

# The UBC Back Study



## About the Study

Many British Columbians employed in heavy industries will suffer from back injuries over the course of their careers. Occupational back injuries are very common in this province, and they are also very costly due to lost workdays, compensation claims, and health care costs.

Although many studies have investigated back injuries and their risk factors, the research community has not reached a consensus on the occupational causes. In part, this is because it is difficult to assess the real-world exposures that contribute to injuries. Our study aimed to develop better methods of measuring exposures, such as muscle activity and postures that are known to contribute to back injuries.

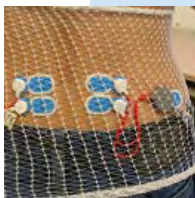
## What did we do?

We tested five approaches for measuring exposures in the following heavy industries: forestry; wood and wood products; construction; transportation; and warehousing.

Three of the approaches used measurement instruments:



**An inclinometer** to measure posture for the whole work shift



**Electromyography (EMG)** to measure back muscle activity for the full shift



**A vibration meter** to measure "whole body vibration" on vehicle seats when the participant was in the vehicle

We also tested two approaches that did not involve instruments:



**Observations** by trained observers of postures, lifting, vehicle use, and tasks for the full shift



**End-of-shift interviews** with employees about postures, lifting, and vehicle use during the shift

## Which exposure measurement tools worked best?

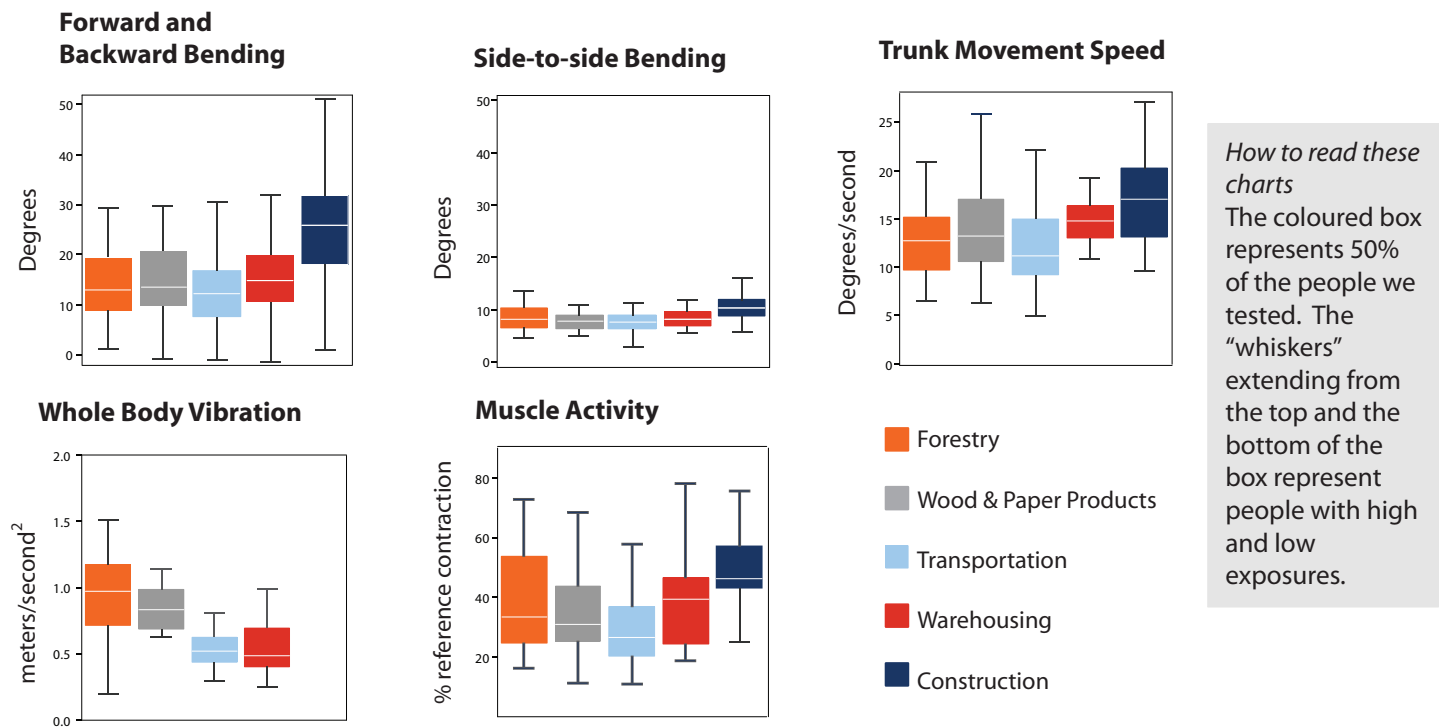
Of the three instruments we used to measure exposures, the inclinometer was most feasible to use in the challenging work environments typical of heavy industry (for example, extreme weather). The inclinometer collected information on bending angles and speed of movements.

