Washington State Department of Labor & Industries

Ergonomics Case Study
Pierce Transit Bus Driver Instructors

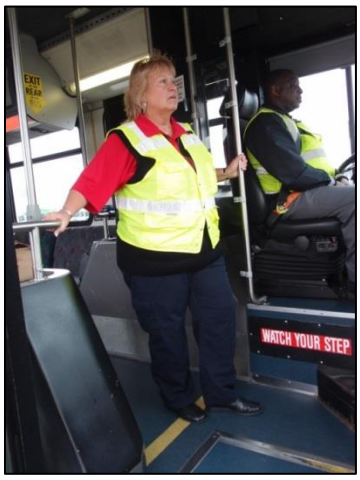
Background

Pierce Transit uses a 6-week rotation for new driver training. During the 6 weeks, the instructor must spend up to 2 weeks of time, 8 hours a day, standing in the bus near the new driver. Regular fleet vehicles are used for training new drivers as Pierce Transit does not have buses devoted solely to training activities. The instructors also have an awkward sitting posture while training drivers in the cutaway vans.

The Problem

The instructors reported pain and injuries with shoulders, knees and feet they associated with standing for long hours in a moving bus. Instructors must hold on to the vertical supports for balance and to stop themselves when the driver brakes or applies the gas pedal. The support span is 37" wide. Holding onto the vertical supports for balance and safety when the bus accelerates and brakes causes a sudden loading to the joints. This can create an over-reaction, or stronger muscle contractions than are normally necessary and this concentrates stress in the joints. Repeated exposure could damage vulnerable structures, such as the knees, rotator cuff in the shoulder, ligaments and tendons in the wrist and hand. Prolonged standing contributes to muscle fatigue in the back and lower extremities. Instructors aren't just standing, however, but must work to maintain their balance continuously as the bus accelerates, turns, and stops. They experienced toe pain because their feet would move forward in their shoes until the toes were jammed against the end of the shoe.

One instructor reported surgeries of the knees and shoulder they related to injuries caused by instructor job duties.



Another risk factor to the challenged standing in the standard buses is whole body vibration (WBV). Stress to the spinal disc contributes to strains and sprains of the low back from exposure to vibration.

When sitting in the cut-away vans, the instructor must either sit on the floor in the front using the vertical pole for back balance or sit in the first seat which produces an awkward neck posture. Awkward neck postures (extension, rotation) can cause compression of discs in the upper spine and stress to muscles of the neck and upper back.

The Solution

The instructors and their supervisor, along with the safety department, wanted to investigate ideas so instructors did not have to stand all day. The solution had to provide for the instructors to continue to be next to the driver, be able to see the driver's mirrors, and the road.

Pierce Transit was presented with a range of options, including a non-permanent seat attached to the hand supports, various modified chairs and benches, and harnesses attached to a seat.

The instructors wanted to try the Muvman stool along with a mat.
http://www.ergodepot.com/Muvman_p/muv.htm
The stool comes in either a microfiber or vinyl seat, and two height ranges. The height adjustment is done with two buttons under the seat. The seat can tilt 360 degrees while the base remains flat. The seat is at a 4 degree forward tilt. There is a handle at the rear to pick the seat up and carry it. The price is about $600.00. Pierce Transit purchased one unit for trial along with 2 styles of floor mats.

All seven instructors tried out the stool and liked the device.

The good features of the stool are:

- Height adjustable
- Seat is the right size for a variety of instructors
- Seat moves with just the right amount of flexibility
- Weight of the unit is light enough to carry from the office to the bus
- The instructors are now able to sit and still see what they need to see
- The mats help with foot stability

The only reported negative was the price.