



## Assessment of perceived injury risks and priorities among truck drivers and trucking companies in Washington State

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### ARTICLE INFO

#### Article history:

Received 20 December 2007

Received in revised form 4 August 2008

Accepted 17 September 2008

Available online 5 November 2008

#### Keywords:

Trucking

Survey

Work-related Injuries

Needs Assessment

Intervention

### ABSTRACT

**Problem:** The trucking industry experiences one of the highest work-related injury rates. Little work has been conducted previously in the United States to assess the hazards, needs, and injury prevention priorities in trucking. **Method:** Two separate industry-wide surveys of 359 trucking companies and 397 commercial truck drivers were conducted in Washington State. **Results:** Trucking companies and drivers both ranked musculoskeletal and slip, trip, fall injuries as the top two priorities. Controlling heavy lifting, using appropriate equipment, and addressing slippery surfaces were frequently listed as solutions. There appears to be a gap in safety climate perception between workers and employers. However, driver and company priorities agreed with industry workers' compensation claims. There is room for safety program management improvement in the industry. The study findings detail opportunities for prioritizing and reducing injuries. **Impact on Industry:** This information can be used to focus and design interventions for the prevention of work-related injuries while improving industry competitiveness.

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### 1. Problem

Industry sub-sectors that comprise the trucking industry experience some of the highest incident and prevalence of work-related injuries compared to other industries (Bonauto, Silverstein, Adams, & Foley, 2006; Leigh, Waehrer, Miller, & Keenan, 2004). Yet relatively few resources have been invested in the research and development of prevention strategies. This is changing with the implementation of the second National Occupational Research Agenda (NORA II) by the National Institute for Occupational Safety and Health (NIOSH). This sector-based approach to identifying research priorities includes Transportation, Warehousing and Utilities as one of the eight industry sectors.

The Bureau of Labor Statistics Census of Fatal Occupational Injuries (BLS, 2007a) reported 555 fatalities in truck transportation in 2006 and a rate of 27.3 per 100,000 workers, which accounts for nearly 10% of all work-related fatalities and at an incidence much higher than that for all industries (4.0 per 100,000 workers). The non-fatal injury rate in 2006 was 5.8 per 100 full-time workers for Truck Transportation, and 10.5 per 100 full-time workers for Couriers and Messengers, compared to a rate of 4.4 for all private industry (BLS, 2007b). With an employment of over 2 million workers, this sub-sector of U.S. industry experiences some of the highest numbers and rates of fatal and non-fatal injuries.

Previous research surveys of truck drivers have been conducted in the United States, however most of this work has focused on hours of service, driver fatigue, and motor-vehicle crash factors (Beilock, 1995; Braver et al., 1992; Monaco & Williams, 2000). A NIOSH conference in 2003 generated a report that identified many potential occupational health risks to truck drivers and research needs in this area (Saltzman & Belzer, 2007). Other research by Belzer, Rodriguez, and Sedo (2002) assessed specifically the impact of economics and other factors on truck driver safety as it pertained to crashes. However, very little survey research has focused on the assessment of the risk factors and perceived conditions that may promote injuries within trucking in the United States.

A survey in Australia by Mayhew and Quinlan (2000) assessed health and safety perceptions of truck drivers in New South Wales. This study found that 51% of truck drivers had experienced a chronic injury or illness in the previous 12 months, and 31% reported chronic back injuries. A measurement of mental health status was used and nearly all drivers were above "normal" stress levels according to the General Health Question (GHQ) with factors of financial stress, long hours, interstate driving, and overnight driving associated with higher stress scores. Another survey by Robb and Mansfield (2007) of self-reported musculoskeletal problems among truck drivers in the United Kingdom found that over 80% reported some musculoskeletal pain in the previous 12 months. Manual material handling and subjective ratings of seat discomfort were associated with the self-reported musculoskeletal pain.

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The Safety and Health Assessment and Research for Prevention (SHARP) Program initiated a project in partnership with the Washington State trucking industry called the Trucking Injury Reduction Emphasis (TIRES) Program. The goals of this program are to systematically identify and prioritize the types of injuries, identify root-cause hazards, and develop practical solutions to help the industry reduce the burden of lost-time injuries. As part of the first phase of the TIRES program, an analysis of Washington State workers' compensation data identified trucking industry groups as having some of the highest compensable workers' compensation claims rates in Washington State (Bonauto et al., 2006). Industry assignment was defined by the North American Industrial Classification System (NAICS) code assigned to the workers' compensation insurance account for each company. In Washington State, General Freight Trucking (NAICS 4841), Couriers (NAICS 4921), Specialized Freight Trucking (NAICS 4842), and Waste Collection (NAICS 5621) each ranked in the top eight industries for compensable workers' compensation claims from 1999–2003. A sub-set of this analysis also showed that most (at least 70%) of injuries in trucking were of four types: (a) upper extremity and back work-related musculoskeletal disorders (WMSDs); (b) slips, trips and falls; (c) struck-by injuries; and (d) motor-vehicle crashes.

