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RESEARCHERS CONFIRM NEW DRILLING DEVICE SIGNIFICANTLY REDUCES PAIN AND FATIGUE DURING OVERHEAD DRILLING

Stress to Hands Reduced 10 Times that of Traditional Method,
New Tool Keeps Workers on the Ground, Preventing Ladder Falls, at No Loss of Productivity

Researchers at the University of California, San Francisco, and UC Berkeley reported that their new device for drilling holes into metal or concrete ceilings, which was configured and refined on construction sites with workers and contractors, has been shown to reduce fatigue and risk of injury to workers performing this task. The overhead drilling device is the culmination of a five-year research project that developed and tested a variety of tools designed to assist construction workers during overhead drilling. The results of their field evaluation research, led by David Rempel, MD, of the Division of Occupational and Environmental Medicine, UCSF, are reported in the March issue of the *Journal of Occupational and Environmental Hygiene*.

This form of overhead drilling is one of the most physically demanding tasks in construction. Workers on a ladder must hold an 8-pound drill overhead with one hand and push it upward with 55 pounds of force for 1-2 minutes. And they may drill hundreds of these holes at a time for hanging pipes, electrical trays and sheet metal ducts. Electricians, plumbers, sheet metal workers and carpenters say this is one of the most fatiguing tasks that they do. The overhead drilling device (or "jig") enables the worker to perform the drilling from the ground without looking up, reducing awkward postures typically applied during the task. The tool is on a wheeled tripod, making it easy for workers to move the jig from hole to hole.

"We wanted to reduce the wear and tear, and associated musculoskeletal disease, for workers doing this task," said Dr. Rempel. "Consider the job – it's like holding a noisy, vibrating 50-pound box above your shoulders while dust drops into your face and eyes – all while you're standing on a ladder."

Results of the field evaluation, where workers used the device for three hours, showed significant reductions in physical stress to workers with no loss of productivity. The average force applied by the hand was 6 pounds compared to 55 pounds with the traditional drilling method. Hand and arm fatigue was reduced from 3.6 (on a scale of 0=none to 5=very) to 0.8 with the use of the device. Arms were less elevated and the head was less extended than with the usual method.

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Regional commercial contractors and local plumber/pipefitter, sheet metal and electrical unions partnered with the researchers in designing and testing the device. The device has received rave reviews from workers, who reported better stability, less vibration, better handling, and reduced muscle fatigue and hand vibration than the traditional method. A number of contractors agree and have ordered a tool from Rempel's lab. Rempel works with a small manufacturer to produce the tools, which are provided at cost to contractors. Neither Rempel nor UCSF has an economic interest in the device. There are currently two tool manufacturers interested in building and marketing the device.

Rempel believes that workers using the device may be able to increase productivity compared with the usual method as they gain experience using the tool. The researchers also believe that widespread use of the device could ultimately lead to lower injury rates in construction workers who perform overhead drilling.

Pictures and videos of the device are on the UCSF Ergonomics Program website: **http://ergo.berkeley.edu/**

– 30 –

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