Participative approach to ergonomic research in transportation: Identification of risks factors and countermeasures for concerns in the courier, waste, and general trucking subsectors

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Problem

- Musculoskeletal disorders are a major concern in the transportation sector.
- The transportation sector has the highest lost time injury (LTI) rates of any sector (WSIB Enterprise, Sept. 2008).
- MSDs account for 45% of total LTIs and 35% of LTI costs (MOL Update, presentation Feb. 18, 2008).

Introduction

- 6 transportation companies (2 courier 3 for-hire trucking companies, and 1 waste) collaborated with CRE-MSD and THSAO on a 2.5 year research project.
- Cross functional teams (drivers, maintenance, managers and union representatives) were formed and received basic training on risk factors and root cause analysis.
- High risk jobs were identified through review of administrative data, self-reported check lists, interviews and activity analysis.
- Detailed ergonomic assessments were completed on all major jobs and tasks and a list of possible interventions was generated for 82 activities.
- Interventions were categorized at the driver, company, customer, truck manufacturer and sector and policy levels.
- The interventions were evaluated based on their effectiveness to reduce MSD risk factors.
- As part of the study, breakout sessions, at a conference in February 2008, gave the 120 participants the opportunity to discuss and comment on possible interventions to reduce specific hazards.
- Groups rated the interventions feasibility based on: risk impact, work environment impact, productivity impact, ease of implementation, and cost.
- Data was collected from surveys that were administered during these sessions.

Summary

- Interventions can be applied in the transportation sector to reduce the risk of injury.
- Applying these interventions will assist in the continuous improvement of ergonomics in the transportation sector.

Examples of Identified Concerns and Countermeasures

General Trucking

CONCERN:
Coupling and uncoupling trailers

COUNTERMEASURES:
1. Follow appropriate procedures and training
2. Ensure adequate preventative maintenance for tractors and trailers
3. Investigate powered (electric, pneumatic or hydraulic) landing gear systems.
4. Purchase trucks and shunt trucks with the same 5th wheel height to minimize need to raise and lower the trailers.
5. Investigate leverage tool to decrease king pin pull force.

CONCERN:
Tractor and trailer ingress / egress

COUNTERMEASURES:
1. Place an extra step or fold out step at the back of trailer to assist with climbing.
2. Add hand holds to ensure 3-point contact and assist with climbing up (ex. grab handles, holes in the floor for hand holds, detachable railing).
3. Use a deckmate ladder for trailers.
4. Load/unload trailers at docks which are same height as trailers.
5. Design tractors, catwalks and trailer headboards with adequate grab handles and steps configurations with adequate grating.

CONCERN:
Truck Cab Design

COUNTERMEASURES:
1. Design seats design with suspension and adjustment for vertical height, lumbar support, tilt, back recline, armrest height and angle.
2. Design seatbelt shoulder strap height to be adjustable.
3. Design steering wheels with tilt and telescoping adjustments and ensure pedals, seat and steering wheel align.
4. Design cab so main controls are within easy reach.
5. Angle dash to bring controls closer.
6. Design dash board so main displays are easily visible.
7. Design engine compartment so fluid check point can be accessed without climbing.

Courier Subsector

CONCERN:
Courier Truck Design

COUNTERMEASURES:
1. Change rear roll up doors to bi-fold.
2. Design front doors to open and lock automatically to reduce double handling of packages
3. Make steps with anti-slip matting,
4. Design steps with less distance between them.
5. Purchase trucks with seating that includes: adjustable lumbar support, adjustable armrest height, good suspension, seat pan tilt.
6. Have height adjustable shelves in the cargo compartment to reduce bending and reaching.
7. Ensure steering wheel has tilt and telescoping adjustments and that it is inline with the pedals and seat.

CONCERN:
Package Sorting

COUNTERMEASURES:
1. Angle the back of bins and tables so packages can be within a 50cm reach
2. Make roller conveyors gravity fed or replace with automated conveyers.
3. Place skids with packages on weight leveling lift tables to reduce reaching.
4. Install vacuum hoist to unload packages to and from conveyor.
5. Add additional workers when unloading cargo to decrease individual lifting
6. Redesign line haul cages with decreased horizontal reach and lower vertical height.

CONCERN:
Loose Loading Trailers

COUNTERMEASURES:
1. Use vacuum hoist on a portable jib crane to lift heavy packages
2. Load packages on an automated conveyer that extends into the trailer
3. Use a step ladder to assist with retrieving packages from top of trailer.
4. Load packages into bins instead of loose loading. Bins should be placed on lift tables to reduce bending or reaching.
5. Add additional workers to assist with loading and unloading trailers, which would reduce individual lifting frequency.

Waste Subsector

CONCERN:
Waste truck design

COUNTERMEASURES:
1. Ensure trucks have adequate grating on exterior and interior steps.
2. Ensure trucks have adequate grab handles at the side doors and the back of truck to encourage 3 point contact.
3. Ensure sufficient grip on grab handles.
4. Design larger, wider and lower hoppers.
5. Ensure that ride-on platforms at back of truck are adequate size and have adequate grab handles.
6. Ensure trucks with air ride to decrease vibration exposure and adjustable seats for more comfortable posture.

CONCERN:
Waste truck design

COUNTERMEASURES:
1. Worker technique and training, :
   - Move feet instead of twisting and throwing the load.
   - Ensuring workers lifts only one garbage bag at a time.
   - Team lift for heavy, awkward loads.
2. Improve communication with the community on where garbage should be placed, especially in winter months.
3. Investigate automated load trucks.
4. Set a maximum weight limit per container and notifying customers that items will be tagged and NOT collected.
5. Consider payment by the hour instead of by tonnage or “finish and go home” pay schemes to reduce lifting frequency.

CONCERN:
Sorting at Material Recovery Facility

COUNTERMEASURES:
1. Decrease width of conveyors to reduce horizontal reach (max conveyer width of 100cm; thus 50cm reach to center).
2. Deflectors on conveyors to direct items closer to workers to reduce reaching.
3. Design waste shoot to be in front of sorter so the sorter does not have to twist and reach behind.
4. Platforms for shorter workers.
5. Ergo matting where sorters stand for long durations.

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