Ergonomic Guidelines for Manual Material Handling
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&

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E.A.S.E. COUNCIL
MATERIAL HANDLING INDUSTRY OF AMERICA
CHARLOTTE, NC
Ergonomic Guidelines for Manual Material Handling

The Team

- EASE Council - MHIA
- Cal/OSHA Consultation Services
- NIOSH
- University of California, Davis
- UC Berkeley Ergonomics Program
- Ergonomics Center of North Carolina
- Johnson & Johnson
- CNA
Ergonomic Guidelines for Manual Material Handling

MMH Guideline Advantages

- Focuses On Improvements Not Problems
- “Best Practices “ Approach
- Practical & Non-regulatory
MANUAL MATERIAL HANDLING

ART AND SCIENCE

- The Movement, Storage, Control & Protection of Goods and Materials

- Throughout Manufacture, Distribution, Consumption and Disposal
Why Address Manual Material Handling?
MUSCULOSKELETAL DISORDERS

- PHYSICAL PROBLEMS
  - pain, swelling
  - numbness, tingling
  - ROM and strength
  - change of skin color

- CHARACTERISTICS
  - acute or chronic
  - no early medical findings
  - factors from home / workplace
MUSCULOSKELETAL DISORDERS

- GENERAL
  - SPRAINS & STRAINS
  - MYALGIA
  - TENDINITIS
  - TENOSYNOVITIS
MUSCULOSKELETAL DISORDERS

- SYNDROMES
  - CARPAL TUNNEL
MUSCULOSKELETAL DISORDERS

- SYNDROMES
  - THORACIC OUTLET
MUSCULOSKELETAL DISORDERS

- BACK PROBLEMS

- Cervical curve
- Thoracic curve
- Lumbar curve
- Back muscles
- Buttock muscles
- Hamstring muscles
- Vertebra
- Disc
- Nerve
- Stomach muscles
- Thigh muscles
MUSCULOSKELETAL DISORDERS

● BACK PROBLEMS
  - DISCS
  - SCIATICA
  - OSTEOARTHRITIS
Why Address Manual Material Handling?

- PHYSICAL DEMANDS OF WORK
  - REPETITION
  - FORCE / WEIGHT
  - AWKWARD POSTURE
  - VIBRATION

- TOOLS & EQUIPMENT
  - POOR GRIPS / Handles
  - EXCESSIVE
    - FORCE / WEIGHT
    - VIBRATION
    - REPETITION
  - AWKWARD POSTURE
    - WRIST / ARM
    - UPPER BODY
Why Address Manual Material Handling?

- **THE WORK ENVIRONMENT**
  - COLD
  - HOT
  - LIGHTING
  - NOISE
  - HOUSEKEEPING

- **THE SET UP OF WORK**
  - ROTATING SHIFT WORK
  - LACK OF TASK VARIETY
  - EXCESSIVE
    - OVERTIME
    - WORK PACE / DURATION
  - POORLY COMMUNICATED
    - EXPECTATIONS
    - JOB DEMANDS
Why Address Manual Material Handling?

Laborers and Material Movers Suffered the Most Injuries & Illnesses With Days Away From Work

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Injuries and Illnesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laborers and material movers</td>
<td>89,510</td>
</tr>
<tr>
<td>Heavy and tractor-trailer truck drivers</td>
<td>71,900</td>
</tr>
<tr>
<td>Nursing aides, orderlies, attendants</td>
<td>56,820</td>
</tr>
<tr>
<td>Construction laborers</td>
<td>41,620</td>
</tr>
<tr>
<td>Janitors and cleaners</td>
<td>35,660</td>
</tr>
<tr>
<td>Retail salespersons</td>
<td>35,420</td>
</tr>
<tr>
<td>Light or delivery service truck drivers</td>
<td>33,280</td>
</tr>
<tr>
<td>Carpenters</td>
<td>29,480</td>
</tr>
<tr>
<td>Stock clerks and order fillers</td>
<td>26,520</td>
</tr>
<tr>
<td>Registered nurses</td>
<td>20,650</td>
</tr>
</tbody>
</table>

(1,315,920 injuries and illnesses that resulted in days away from work)

Why Address Manual Material Handling?

