

New electric rotary drills cut dust, noise and vibration without reducing productivity

Pneumatic rock drill vs. electric rotary hammer drill: Productivity, vibration, dust, and noise when drilling into concrete

David Rempel, Andrea Antonucci, Alan Barr, Michael R. Cooper, Bernard Martin, and Richard L. Neitzel. Applied Ergonomics, 2019; 74:31-36.

Overview

During structural upgrades, construction workers must drill large holes in concrete to insert rebar dowels, a physically demanding task exposing workers to high levels of hand vibration, noise, and respirable silica dust. Structural contractors have long relied on pneumatic rock drills for drilling large holes in rock and concrete, but new, powerful electric rotary hammer drills are appearing on the market. In a series of three experiments, researchers compared the performance of pneumatic and electric drills of similar mass while drilling concrete.

Key Findings

- Productivity levels, measured in millimeters penetrated per second, were essentially the same with the electric and pneumatic drills.
- The mean peak noise level for the pneumatic drill, 130.4 dBC, was significantly greater than for the electric drill (117.7dBC). The noise level for both drills would require hearing protection, but the levels for the pneumatic drill would require double protection (e.g. earplugs and earmuffs).
- Handle vibration levels were much higher for the pneumatic than the electric drill. To comply with ISO vibration exposure limits, a worker would be limited to 8 minutes per day operating the pneumatic drill, while a worker could operate the electric drill for nearly four hours.
- Respiratory silica levels were an astonishing 40 times higher with the pneumatic drill than with the electric drill.
- The authors recommend that structural contractors consider switching from pneumatic rock drills to electric rotary drills for drilling large holes into concrete, such as dowel and rod work, in order to protect the health of construction workers.

For more information, contact:

David Rempel: David.Rempel@ucsf.edu

See abstract:

<https://bit.ly/2M0fRKS>

©2018, CPWR-The Center for Construction Research and Training. All rights reserved. CPWR is the research and training arm of NABTU. Production of this document was supported by cooperative agreement OH 009762 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.



**THE CENTER FOR CONSTRUCTION
RESEARCH AND TRAINING**

WWW.CPWR.COM