UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

SCHOOL OF MEDICINE
DEPARTMENT OF MEDICINE
DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

ERGONOMICS PROGRAM
1301 S 46TH St., Bldg 163
RICHMOND CA 94804
TEL: (510) 665-3403
FAX: (510) 665-3423

24 March 2010

The Overhead Drill Press makes the task easier and safer

Commercial construction electricians, plumbers, pipefitters and sheet metal workers will tell you one of the most physically demanding tasks they do is overhead drilling. It is not easy to drill dozens or hundreds of anchor holes a day into concrete or metal ceiling to secure pipes, cable trays, and ductwork. It causes pain and fatigue in the arm, shoulder, and back from standing on a ladder, holding an 8-lb drill overhead, and pushing it upward with 55 lbs of force for 1-2 minutes to drill each hole. Then doing it over and over. Workers get tired and sore from this work, and they also get injured. A torn rotator cuff can take a skilled worker off the job for weeks and he or she may not be up to doing this type of work for months, or ever.

Engineers and physicians at the University of California, San Francisco completed a five year research project to develop and test a new device to make overhead drilling easier, while maintaining the quality and speed of work. Their goal was to reduce the extreme fatigue and risk of injury associated with overhead drilling. They also hoped to allow workers to drill from the ground (reducing the risk of falls from ladders) and reduce exposure to hand vibration and concrete dust.

The researchers developed a partnership with contractors and unions, resulting in testing seven different device designs by more than 100 workers at their worksites. The workers made suggestions for improving each design and the final design reflected their insightful ideas. The final design allows drilling to be done efficiently and with less wear and tear on the body.

How much better is the new method?

- Workers report dramatically less fatigue from drilling, better stability and handling of the drill, and they felt less vibration while drilling.
- The force applied by the workers' hands while drilling is only 6 lbs – compared to 55 lbs for the usual manual method.
- Drillers did not have to hold their arms overhead as much, nor tilt their head back as much to look up at the drill target.
- Productivity (number of holes drilled per hour) was the same as with the usual manual method. In the study, workers used the device for about 3 hours. When workers have more experience using the device, it is expected their productivity will be better.

Quotes from commercial construction workers who used the device

"It is the best device I know of for this difficult job." – Journeyman Carpenter, 57 yrs old.

"Can drill all day without fatigue. If there are a lot of holes to drill, this is an excellent tool." – Journeyman Plumber, 37 yrs old.

"My low back did not get sore – this keeps me from getting tired so soon." – Journeyman Electrician, 39 yrs old.

Features of the design

- Uses an inverted drill-press design to raise the drill to the ceiling, using a hand wheel with linear gear.
- Drills from the floor - reaching ceilings up to 12 feet.
- Works in scissor lift or bucket.
- The worker is further from the drill: reducing noise, vibration and dust.
- Air-filled, locking tires move easily over obstacles on the ground.
- Saddle accommodates most types of hammer drills.

See it for yourself!

Pictures, video, and more details about the overhead drill press can be found on the University of California, Ergonomics Program website: http://ergo.berkeley.edu

How can you get your own inverted drill press?

The research team has no patents or economic interest in the device. Two tool manufacturers have expressed an interest in manufacturing and selling it. However, with the downturn in the economy, the companies have been hesitant to develop a new tool for the market just yet.

In the mean time, the university can provide design plans so you can build your own overhead drill press. Or, they can sell you one of the experimental devices (sold at cost) for you to try out. If you buy one of the experimental devices, or build your own, UCSF researchers ask you to give them feedback about improvements to make the design even better. Please contact Alan Barr (alan.barr@ucsf.edu).

Partners who participated in the research project
Unions: IBEW Local 48, Sheet Metal Local 16, and UA Local 490.
Contractors: Cherry City Electric, Electric Construction Co., Oregon Electric Group, Rosendin Electric, Apollo Sheet Metal, Interstate Mechanical, JH Kelly Construction, Temp Control Mechanical, Streimer Sheet Metal Works, Fortis Construction, Layton Construction, Skanska Construction, and Turner Construction.
Funder: Center for Construction Research and Training (CPWR) and the National Institute of Occupational Safety and Health (NIOSH), and WorkSafeBC.
Research Team at the University of California, San Francisco,
Alan Barr, Demetra Star, Maggie Robbins, Ira Janowitz, David Rempel.

Notes

For further information on this media release, please contact:
Maggie Robbins, BS, MPH
Research Project Coordinator
Ergonomics Program
University of California, San Francisco
1301 S. 46th Street, Building 163
Richmond, CA 94804
http://ergo.berkeley.edu/
510-620-5864

We can send full-resolution JPG files of these or other photos:

1) Inverted drill press in use.
2) The usual method. [worker on ladder holding drill]
3) Hinged drill saddle. [partial image of device, with a drill (with dust-capture attachment) fitted to saddle, and saddle tipped back.]