In all of Private Industry and in Goods Producing & Service Providing Industries, Overexertion was a leading cause of injuries & illnesses.

Why Address Manual Material Handling?

The Nature of the Disabling Condition, Occupational Injuries and Illnesses with Days Away from Work, 2003

Sprains & strains, back pain, soreness & pain, tendonitis and CTS accounted for 53% of all lost time injuries & illnesses.

Nature of Injury or Illness
(1,315,920 injuries and illnesses that resulted in days away from work)

Why Address Manual Material Handling?

The Part of Body Affected, Occupational Injuries and Illnesses with Days Away from Work, 2003

- Back: 23.1%
- Upper extremities: 22.7%
- Lower extremities: 21.2%
- Trunk, except back: 12.8%
- Multiple body parts: 9.9%
- Head, except eye: 3.6%
- Eye: 2.8%
- Neck: 1.6%
- Body systems: 1.4%
- Other: 0.8%

The Back & Upper Extremities Were Involved In Almost 1/2 of All Lost Time Injuries & Illnesses

Why Address Manual Material Handling?

Bodily Reaction & Exertion Accounted For Over 40% of All Lost Time Injuries & Illnesses

The Manner in Which the Disabling Condition Occurred, Occupational Injuries and Illnesses with Days Away from Work, 2003

- Bodily reaction and exertion: 42.1%
- Contact with objects and equipment: 26.0%
- Falls: 20.2%
- Transportation accidents: 4.4%
- Exposure to harmful substances: 4.2%
- Assaults and violent acts: 1.7%
- Fires and explosions: 0.2%
- Other: 1.2%

Why Address Manual Material Handling?

Costs

- **DIRECT**
  - W.C. (Medical, Indemnity, Loss exposure)
  - Lost Productivity
  - Errors & Defects

- **INDIRECT (Up to 4X Direct Costs)**
  - Turnover,
  - Absenteeism,
  - Re - Training
Why Address Manual Material Handling?

Workers' Compensation Data - 2003

Pattern of High Losses
Strains, Rep. Motion, Pushing, Pulling, Holding, Twisting, Using Tools/Machines, Carrying, Objects Lifted/Handled
Why Address Manual Material Handling?

California W.C. Data - 2003
53% of Insurance Market

<table>
<thead>
<tr>
<th>Activity</th>
<th>% All Claims</th>
<th>% All Costs</th>
<th>Total Incurred Costs ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain/Injury Lifting</td>
<td>11</td>
<td>12</td>
<td>314,484,353</td>
</tr>
<tr>
<td>Strain/Injury Misc.</td>
<td>9</td>
<td>10</td>
<td>264,614,044</td>
</tr>
<tr>
<td>Rep Motion (CRPL Tunnel)</td>
<td>2.5</td>
<td>3.5</td>
<td>91,683,456</td>
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<tr>
<td>Injury Pushing/Pulling</td>
<td>3</td>
<td>3.5</td>
<td>87,505,943</td>
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<tr>
<td>Injury Holding Carrying</td>
<td>2</td>
<td>2</td>
<td>48,248,929</td>
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<tr>
<td>Twisting</td>
<td>2</td>
<td>2</td>
<td>42,645,706</td>
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<tr>
<td>Object Lifting/Handled</td>
<td>3</td>
<td>1</td>
<td>17,821,835</td>
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<tr>
<td>Strain/Injury by Reaching</td>
<td>1</td>
<td>1</td>
<td>16,859,056</td>
</tr>
<tr>
<td>Totals</td>
<td>34</td>
<td>36</td>
<td>883,863,322</td>
</tr>
</tbody>
</table>
Why Address Manual Material Handling?

Workers' Compensation Data: 2002

Pattern of High Losses
Strains, Rep. Motion, Pushing, Pulling, Holding, Twisting, Using Tools/Machines, Carrying, Objects Lifted/Handled
Why Address Manual Material Handling?

