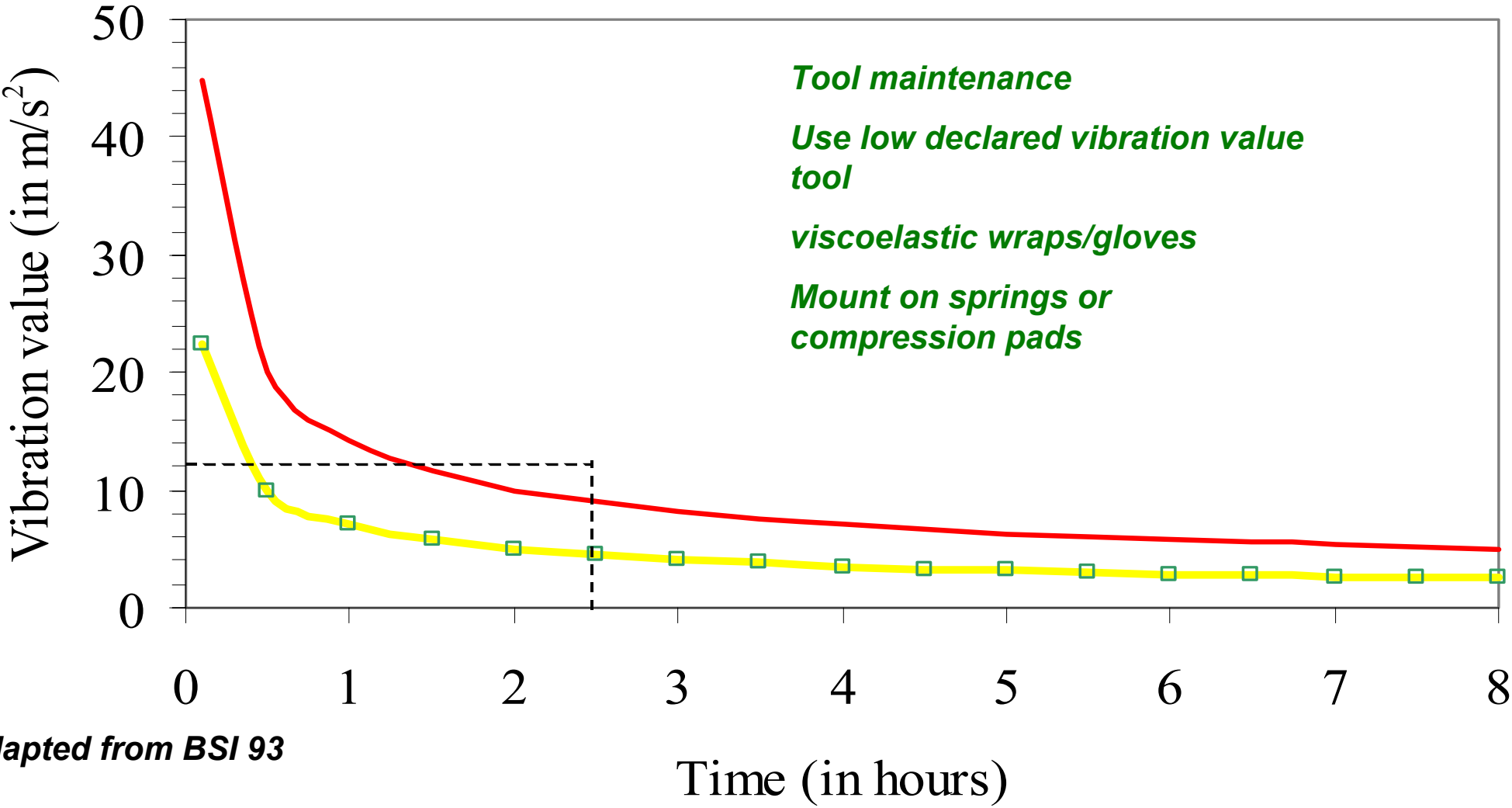
Control Strategies: *Hand Arm Vibration*