The second phase of the TIRES Project was to conduct industry-wide surveys of both trucking employers and truck drivers to assess perceptions of hazards, needs, and priorities within Washington State trucking companies. The goals of the surveys were to: (a) obtain demographic information not available from administrative databases to better describe the work and organization of trucking companies, and the population of truck drivers; (b) assess worker and company priorities to better target educational needs and interventions; and (c) identify risk factors, solution strategies, and barriers to preventing occupational injuries from both the company and driver perspectives. The following presents results of these two surveys summarizing responses from trucking employers and truck drivers.

## 2. Methods

Two state-wide surveys were administered to employers and employees with commercial drivers licenses in the trucking industry. The employer survey, sent to Washington State trucking companies, assessed: (a) needs and priorities in the trucking industry, (b) reported causes of injuries with associated solutions and barriers to implementation, and (c) safety climate from the employer perspective. The employee survey asked truck drivers to assess their perceptions of: (a) the level of exposure to injury risk factors, (b) prevalence of pain/injury, (c) causes of injuries with associated solutions and barriers to implementation, and (d) safety climate.

Questions were developed through inclusion of questions from previous trucking survey research (Monaco & Williams, 2000; Mayhew & Quinlan, 2000) and through 12 months of structured interviews and focus groups with companies, labor unions, truck drivers, and industry associations in Washington State. The survey instruments were reviewed and pilot-tested by industry and labor partners for relevance, accuracy, and completeness of content.

### 2.1. Truck Driver Survey

A random sample of 2,189 drivers distributed across the trucking sector was taken from a database population of 18,988 current commercial drivers license (CDL) holders employed in trucking companies. The current CDL holders from the Washington State Department of Licensing were cross-referenced against a database from the Washington State Employment Securities Department to identify those employed by a company within the trucking industry North American Industrial Classification System (NAICS) codes (NAICS 484, 492 and 5621). Phone numbers were not included in the data and were obtained by a directory look-up. Data-sharing agreement contracts were in place

between agencies to assure integrity and security of any confidential data.

A total of 397 complete surveys were received from 700 qualified truck drivers, for a response-rate of 57%. There were 300 completed mail, 83 phone, and 14 web surveys. Out of the total sample, 1,489 were disqualified, 241 were unreachable, and 64 refused the survey. Of the disqualified sample, 1,071 either had a bad address or no listed phone number and 186 had a phone number that was either wrong or disconnected.

A survey with questions relating the type of work and trucking normally conducted, exposure to injury risk factors, reported pain/injury, risk prioritization (ranking from "most important to "least important"), safety climate (Dedobbeleer & Beland, 1991), and perceptions of injury causes (qualitative response), solutions (qualitative response) and barriers (qualitative response) was mailed to each truck driver in the spring of 2006. Postcard reminders were mailed 10–14 days after the first mailing, and telephone follow-up with standard protocol was initiated with non-responders after an additional seven days. A web survey form was included as a response method option on the mailed survey and the postcard follow-up.

### 2.2. Employer Survey

A total of 926 trucking companies were identified through Employment Security data within one of the associated trucking industry NAICS having at least five full-time-equivalent employees during each quarter in 2004. Surveys were mailed to each company in the spring of 2005, and 359 surveys were completed after postcard reminders and telephone follow-up protocols identical to that of the driver survey from 690 qualified companies (52% response). Out of the total sample 236 were disqualified, 240 were not reachable or did not respond, and 91 refused the survey.

Questions relating to company priorities and procedures were included in addition to applicable driver survey items. Injury types and profitability concerns were ranked from biggest concern or problem (score = 1) to smallest concern. Weighted ranking scores were calculated by multiplying each of the rank scores by the number of respondents for each category and then adding each category score together. The lower the weighted ranking score, the higher the problem was ranked overall by respondents.

Interviews with industry associations in Washington State identified a truck fleet size of 25 trucks as a cut-point definition for small and large companies in the survey, with the goal of obtaining a representative sample of both segments (Table 1). A descriptive analysis of all survey variables was conducted and relationships were explored between all variables where a plausible hypothesis existed for a comparison. Statistical differences were evaluated using the chi-square test statistic for ordinal data, and using independent samples t-tests for continuous data, with a significance level of 0.05. Significant differences by measure were evaluated by sub-sector, fleet size, and survey when applicable for each measure. Survey instruments and research methods involving human

**Table 1**

Survey Responses for Truck Driver and Employer Surveys by NAICS and Reported Fleet Size

Industry Sub-Sector (NAICS)	Truck Driver Respondents		Employer Respondents	
	<25 Trucks	≥25 Trucks	<25 Trucks	≥25 Trucks
General Freight (4841)	60	84	99	56
Specialized Freight (4842 excl 48421)	49	49	53	19
Waste Collection (5621)	19	21	19	6
Couriers & Messengers (492)	11	25	14	6
Used Household & Office Goods (48421)	35	13	43	9
Total	176	193	228	96

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