California W.C. Data - 2002

50% of Insurance Market

<table>
<thead>
<tr>
<th>Strain/Injury Lifting</th>
<th>11</th>
<th>12.5</th>
<th>499,551,388</th>
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<tbody>
<tr>
<td>Strain/Injury Misc.</td>
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<td>10</td>
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<tr>
<td>Rep Motion (CRPL Tunnel)</td>
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<td>3.5</td>
<td>140,047,697</td>
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<tr>
<td>Injury Pushing/Pulling</td>
<td>3</td>
<td>3</td>
<td>128,910,435</td>
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<tr>
<td>Injury Holding Carrying</td>
<td>2</td>
<td>2</td>
<td>74,213,592</td>
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<tr>
<td>Twisting</td>
<td>1.5</td>
<td>1.5</td>
<td>54,538,089</td>
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<tr>
<td>Object Lifting/Handled</td>
<td>3</td>
<td>1</td>
<td>23,574,020</td>
</tr>
<tr>
<td>Strain/Injury by Reaching</td>
<td>1</td>
<td>1</td>
<td>29,392,193</td>
</tr>
</tbody>
</table>

Totals: 33% All Claims, 35% All Costs, Total Incurred Costs: $1,337,576,974
Why Address Manual Material Handling?

Workers' Compensation Data: 2001

Pattern of High Losses
Strains, Rep. Motion, Pushing, Pulling, Holding, Twisting, Using Tools/Machines, Carrying, Objects Lifted/Handled
Why Address Manual Material Handling?

California W.C. Data - 2001
43% of Insurance Market

<table>
<thead>
<tr>
<th>Manual Material Handling</th>
<th>% All Claims</th>
<th>% All Costs</th>
<th>Total Incurred Costs ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain/Injury Lifting</td>
<td>11</td>
<td>13</td>
<td>558,864,656</td>
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<tr>
<td>Strain/Injury Misc.</td>
<td>9</td>
<td>11</td>
<td>445,435,822</td>
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<tr>
<td>Rep Motion (CRPL Tunnel)</td>
<td>3</td>
<td>4.2</td>
<td>180,254,890</td>
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<tr>
<td>Injury Pushing/Pulling</td>
<td>3</td>
<td>3.5</td>
<td>152,023,340</td>
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<tr>
<td>Injury Holding Carrying</td>
<td>2</td>
<td>2</td>
<td>78,185,860</td>
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<tr>
<td>Twisting</td>
<td>1.3</td>
<td>1.3</td>
<td>55,317,938</td>
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<tr>
<td>Object Lifting/Handled</td>
<td>3</td>
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<td>23,018,957</td>
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<tr>
<td>Strain/Injury by Reaching</td>
<td>1</td>
<td>1</td>
<td>29,898,408</td>
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<tr>
<td>Totals</td>
<td>34</td>
<td>36</td>
<td>1,522,999,871</td>
</tr>
</tbody>
</table>
Why Address Manual Material Handling?

Workers' Compensation Data: 2000

Workers' Compensation Data: 1999

- % of All Claims
- % of All Incurred Costs
Why Address Manual Material Handling?

Workers' Compensation Data: 1998

- STRAIN/INJURY BY MISCELLANEOUS (60)
- STRAIN/INJURY BY ALL OTHER (69)
- REPETITIVE MOTION AT CARPRIE TUNNEL (67)
- INJURY BY PUSHING OR PULLING (58)
- INJURY BY HOLDING OR CARRYING (67)
- CUMULATIVE STRESS (93)
- CUMULATIVE PRESCRIPTION OF HANDLING (67)
- OBJECT LIFTED OR HANDLED (17)
- TWISTING (53)
- WIELDING OR THROWING (61)