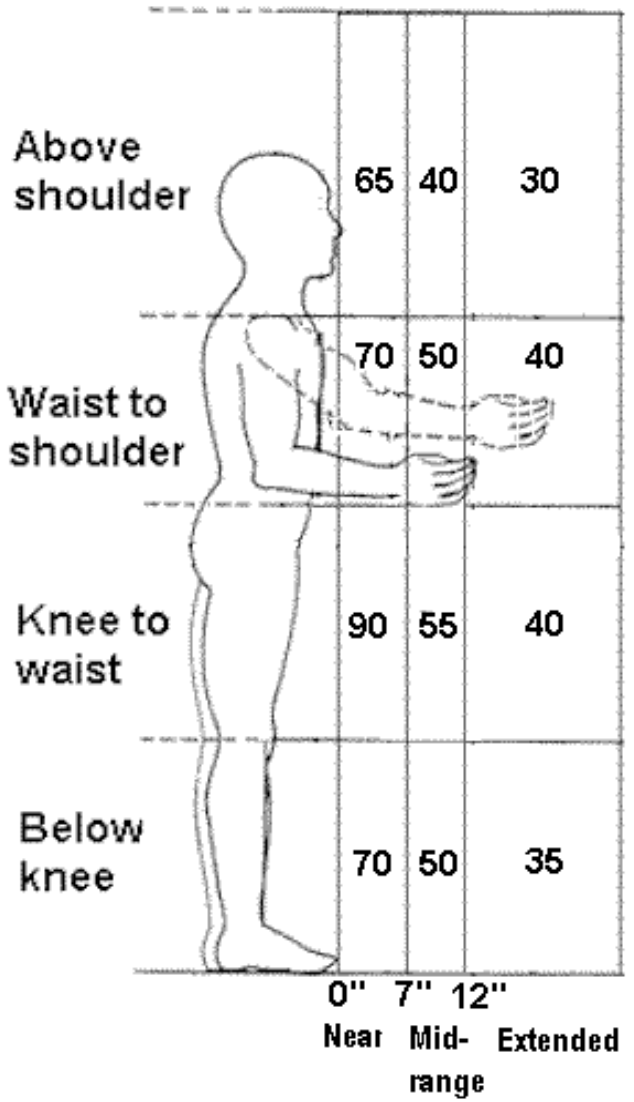


Adapted from BSI 93

Lifting Analysis Example from Appendix B

Determine the Unadjusted Weight Limit.

Step 2



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Lifting Analysis Example from Appendix B

Step 3

Find the Limit Reduction Modifier.

How many lifts per minute?	For how many hours per day?		
	1 hr or less	1 hr to 2 hrs	2 hrs or more
1 lift every 2-5 mins.	1.0	0.95	0.85
1 lift every min	0.95	0.9	0.75
2-3 lifts every min	0.9	0.85	0.65
4-5 lifts every min	0.85	0.7	0.45
6-7 lifts every min	0.75	0.5	0.25
8-9 lifts every min	0.6	0.35	0.15
10+ lifts every min	0.3	0.2	0.0

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WA Implementation Process

- Long phase-in by industry/size (2-6 years)
- Demonstration projects (WC premium discounts available)
- Workshops, training materials
- Website (resources, solutions, best practices) [www.lni.wa.gov/wisha/ergo]
- Blue ribbon panel review of readiness
- CDC grant to evaluate implementation process

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First to Comply: Large Employers (>50 FTEs) in Top 12 Industries by Prev Index

- Trucking & Courier Services
- Nursing & Personal Services
- Masonry, Stonework
- Air Transportation Scheduled
- General Contractors-Residential
- Roofing
- Carpentry & Floor work
- Residential Care
- Grocery Stores
- Concrete Work
- Landscaping & Horticultural Services
- Sawmills
- *Dept Labor & Industries*

Awareness Education, Identify jobs: 7/01/02, Fix hazards 7/01/03

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Help

- Workshops
- Consultations
- Websites: http:/www/lni/wa/gov/wisha/ergo
- Awareness education modules
- Demonstration projects
- Blue Ribbon Panel (ensure understandability of rule, educational materials available, compliance assistance available, compliance policies fair and consistent)
- CDC study on evaluation of implementation process

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Demonstration Projects

- Sawmills
- Roofing
- Drywall/Masonry
- General Contractors
- Nursing Homes
- Air Transportation
- Grocery Stores
- Trucking
- Hardware stores/distribution centers
- Landscaping & Horticulture
- Newspapers
- Deciduous Tree Fruits
- Hops
- Landscaping
- Fastener Distribution
- Residential Construction
- Ergo Education toolkits

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Future

WA State

- Blue Ribbon Panel report
- Fair & consistent enforcement begins 7/02
- Lawsuit 10/01
- Legislative agenda

OSHA

- Public discussions
- Voluntary approach
- Partnerships with business organizations
- Regulatory strategy only if multiple states enact own but different rules
- Wait for next administration

