currently being evaluated at masonry apprenticeship training centers across the US. Previous studies indicate that musculoskeletal symptoms among journey-level masons are most prevalent in the low back, shoulder, and wrists and hands. However, little is known about symptoms among masonry apprentices as they enter the trade. Since MSDs are cumulative in nature, it is paramount to reduce exposures and risk of injury among apprentices before symptoms are prevalent. The purpose of this study is to report the distribution of musculoskeletal symptoms among masonry apprentices.

Methods: Masonry apprentices participated in this study as part of a larger national randomized controlled trial evaluating the SAVE program. Part of the evaluation includes measuring musculoskeletal symptoms via self-report. Among other questionnaires, participants completed demographic inventories and the Modified Nordic questionnaire (MNQ) assessing musculoskeletal symptoms. The MNQ is a validated questionnaire that asked apprentices about current work-related musculoskeletal symptoms in specific body regions, whether they saw a physician for the symptoms, and if they missed work in the last week due to the symptoms.

Results: One hundred forty masonry apprentices with a mean (SD) age of 29 (7.2) participated in this study. The majority were in their first year of the apprenticeship program (45%), were male (97%), and Caucasian (57%). Some apprentices had OSHA 10 training (68%), previous ergonomics training (16%), and stretch and flex training (27%). The most common body regions with musculoskeletal symptoms were the low back (56%), wrist/hand (46%), knee (34%), upper back (33%), and shoulder (31%). The mean (SD) number of regions (out of 9 regions asked about) with work related symptoms across all apprentices was 2.7 (2.1) regions. Although many apprentices reported musculoskeletal symptoms, most did not miss work or consult a healthcare practitioner. Consistent with previous studies of journey-level masons, low back pain was most prevalent, yet only 4% of apprentices accessed healthcare in this study compared to 34% in previous research of journey-level masons.

Discussion: These findings suggest that the level of musculoskeletal symptoms early in their careers are minimal and that the frequency of symptoms and seeking healthcare increases with time in the masonry trade. Further analysis of musculoskeletal symptoms among apprentice masons will occur prospectively through the SAVE project. These apprentice symptom responses indicate that effective ergonomic interventions have the potential to reduce musculoskeletal symptoms and are essential for reducing MSDs as they progress through their careers.

H4.3
Title: Comparison of Productivity, Vibration, Dust, and Noise Between Pneumatic Rock Drill and an Electric Rotary Drill

Authors: David Rempel, Eileen Betit, Andrea Antonucci, Alan Barr, Michael Cooper, Barnard Martin, Richard Neitzel

Background: Both pneumatic rock drills and new electric rotary hammer drills are used for drilling large holes (e.g., 10 to 20 mm diameter) into concrete for structural upgrades to buildings, highways, bridges, and airport tarmacs. However, little is known about the differences in productivity, and exposures to noise, handle vibration, and dust between the two types of drills. The aim of this study was to compare these outcomes with similar mass electric rotary and pneumatic rock drills drilling into concrete block on a test bench system.

Methods: Three experiments were conducted on a test bench system to compare an electric (8.3 kg) and pneumatic drill (8.6 kg) on (1) noise and handle vibration, (2) respirable silica dust, and (3) drilling productivity. The test bench system repeatedly drilled 13 mm diameter x 100 mm depth holes into cured concrete block while the respective exposure levels were measured following ISO standards.

Results: Productivity levels were similar between the electric and the pneumatic drill (9.09 mm/s vs. 8.69 mm/s ROP; p=0.15). However, peak noise (LPeak: 117.7 vs. 139.4 dBC; p=0.001), weighted total handle vibration (ahw: 7.15 vs. 39.14 m/s2; p=0.002), and respirable silica dust levels (0.55 vs. 22.23 mg/m3; p=0.003) were significantly lower for the electric than the pneumatic drill.

Discussion: While there were no differences in drilling productivity between an electric and pneumatic drill of similar mass, there were substantial differences in exposure levels of noise, handle vibration, and respirable silica dust. Structural contractors should consider switching from pneumatic rock drills to electric rotary hammer drills for structural drilling into concrete in order to reduce worker exposures to the hazards of noise, hand vibration, and silica dust.

N O I R S

National Occupational Injury Research Symposium

SYMPOSIUM PROGRAM
October 16-18, 2018
Morgantown, WV