% of All Claims
% of All Incurred Costs

0.00% 2.00% 4.00% 6.00% 8.00% 10.00% 12.00% 14.00%

Workers' Compensation Data: 1997

- STRAIN/INJURY BY MISCELLANEOUS (60)
- STRAIN/INJURY BY ALL OTHER (69)
- REPETITIVE MOTION AT CARPRIE TUNNEL (67)
- INJURY BY PUSHING OR PULLING (58)
- INJURY BY HOLDING OR CARRYING (67)
- CUMULATIVE STRESS (93)
- CUMULATIVE PRESCRIPTION OF HANDLING (67)
- OBJECT LIFTED OR HANDLED (17)
- TWISTING (53)
- WIELDING OR THROWING (61)

% of All Claims
% of All Incurred Costs

0.00% 2.00% 4.00% 6.00% 8.00% 10.00% 12.00% 14.00%
### Why Address Manual Material Handling?

#### California W.C. Patterns 1997 – 2003

<table>
<thead>
<tr>
<th>Activity</th>
<th>% All Claims</th>
<th>% All Costs</th>
<th>Total Incurred Costs($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain/Injury Lifting</td>
<td>11 - 13</td>
<td>11 - 13</td>
<td>1,372,900,397</td>
</tr>
<tr>
<td>Strain/Injury Misc.</td>
<td>9</td>
<td>10 – 11</td>
<td>1,097,399,426</td>
</tr>
<tr>
<td>Rep Motion (CRPL Tunnel)</td>
<td>2 - 3</td>
<td>3 - 5</td>
<td>411,986,043</td>
</tr>
<tr>
<td>Injury Pushing/Pulling</td>
<td>3</td>
<td>3 - 4</td>
<td>368,439,718</td>
</tr>
<tr>
<td>Injury Holding Carrying</td>
<td>1 - 2</td>
<td>2</td>
<td>200,648,381</td>
</tr>
<tr>
<td>Object Lifting/Handled</td>
<td>0.1 – 3</td>
<td>0 - 1</td>
<td>64,414,812</td>
</tr>
<tr>
<td>Strain/Injury by Reaching</td>
<td>1</td>
<td>1</td>
<td>76,078,657</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>27 - 34</strong></td>
<td><strong>30 – 37</strong></td>
<td><strong>3,591,867,434</strong></td>
</tr>
</tbody>
</table>
Ergonomic Guidelines for Manual Material Handling

Why Develop Guidelines?

- What About Ergonomic Regulations?
  - Federal OSHA
  - Cal/OSHA
Ergonomic Guidelines
for Manual Material Handling

● Federal OSHA Ergonomic Standard
  – Promulgated November, 2000
  – Congress repealed standard March, 2001 as part of Contract with America, the Congressional Review Act (1995),

● For the Future
  – Same law (i.e. Congressional Review Act) if OSHA promulgates another standard, the new standard can not be similar to the one that congress nullified in 2001
Ergonomic Guidelines for Manual Material Handling

- Federal OSHA’s Current Strategy - 4 parts
  - Develop Industry / Task Specific Voluntary Guidelines
  - Enforcement - General Duty Clause (Section 5(a)(1) of OSHA Act
  - National Advisory Committee (convened 2002-3)
  - Outreach & Assistance
Ergonomic Guidelines for Manual Material Handling

- Industry / Task Specific Voluntary

- Based On
  - Current incidence rates - injuries & illness
  - Information on effective / feasible solutions
Ergonomic Guidelines
for Manual Material Handling

- Industry / Task Specific Voluntary Guidelines
  - Lots of Help - Three Part Recommendations
    - Management Practices
    - Worksite Analysis
    - Hazard Control
  - Meatpacking, Nursing Homes, Grocery, Poultry & Shipyards
Ergonomic Guidelines
for Manual Material Handling

Industry / Task Specific Voluntary Guidelines

- Lots of Help - Three Part Recommendations
  - Management Practices
    - Providing Management Support, Involving Employees
    - Providing Training
    - Evaluating Ergonomics Efforts
  - Worksite Analysis
    - Identifying Problems
    - Checklists
    - Addressing Reports of Injuries
Ergonomic Guidelines for Manual Material Handling

Industry / Task Specific Voluntary Guidelines

- Lots of Help - Three Part Recommendations
  - Hazard Control
    - Implementing Solutions
    - Lots of Pictures & Examples of Solutions (Tools, Workstations, MMH, PPE)
Ergonomic Guidelines for Manual Material Handling

Industry / Task Specific Voluntary Guidelines

- Hazard Control

**MANUAL MATERIALS HANDLING - Hoppers and Augers**

**DESCRIPTION:**
Container used to hold and dispense contents into a machine, a new container, or onto a workstation through an open gate or using a screw-type mechanism.