Both the observation and interview methods were feasible to use, and were less expensive than using the instruments. Of these two methods, observation did a better job of predicting (through statistical techniques) the measurements that were taken with the instruments.

## What did we find?

Our fieldwork resulted in extensive measurements relating to posture and bending, muscle activity, and whole body vibration in the five heavy industries.

The charts below show measurements of posture, muscle activity, and whole body vibration by industry.



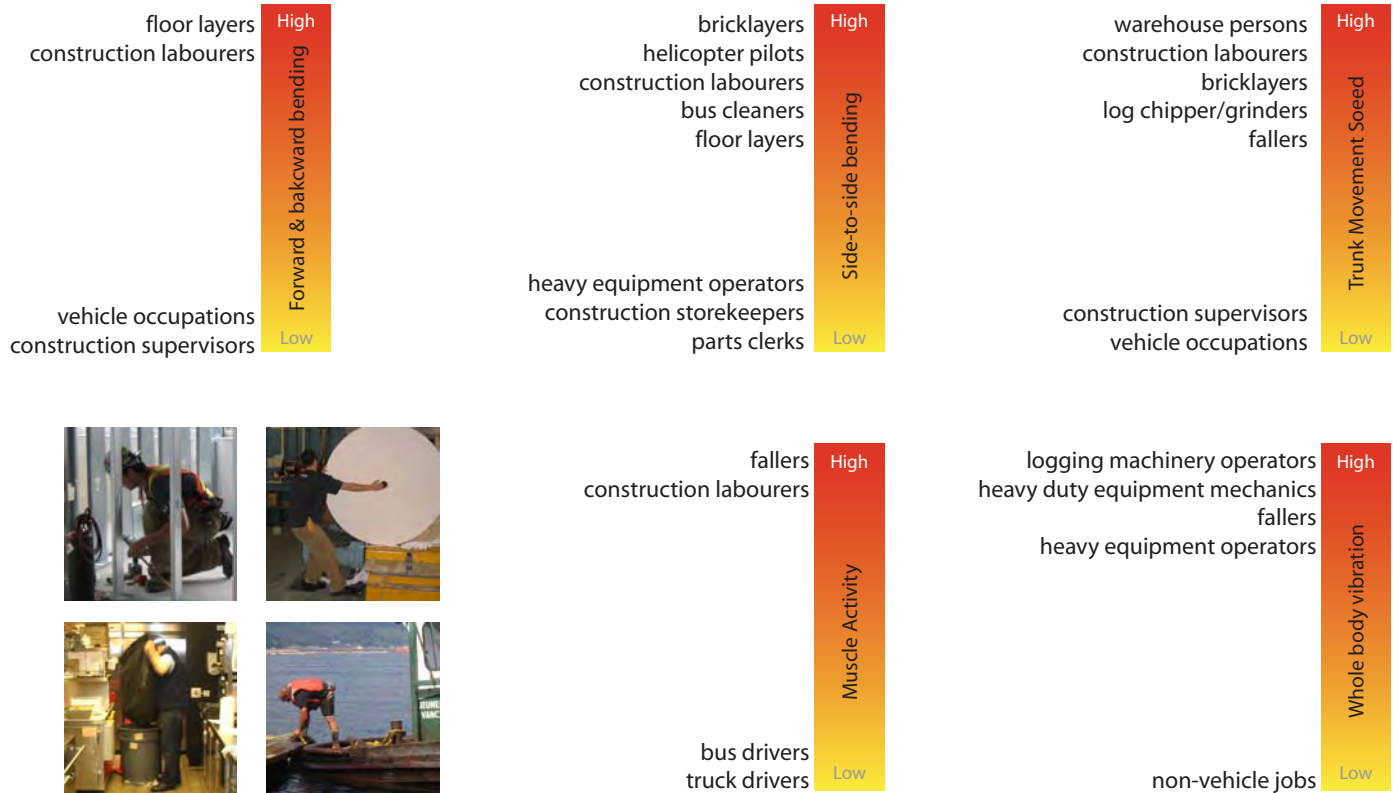
Using statistical techniques, we were able to compare exposures across industries and across job types. Our analysis of industries showed that construction workers, on average, had the highest exposures to bent postures and muscle activity from bending and lifting. Employees in the forestry and wood products industries, who operated heavy equipment or drove trucks, on average, had the highest exposures to whole body vibration.



