

## Ergonomics Case Study Washington State Ferry Signature Devices

### Background

Workers from Washington State Ferries (WSF), a division of the Department of Transportation (WSDOT) contacted L&I for help with the Toll Booths at the ferry terminals. Some of the Ticket Sellers experienced discomfort when handing an electronic signature capture device out the toll booth window to motorists who were paying by credit or debit card. The WSF Safety Office had already brought in the ergonomist from WSDOT, Dr. Ed Stevens, Jr. The L&I ergonomist focused her assessment on the use of the signature capture device, while Dr. Stevens looked at the bigger picture, including the signature device, toll booth design, and set up of computers and other equipment.

### Issues Found

Ticket Sellers handed the signature capture device to car and truck drivers, back and forth, hundreds of times a day. Ticket Sellers had to reach, bend and twist to fit through the narrow toll booth window and out to the car windows. Although fairly lightweight (28 ounces), the signature capture device was held in a pinch grasp through the window at a full arm's length. This increased the stress on the Ticket Sellers' hands, shoulders, and backs.

Dr. Stevens' study found other issues that added to the awkward reaching and postures. The layout of equipment was not the same from one toll booth to the next. WSDOT had installed an automated system that was meant to read customers' cards, but for some reason it wasn't used often enough by customers to reduce the Ticket Seller's work load.



## Recommendations

Several solutions were proposed by both ergonomists. These included:

- Consider getting rid of the signature capture device.
- If the accounting department decided that signatures are a must, then mount the signature capture device outside the toll booth windows so only the customers handle it.
- Explore other systems, like the Good-To-Go electronic tolling system on the Tacoma Narrows Bridge. This would create consistency across WSDOT systems.
- Figure out why customers don't use the automated card reader system and correct it.

Dr. Stevens' toll booth recommendations included:

- Make all window openings 30 inches wide to accommodate a large male's shoulders with room for movement.
- Install shades to help reduce glare.
- Work closely with Ticket Sellers to design an "optimal" workstation within the booths.

## Implementation

Rather than eliminate the signature capture device completely, WSF changed the requirements of its use in August of 2008. It's now handed out the toll booth window only when the fee is more than \$100 or the customer uses a debit card.

## Follow-up

The Ticket Sellers were able to dramatically reduce the amount of reaching and gripping they do, as shown by data provided by WSF Operations Department. Use of the signature capture device was recorded for 2 month sample periods in 2008 both before and after WSF made the change in their process. Prior to the change, the signature capture device was handed out the window an average of 10,645 times every day system wide. After the change in August, 2008, the signature capture device was handled an average of only 177 times per day system wide. This is more than a 98% decrease in its use.

Ticket Sellers expressed their pleasure at the reduction in signature device use:

- "It's a nice change. Swipe—Done!"
- "I'm happy not to use it."
- "I'm thankful that I don't have to use it anymore."
- "I love it!"
- "We use less paper and it's faster."
- "Now that I only use it once or twice a day, I have less discomfort in my shoulder and arm."

Thanks to Manny Perez, WSF Fleet Safety Coordinator, for Implementation and Follow-up data, and Dr. Ed Stevens for Ergonomic study findings.