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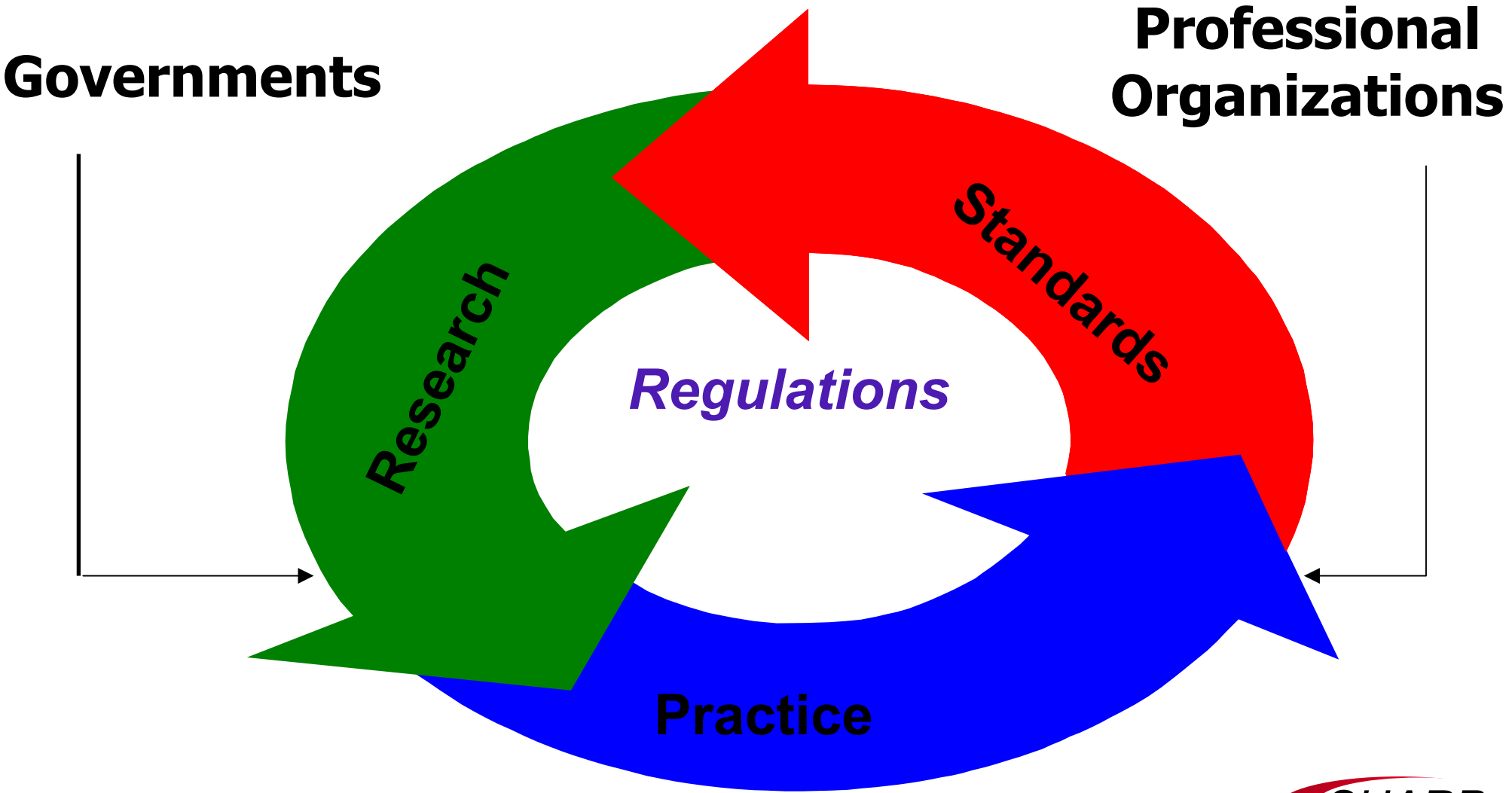
Ergo Feedback Loop: Implementing Change



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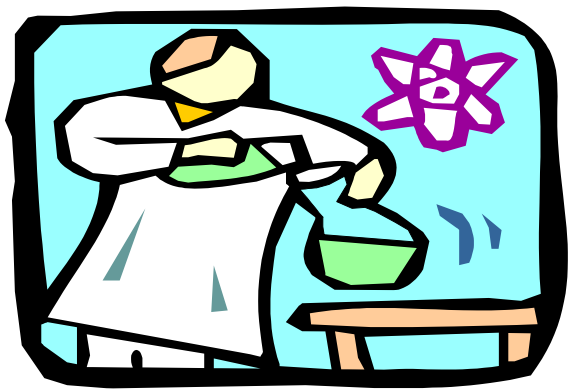
Science & Public Health

"All scientific work is incomplete…All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to command at a given time."

Hill, AB.

Proc Royal Soc Med. 1965



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