The back study research team spent over 1500 hours at worksites in BC, collecting data on exposures linked to back injuries. We visited a diverse range of worksites, from construction sites to log booms to paper mills. We are very grateful to the study participants and their employers, all of whom generously offered their time and commitment to the study.

## Exposures by job

As can be seen in the charts on the previous page, there was a high degree of variability within industries, so it was helpful to examine exposures by job. The chart below shows job types with high and low exposures.



## How will this information be used?

We hope that the information we've gained will help other researchers when they are choosing tools for measuring exposures linked to back injuries. We think that using a combination of the inclinometer and observation will do a good job of predicting exposures.



## How many employees in BC have back injuries?

In addition to learning more about how to measure back injury risk factors, we also wanted to know how many employees in our province have back injuries. To answer this question, we gathered data on hospital visits, doctor visits, and workers compensation claims among more than 100,000 employees employed in the five heavy industries over 10 years. Employees were counted as having a back injury if they had a time-loss workers' compensation claim, a hospitalization, or two visits to a doctor in 12 months with a diagnosis related to back pain or symptoms. We gathered three types of information relating to back injuries:

- How many employees had a back injury in the past 10 years?
- How many employees currently have a back injury?
- How many employees have a new back injury (with no prior history of back injury, at least for 3 years)?

## What we found

Overall, 63.5% of employees in the five heavy industries had a diagnosed **back injury** at some time during the 10-year study period. This ranged from 60.5% among employees in forestry to 67.3% among employees in warehousing.

The number of employees with a **current back injury** increased from 19.8% of the study population in 1992 to 24.3% of the population in 2000. This increase was seen in all of the five industries over time. The number of employees with a **new back injury** (after no injury for at least 3 years) fell from 5.7% in 1995 to 4.0% in 2000. This drop was also observed across all five industries. While the drop in the number of new cases may indicate that injuries are being prevented over time, the rise in total number of cases indicates that employees who have a back injury and remain in the industry continue to have ongoing disability necessitating health care and/or time off work.

We also looked at how many employees in BC have back injuries by industry, shown in the table below:

	How many employees have ever had a back injury in the past 10 years?				
Year (Overall) 1992-2000 (63.5%)	Construction	Forestry	Transportation	Warehousing	Wood/Paper
	64.2%	60.5%	67.3%	67.2%	61.5%
	How many employees currently have a back injury?				
1992 (19.8%) ▼	19.8% ▼	18.3% ▼	22.0% ▼	21.9% ▼	18.5% ▼
2000 (24.3%)	24.3%	22.9%	27.3%	25.0%	22.4%
	How many employees have a new back injury?				
	no prior symptoms/pain from 1992-1994				
1995 (5.7%) ▼	5.4% ▼	5.4% ▼	6.1% ▼	5.6% ▼	5.6% ▼
2000 (4.0%)	4.2%	4.1%	3.8%	3.5%	4.1%

Finally, we looked at how often employees used health care services related to back injury over time. We observed three different patterns:

- One group (22.9% of study population) had no back-related health care contacts during the study period.
- One group (26.4%) had a consistent pattern of frequent on-going back-related health care contacts throughout the 10-year study period. This group represents employees with chronic back pain and symptoms.
- The remaining group (50.7%) had episodes of medical care for back pain and symptoms lasting for about 1-3 years, then periods with no medical care related to back injury.

## For more information

This letter is a brief summary of our research results. A complete final report and many more resources can be found on our study website: [www.cher.ubc.ca/backstudy.htm](http://www.cher.ubc.ca/backstudy.htm)

Study partners:



Study funded by:

