Job Intervention Examples From Parts Depots

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Outline

• **Ergonomic Hazards in Parts Distribution**
  – Two studies from UAW/Big Three Joint programs

• **Tools for Evaluation**
  – NIOSH Lifting Formula
  – 3 Dimensional Static Strength Prediction
  – RULA

• **Examples of Fixes**
Ergonomics Process

Injuries
Symptoms
Job characteristics

Evaluate risk factors

Risk factors?

Design & implement

Re-Evaluate risk factors

Stop

Risk factors?

Job closed

UAW analysts

Timely Manner (Quick fix or 6months)

2 weeks
UAW Joint Programs Parts Depot Injury Research

• Study Goals
• Methods and Findings
  – Phase I: Injury Epidemiology (Johns Hopkins)
  – Phase II: Ergonomic Analysis (U. of Mich.)
  – Phase III: Intervention Evaluation (U. of Mich.)
• Findings
  – Ergonomics committees can identify, prioritize, and fix problem jobs
  – Troubleshooting fixes may be required

– Study Citation
Parts Distribution: High Risk Work

Injuries in Parts Depots

- When injuries happened the injuries were severe.
- What were the underlying causes?
- Research study conducted
Epidemiology: Age

- Incidence declines with age.
  - Healthy Worker effect?
  - High Seniority reduces exposure?
**Gender**

*Are women more effected than Men*

*Possible Reasons Women have higher rates:* Job placement, low seniority, greater physical stress

*Injuries related to exposure*
Epidemiology: Location

- Is there a difference in ergonomic processes in the different locations?
Epidemiology: Job Classification

- Is there a difference across job classifications?
- Can’t tell from Injury data/job titles
High Risk Jobs

*Operators Identify worst jobs*
- Picking Parts
- Awkward lifting tasks
- Low bins
- High bins

*Specific Parts*
- Leaf Springs
- Doors
- Prop shafts
High Risk Jobs

- Picking from bins
- Loading into Cardboard Triwall
High Risk Jobs

- Small parts racks
- Ladder cart
ObjectsHandled

- Loose part(s)
- Sheet metal
- Heavy metal (axles)
- Fluids
- Corrugated boxes
- Sealed bags
- Empty totes
- Dunnage
- Full totes
- Hand carts
- Labels
- Scanners
- Other
Parts Containers

- Handholds not at center of gravity

Poor handle design traps fingers, reduces grip strength, requires wrist deviation
Cart Design

Wheels too small. Cart hard to push.

Large wheels. Easy to push.
Ergonomics Evaluation: Phase II

• 59 “jobs” were evaluated during Phase II
• Job defined as activities performed by a worker at a single workstation
• Selection based on:
  – “Top 10” lists submitted by PDCs
  – Walkthroughs 5
• Findings summarized in “one-page” reports

Primary Evaluation Tools

- Risk Factor Checklists
  - UAW-GM
    - Risk Factor Checklist
  - Daimler Chrysler
    - Humantech Brief/RPM
    - ERGO PAL
  - UAW-Ford
    - EST
      - Newly Launched Computerized Checklist
  - UAW Local 2488-Mitsubishi
    - Humantech RPM
  - UAW Local Toyota
    - NEBA
Secondary Tools

- **Liberty Mutual**
  - Snook, Ciriello
  - Push/Pull
  - Carry
- **Rapid Upper Limb Assessment (RULA)**
- **NIOSH Lifting Formula**
  - 1991 and 1981
- **U of M 3DSSP**
Current tools

- **Risk Factor Checklists**
  - UAW-GM
    - Risk Factor Checklist
  - Daimler Chrysler
    - Humantech Brief/RPM
    - ERGO PAL
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- **Liberty Mutual**
  - Snook, Ciriello
  - Push/Pull
  - Carry
- **NIOSH Lifting Formula**
  - 1991 and 1981
Training

• **Example**
  – 43 pound axles
  – Lift from conveyor to overhead monorail
  – 1 every 12 seconds

• **1991 NIOSH**
  – Lifting index of 2.5

• **3DSSP**
  – Exceeds Strength Design Limits for Shoulder
Secondary Tools: 3DSSP

- Available training programs at ergonomics conferences
- Annual trainings in Michigan and other parts of the country.
Valuable for Job Redesign

- Shoulder Torque changes from 265 in*Lbs to 131
- Back Compression 423 to 239
Job Interventions

- Using these tools parts depot work stations were evaluated.
- Job fixes were installed and evaluated
  - Worker surveys were important in fine tuning the job fixes

Before
After
Loading Triwall

Before

After: Operators have increased shoulder flexion but improved back posture.
Fine tuning

Motor unit is an obstacle. Product was redesigned with manufacturer.
Conveyor Line

Before: Two tier conveyor leads to awkward lift

After: Accordion style conveyor: provides needed space while eliminating back bend
Conclusions

• Tools can be used to document reduction of ergonomic risk
• Operator interviews show reduction in discomfort and acceptance of job changes
• No quick fix that eliminates all hazards or trade-offs, but the jobs were significantly improved
Website WWW.UAW.ORG
http://www.uaw.org/hs/at/

- A Variety of links divided by category
  - Chemical hazards
  - Environmental data
  - OSHA Compliance
  - NIOSH resources

- Ergonomic links
NIOSH LINK

http://www.cdc.gov/niosh/topics/ergonomics/
HAL TLV Link

- Web site for hand Activity Level Application
  - [http://umrerc.engin.umich.edu/jobdatabase/RERC2/HAL/ACGIHTLV.htm](http://umrerc.engin.umich.edu/jobdatabase/RERC2/HAL/ACGIHTLV.htm)
Rating Job Improvements

- Strain Index
- Hand Activity Level Threshold Limit Value
- Visit UAW.org for links to HAL Web Site
Other Useful Sites

• https://gsp.extra.daimlerchrysler.com/mfg/amedd/tooldesign/section15page.htm