**WHEN TO USE:**
When storage of product or other items is required at a workstation.

**POINTS TO REMEMBER:**
- Hoppers are generally preferred for dispensing larger objects such as poultry parts, whereas augers are generally preferred for smaller product such as ice, spices, and tenderizers in predetermined quantity to match recipe or packaging units.
- Hoppers are loaded from the top of the unit and have a gate to drop contents in bulk or pre-measured quantities, whereas augers have screw-type mechanisms that lift smaller particles from a transport container and dispense in pre-measured quantities.
- Operation can be automatic or employee initiated with activation controls located to avoid reaching and bending.
- May replace the need for shoveling, especially for ice.
- To load hoppers and avoid additional lifting, consider devices such as mechanical lifters, dumpers, augers, and conveyors.
Ergonomic Guidelines for Manual Material Handling

Industry / Task Specific Voluntary Guidelines

- Hazard Control

**MANUAL MATERIALS HANDLING - Vacuum Systems**

**DESCRIPTION:**
Vacuum systems for lifting and transport of materials.

**WHEN TO USE:**
Vacuum systems can be used for lifting and transporting poultry parts, boxes of product, spice bags, ice, and other materials. Applications of vacuum systems include:
- Lifting of individual boxes and placement onto racks or pallets for storage or transport.
- Vacuum systems connected to chutes or transport tubes can transport individual poultry parts or collect poultry parts in a container.

**POINTS TO REMEMBER:**
- Vacuum entry points can be placed at individual work areas to gather product for transport to chillers or other holding areas for further processing or packaging.
- Vacuum systems can be designed specifically to handle internal transport of hearts, livers, gizzards, and necks from harvesting area to giblet handling area.
Ergonomic Guidelines for Manual Material Handling

- **Enforcement**

  - Focus - industries/employers with know high injury & illness rates related to ergonomics by:
    - National Emphasis Programs
    - Local Emphasis Programs
    - Enforcement

  - Addresses Ergonomic by Issuing:
    - Citation under General Duty Clause 5(a)(1)
    - Ergonomic Hazard Alert Letters
Ergonomic Guidelines
for Manual Material Handling

● Enforcement

– National Emphasis Programs
  ● Nursing Homes – 2002-3 (1225 Inspections / 157 EHA Letters)

– Local Emphasis Programs
  ● 8 Area Offices (240 EHA Letters)
  ● Meat processing, Warehousing, Hospitals
  ● Auto Parts Manufacturing
Ergonomic Guidelines
for Manual Material Handling

- Enforcement

  - Ergonomic Hazard Alert (EHA) Letters
    - Issued When Not Enough Documentation to Write Citation
    - 397 Issued (240 to various industries / rest to Nursing Homes)
    - Alerts Employers to the Hazards / Suggests Improvements
    - Follow-up Case – by Case
Ergonomic Guidelines for Manual Material Handling

- **Enforcement – General Duty Clause 5(a)(1)**
  - 5(a)(1) - Employer must “furnish to each employee employment and place of employment free from recognized hazards that cause or are likely to cause death or serious physical harm to employee”
  - OSHA Must Show
    - Employer Did Not Keep Workplace Free of Hazards Employees Were Exposed To
    - Hazard caused or likely to cause death / serious physical harm
    - Hazard was recognized
    - Feasible abatement exists
Ergonomic Guidelines for Manual Material Handling

- **Enforcement – General Duty Clause 5(a)(1)**

- **OSHA Citations 2000 – 2005**

- **Total of 17**
  - 2005 - 0
  - 2004 - 4
  - 2003 - 12
  - 2002 - 1
Ergonomic Guidelines for Manual Material Handling

