



Best Practices for Reducing Physical Injuries Among Masonry Workers

Overcoming barriers and expanding the use of ergonomic solutions on jobsites

The Challenge

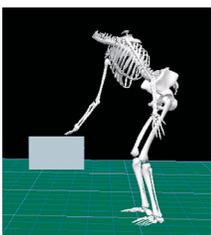
In the construction industry, bricklayers have the highest rate of back injuries resulting in time away from work and mason tenders have the highest rate of overexertion injuries. The work is physically demanding due to repetitive bending, lifting and twisting, the weight of the materials handled, and the height of the work. Among working bricklayers, for example, roughly 70 percent report ongoing back pain. The resulting injuries and lost workdays are costly for contractors and workers and too often shorten careers. Safer equipment, materials, and work practices are available but have not been widely adopted by contractors or accepted by workers.

The Response

Dr. Laura Welch, CPWR's Medical Director, assembled a research team from Eastern Washington University, the University of Oregon, and the University of Iowa to identify the most effective ergonomic solutions for the masonry industry and potential barriers to their use. The team brought together 43 masonry stake-holders to find out what they considered the best tools, work practices, and materials to reduce the risk of work-related musculoskeletal disorders and the factors that limit their use. This initial discussion prompted the research team to conduct ergonomic evaluations for those solutions identified as needing additional research and led to a more in-depth telephone survey of stakeholders. More than 180 masonry contractors, representing 16 states in the Northeast, Southeast, Midwest, and West Coast, were surveyed to gain a better understanding of contractors' use of selected ergonomic solutions, their perceptions of the advantages and disadvantages of each, and where they are used.



The Results



Digital rendering of a bricklayer lifting a block while attached to motion capture sensors.

The survey results revealed significant regional variations in the use of ergonomic solutions. For example, contractors in the Northeast had a higher utilization of half-size pallets than those in the other regions and those on the West Coast had the highest utilization of mortar silos and H-block. The researchers learned that several factors contribute to these variations in use of solutions. Customary practices in an area and contractor-to-contractor communications have the greatest influence. Other factors include local building codes and who selects the materials, equipment, and work practices. In terms of the advantages and disadvantages of different ergonomic solutions, those surveyed cited time savings as the main advantage driving the use of solutions, followed by increased productivity and safety. Disadvantages ranged from the cost of the equipment to the quality of materials.

These findings led to the establishment of ongoing mechanisms to raise awareness and use of solutions by workers and contractors. The research team developed a comprehensive list of masonry ergonomics best practices, which CPWR included in its *Construction Solutions* website for easy access by workers and contractors. In addition, CPWR developed a *Return on Investment Calculator* (www.safecalc.org) to help contractors assess the financial impact of using ergonomic and other solutions. Individual researchers initiated follow-up studies for specific solutions to raise awareness of their benefits.



Motion capture sensor markers attached to a bricklayer's clothing record back and arm positions to detect stressful work positions.

The CPWR IMPACT

The *Best Practices* study provided stakeholders and researchers with critical information on the underlying factors that influence the adoption of ergonomic solutions by contractors and workers and led to several important next steps:

- The Masonry Research to Practice [r2p] Partnership, which includes three national organizations representing the masonry industry, designated several of the ergonomic solutions from the study as priorities to promote with contractors and workers. The Partnership created a website to increase the use of mast climbing scaffolds and is working on materials to promote the use of ergonomically designed hand tools.
- CPWR expanded the number of ergonomic solutions available through its *Construction Solutions* website and developed return on investment (ROI) examples for lightweight block and aerial lifts. These two masonry solutions are among the top-viewed pages on the site.
- Members of the research team developed a video, *Advantages of a Two-Mason Lift Team*, which has already received more than 700 page-views on YouTube and been the subject of workshops and articles.
- Presentations on the study's findings were made at national conferences including the World of Concrete, the American Physical Therapy Association, the Construction Safety Conference, and the Applied Ergonomics Conference.
- Articles about the study and masonry ergonomics in publications such as *EHS Today*, the *BAC Journal*, and *Masonry Construction Magazine* are raising awareness and acceptance of ergonomic solutions.



What made it a success?

The CPWR team's recognition that there is not a one-size-fits-all ergonomic solution for the masonry industry helped increase stakeholders' willingness to consider, promote, and use solutions.

Steps that led to success included:

- Involving stakeholders in the identification of ergonomic best practices and the barriers to their use.
- Including a diverse group of researchers with a solid understanding of masonry — an M.D., a physical therapist, a chiropractor, and an ergonomist.
- Identifying gaps in the research findings for promising interventions and making them the focus of new research.
- Taking a holistic approach to addressing ergonomic hazards and promoting a variety of interventions, instead of focusing on promoting a single intervention that may not be a viable option for all contractors or projects.



Research team member, Dr. Dan Anton of Eastern Washington University, explains how handling light weight block changes muscle activity.