



endings & beginnings



ergonomic hazards (bending, stooping, and lifting) as important concerns for their trainees.

- More than one-third of trainers taught workers whose primary languages were not English.
- Trainers estimated more positive effects of training on safety activities under workers' control as compared with those under employers' control.
- Follow-up contact with trainers may be an indicator of training effectiveness, an informal means of workplace intervention, or both. This concept should be further explored.
- Of 175 trainees who participated in a baseline survey, 127 were U.S. born and 41 were born in Mexico. Safety knowledge and attitude improvements were measurable at three months in both groups.
- Features of both union membership and training may affect safety behaviors. Further study should explore how this knowledge can be applied to reduce the disproportionately high rate of work-related injuries among foreign-born Hispanic workers.



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Handheld Device to Conduct Electrical Inspections

Lead Researcher: Mark Fullen, EdD, West Virginia University

Dr. Fullen and his research team wanted to know whether conducting electrical inspections using a handheld digital tool, similar to a Blackberry, could improve safety performance on construction sites. The team collaborated with CPWR to revise its PDA-based safety inspection software, which includes guidance on OSHA electrical standards. A key feature of the tool is its ability to generate site-specific hazard reports for contractors.

One unionized construction worker was selected to attend the OSHA 3090 electrical standards course and was also trained on use of the handheld tool to

Refining the Overhead Drilling Assist Device

Demand is brisk for the novel overhead drilling device developed by Dr. David Rempel and his research team. It has become so popular that an electrical contractor plans to build enough of the devices to serve a workforce of up to 1,600 electricians. Dr. Rempel and his colleagues from UCSF and Simon Fraser University have perfected the design over the past five years to assist construction workers with overhead drilling into concrete and metal ceilings. Such workers face many risks, including silica dust exposure, falls from ladders, acute injuries to the wrist when the drill seizes, and chronic musculoskeletal disorders of the wrist, forearm, shoulder, and back. The device enables the worker to perform the drilling from the ground without looking up, thereby reducing the high forces and awkward postures typically applied during the task.

Dr. Rempel developed and refined the device by working with building trades unions and contractors. The device has received rave reviews from workers, who report more comfortable postures, as well as reduced muscle fatigue and hand vibration while using the device. Now the research team has data to validate the workers' subjective responses. The team measured ergonomic factors such as force and musculoskeletal strain, with and without device, and found that the device frequently outperformed the usual drilling method. For instance, the average hand forces measured during drilling with the overhead device were about 10 times less than hand forces with the traditional drilling method. Another measurement showed how the device reduces shoulder muscle strain and fatigue: the percent time with the shoulder flexed or abducted stretched to greater than 60 degrees was 21% with the device, compared to 40% with the usual drilling method. Also, there was significantly less head extension with the device compared to the usual method.

Dr. Rempel and his research team have been seeking collaborators to



bring this product to market. Now that dream is coming closer to reality. Cupertino Electric, a regional contractor, has recently invested resources in improving the device design and plans to build many of the devices so that they will be available at all of their construction sites. This electrical contractor employs 900 to 1,600 electricians (IBEW Local 332). Cupertino Electric was in-

After testing the tool, many contractors have asked to purchase it.

troduced to the device at one of Dr. Rempel's presentations to the National Electrical Contractors Association. Their fabrication department has modified the device design and developed what they call the Upside-Down Drill Press. They have also developed a lightweight version of the device for use in a scissor lift, called a Pogo-stick Upside Down Drill Press.

The modified devices have received positive reviews by several construction workers. Cupertino Electric is interested in working with Dr. Rempel to formally evaluate the two new designs on construction sites.

Trials of the device have been so positive that many contractors in addition to Cupertino Electric have asked to purchase the tool. Dr. Rempel receives an average of two enquiries a week about how to obtain the device. He currently works with a small tool fabricator who produces one or two devices each month.