- National Advisory Committee (2002-4)

- Advised On:
  - Ergonomic Guidelines
  - Research - Gaps, Future Needs
  - Methods to Provide Outreach / Assistance
Ergonomic Guidelines
for Manual Material Handling

- Outreach and Assistance
  - eTools
  - Success Stories
  - Case Studies
  - Cooperative Programs
  - Training & Education
  - Speeches
  - Industry Developed Guidelines
  - Additional Information
Ergonomic Guidelines for Manual Material Handling

California

- 1993 WC REFORMS - AB 110
  - CAL/OSHA Must Focus Resources
  - Establishments with Highest Incidences of Preventable Injuries / illness and W.C. Losses
Ergonomic Guidelines for Manual Material Handling

California Ergonomics Standard

- T8CCR 5110
- Long History – 1986
- Enforced / addressed on a “case by case” basis
  - Answer complaints / requests for consultation
- If facts indicate hazards may be present then:
  - inspection /consultation conducted
  - information gathered
  - standard applied if facts support the case
Ergonomic Guidelines for Manual Material Handling

California Ergonomics Standard

- **Scope / Application**
- **Program to Minimize RMIs**
  - Worksite Evaluation
  - Control of Exposures
  - Training
- **Satisfaction of Employer’s Obligation**
Ergonomic Guidelines for Manual Material Handling

California Ergonomics Standard

(a) Scope & Application

- RMI to More Than One Employee and
  - (1) Work related causation - predominantly caused (50% or more by repetitive work)
  - (2) Employees performing job / process / operation of identical work activity
    - same repetitive motion task
    - such as / not limited to word processing / assembly / loading
Ergonomic Guidelines
for Manual Material Handling

California Ergonomics Standard

- (a) Scope & Application

- RMI to More Than One Employee and
  - (3) Were Musculoskeletal injuries
  - (3) Licensed physician objectively identified / diagnosed
  - (4) Reported in last 12 months/not before July 3, 1997
Ergonomic Guidelines
for Manual Material Handling

California Ergonomics Standard

- (c) Satisfaction of Employer’s Obligation

- Employers Obligation Satisfied Unless It Is Shown
  - measures known but not taken are substantially certain to cause greater reduction in RMIs
  - no additional unreasonable costs from alternative measures
Ergonomic Guidelines for Manual Material Handling

California Ergonomics Standard

- **History-** T8CCR 5110 Since Adoption
- **Inspections Conducted / Citations Issued**
  - 2003 - 6 / 19
  - 2002 - 10 / 24
  - 2001 - 14 / 34
  - 2000 - 16 / 38
  - 1999 - 18 / 24
  - 1998 - 6 / 5
- **Totals -** 70 Inspections / 144 Citations Issued
Why Develop Guidelines For Manual Material Handling?

Summary

- Common Type of Operation Worldwide
- Reduce Injuries
- Reduce Costs
  - Direct
    - W.C. (Medical, Indemnity, Loss exposure)
    - Lost Productivity
    - Errors & Defects
  - INDIRECT (Up to 4X Direct Costs)
    - Turnover
    - Absenteeism
    - Re - Training
Why Develop Guidelines For Manual Material Handling?

Summary

- Provide Competitive Edge by Improving
  - Productivity / Efficiency
  - Product / Service Quality
  - Customer Appeal
  - Management Tools
Why Develop Guidelines For Manual Material Handling?

Summary

- Ergonomic Regulations?
  - Federal Regulation
    - Repealed
    - No Current Regulation
    - Future – Can Not Adopt Similar Regulation
    - 20 Total OSHA Citations 2000 – 2005
    - OSHA Now - Outreach / Guidelines
Why Develop Guidelines For Manual Material Handling?

Summary

- Ergonomic Regulations?
  - California Regulation
    - 70 Inspections / 144 Citations 1998 – 2003
    - States Programmatic Requirements
    - Many Enforcement Issues
Ergonomic Guidelines for Manual Material Handling

Summary

California Ergonomics Standard

- Enforcement Issues - (a) Scope & Application
  - Standard says “repetitive motion injuries”
    - what about “static posture” or other types of injuries?

