

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

CONCERN:
Tractor and trailer ingress / egress



- COUNTERMEASURES:**
- Place an extra step or fold out step at the back of trailer to assist with climbing.
 - 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).
 - Use a deckmate ladder for trailers.
 - Load/unload trailers at docks which are same height as trailers.
 - Design tractors, catwalks and trailer headboards with adequate grab handles and steps configurations with adequate grating.

CONCERN:
Truck Cab Design



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

Courier Subsector

CONCERN:
Courier Truck Design



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

CONCERN:
Package Sorting



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

CONCERN:
Loose Loading Trailers



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

Waste Subsector

CONCERN:
Waste truck design



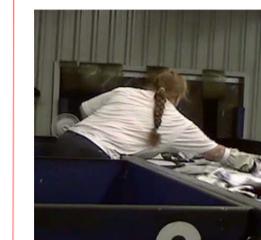
- COUNTERMEASURES:**
- Ensure trucks have adequate grating on exterior and interior steps.
 - Ensure trucks have adequate grab handles at the side doors and the back of truck to encourage 3 point contact.
 - Ensure sufficient grip on grab handles.
 - Design larger, wider and lower hoppers.
 - Ensure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

CONCERN:
Waste truck design



- COUNTERMEASURES:**
- 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.
 - Improve communication with the community on where garbage should be placed, especially in winter months.
 - Investigate automated load trucks.
 - Set a maximum weight limit per container and notifying customers that items will be tagged and NOT collected.
 - 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:**
- Decrease width of conveyors to reduce horizontal reach (max conveyer width of 100cm; thus 50cm reach to center).
 - Deflectors on conveyors to direct items closer to workers to reduce reaching.
 - Design waste shoot to be in front of sorter so the sorter does not have to twist and reach behind.
 - Platforms for shorter workers.
 - Ergo matting where sorters stand for long durations.