- RMI to More Than One Employee & work related / predominantly caused (50% or more by repetitive work)
  - off the job activities? Ultimately the doctors opinion / judges decision
Ergonomic Guidelines for Manual Material Handling

Summary

California Ergonomics Standard

- **Enforcement Issues - (a) Scope & Application**
  - “identical work activity” means the same:
    - “task category” (assembly / loading / etc.) / risk factors / body parts used
  - “objectively identified and diagnosed”
    - measurable and observable signs & symptoms
    - “customary protocol” (symptoms / labs / physical exam / work history)
    - info taken as a whole supports RMI diagnosis
Why Develop Guidelines For Manual Material Handling?

Summary

● **Guidelines - Practical, Specific Information on:**
  - Effective Management Practices
    ● Involving Employees
  - “Best Practices” Approach - How To
    ● Evaluate Worksites
    ● Train Employees
    ● Select & Implement Improvement Options
    ● Ongoing Problem Solving & Follow-up
  - Resources & More Help
“BEST PRACTICES”
APPROACH
IMPROVEMENT OPTIONS

IMPROVE THE “FIT”
BETWEEN THE
WORK & EMPLOYEES
A “BEST PRACTICES” APPROACH

Proactive

Noticing Potential Problems

The Ergonomic Cycle

Follow-Up

Work Evaluations

Improvement Options & Training

No “potential” problems identified

Improvements not presently needed
Ergonomic Guidelines for Manual Material Handling

What Can These Guidelines Do For You?

Why Improve Your Workplace?

How to Improve Your Workplace
- What to Look For
- What Are Ergonomic Improvements?
- How to Make Changes - “Proactive Problem Solving”
Ergonomic Guidelines for Manual Material Handling

What Can These Guidelines Do For You?

“A Best Practices Approach”
- Looking for Clues
- Prioritizing Jobs for Improvements
- Choosing “Effective Improvements”
- Following - Up

The Matrix – Improvement Options for Common Manual Material Handling Tasks
The Ergonomic Guidelines for Manual Material Handling
Mario Feletto
Cal/OSHA Consultation Services
Research & Education Unit
Sacramento, California
• Non Profit Trade Association
• Established 1945
• Members include 750+ Manufacturers

E.A.S.E. Ergonomic Assist Systems and Equipment
A Product Council of Material Handling Industry of America
INTRODUCING …

“The Ergonomic Guidelines for Manual Material Handling”
What Will the Guidelines Look Like?

The Layout

I. Introduction – Process Piece

II. Matrix:
   a. What is the worker doing?
   b. What is the worker handling?

III. Templates with Photos & Examples

   Equipment Improvement Options & Simple,
   Less Expensive Improvement Options

IV. Resources / Index / Appendices
<table>
<thead>
<tr>
<th>What Will the Guidelines Look Like?</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lifting/ Lowering, Palletizing/ De-Palletizing:</td>
<td>Boxes, Trays, Totes, Crates</td>
<td>Buckets, bottles, cans</td>
<td>Drums</td>
<td>Empty Pallets, Skids, Large Containers, Wire Baskets</td>
<td>Parts</td>
<td>Rolls, Coils</td>
<td>Sacks/ Bags</td>
<td>Sheets, Boards</td>
<td>Tools, Fixtures, etc</td>
</tr>
<tr>
<td>2. Filling / Emptying Containers:</td>
<td>manually scooping, pouring or packing/unpacking</td>
<td>*Material ON</td>
<td></td>
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<td>3. Carrying:</td>
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<td>4. Assembling &amp; Positioning:</td>
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**WHAT IS THE WORKER HANDLING?**

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*Material ON  
*Material IN
What Will the Guidelines Look Like?

What is the worker doing? Lifting/lowering, palletizing/de-palletizing

What is worker handling? Boxes, totes, trays, crates

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<th>Limitations:</th>
<th>Equipment Improvement Options:</th>
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<td><strong>Possible Risk Factors:</strong></td>
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<td>Awkward Posture</td>
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<td>Force on back</td>
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Simple, Less Expensive Options:
What Will the Guidelines Look Like?

**MANUAL MATERIAL HANDLING JOB DUTY DESCRIPTION**

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<th>Job Duty Description</th>
<th>Possible Risk Factors</th>
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<td>Unloading parts from containers, baskets, gaylords</td>
<td>Awkward, static posture</td>
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**Main Body Parts Affected:**
- Back
- Neck/Shoulders

**Improvement Options:**
- Alter the workplace
  - Provide a clear pathway
- Change the objects used in the task
  - XXXXXXX XXX XXXXXXX
  - XXXXXXXXXX XXX XXXXXXX
- Change the Job Tasks:
  - Rotate this task with other, non-loading, tasks
  - Take short, frequent breaks from this task

**Improvement Options: Equipment**
- Use a lift and tilt table
- Use a mobile bin tilter

draft 9-36-03
What Will the Guidelines Look Like?

More Improvement Options

- Use a portable stacker
- Use a lift and tilt device
- Use lift and tilt tables
- Use a portable lift and tilt
- Use pick and place tilt stands
- Use collapsible bins with drop down side
- Use collapsible bins with drop down sides
- Use a Container Rotator

draft 9-30-03
LIFTING
STRETCHING
REACHING
BENDING
STOOPING
and
WALKING

These unnecessary worker activities can result ergonomic problems
Pallets

MANUAL LOADING AND UNLOADING OF PALLETS CONTINUES TO BE ONE OF THE MOST COMMON AND MOST INJURY PRONE TASKS IN INDUSTRY TODAY.
These are automatic load leveling devices that maintain the top of the load in the 30 to 38” ergonomic window.
Sitting or standing a lift can eliminate the back bending to associated with pallet loading/unloading.

Portability allows the operator to bring the machine in close & eliminate walking around.
Balancers can also be used to unload pallets and make positioning goods at various locations within a machine or work center.

Notice the bi-directional work station crane.

These trays of parts become virtually “weightless”.
These lightweight lifts are highly maneuverable.
Lifts and positioners can also be fitted with turntables for "near side" loading.

As much as 40% of the time required loading a pallet, can be spent walking around it!
There are inexpensive machines to transport pallet loads in and around work stations - even load positioners.
This vacuum lifter makes easy lifting and maneuvering of these heavy cheese wheels.

This is a really cheesy job!
Containers

Manual loading and unloading of wire baskets, containers and Gaylord's leads to a high incidence of lower back injuries.
Repetitive bending into containers can result in a high incidence of back injuries.
Bending eliminated!
Parts picking at a hydraulic press work station

Imagine the back extension, bending and reaching required to get to these parts.
Parts picking made productive from fixed height tilters

Notice the high hinge causing the container to elevate as it tilts.
Parts picking on assembly line
Manipulators making easy work of handling cylinder heads in a machining center
Electric chain hoist on articulated jib crane

Notice the use of gravity roller conveyor to ease the feeding of parts.
Wrong!

Where no loading dock exists

Make that three wrongs!
I love this lift! Right!
This expandable conveyor is driven right into the truck.

The individual boxes and cartons are conveyed right to the worker.

Notice how the odd sizes and shapes are handled easily by a single piece of equipment.
Portable lift for vertical positioning panels in a finishing operation
Lift & Tilt to position electrical panels in this work cell

Notice the accordion skirting to cover scissors legs.
lifters to manipulate the small stuff
IAD - Intelligent Assist

Amplifies operator’s power
Unit has an intuitive, human-like feel

Intuitive
The operator has a sense of control & feel over the load using normal arm, wrist and hand movements.

Intelligent
Resolver feedback from the servomotor allows for future implementation of programmable human limits.
This lift and gravity conveyor permits one person to do what was a two man job.
Use portable lifts to level loads and eliminate bending and reaching
Questions?

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Mario Feletto - Cal/OSHA
James J. Galante - EASE Council
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