

ERGONOMIC INNOVATIONS

Encouraging contractors to adopt tools and practices that reduce musculoskeletal disorders



In Ontario construction, musculoskeletal disorders (MSDs) represent about 35% of all lost-time injuries, and approximately 30% of total direct WSIB costs. MSDs are a large and expensive problem. They are caused mostly from manual handling of heavy material, awkward postures, highly repetitive movements, contact stress, and vibration exposure.

It's a challenge to prevent MSDs in construction. Despite technological advances in other industries, construction remains a physically demanding job for many workers. As well, contractors have little or no control over architectural design or the choice of materials.

Despite the challenges, evidence suggests that contractors adopt ergonomic innovations all the time. The evidence was uncovered during a joint study between the University of Waterloo's Centre of Research Expertise for the

Prevention of Musculoskeletal Disorders (CRE-MSD) and the Construction Safety Association of Ontario (now the Infrastructure Health and Safety Association, IHSA).

The research team looked for examples of workers and companies using new tools, work processes, and insights that reduce the risk of MSDs in construction work. The team identified a total of 20 such ergonomic innovations on worksites in southern Ontario over eight months.

The team considered work tools or work methods to be innovative if they reduced forceful exertion, awkward posture, repetition, and vibration. The innovations had to be commercially available and different from the traditional work methods used by the trades. Some examples and a brief summary are listed on the next page.

Currently, IHSA and CRE-MSD are conducting another study to encourage construction companies to try out these new innovations to reduce MSDs. The purpose of the study is to raise awareness of MSDs in construction and to explore how the use of these innovations can spread throughout the industry. The study will also ascertain the cultural characteristics of companies already using the innovations and companies that are willing to try them. For more information about the study, visit <http://www.cre-msd.uwaterloo.ca/Construction.aspx>

If you would like to participate in the study and adopt one of the innovations, the team will provide you with the services of an ergonomist and any other help you may need with the innovation. They would first ask you about your company, your health and safety program, and your employees' awareness of MSDs. The team will include this information in a research paper. They will also develop a booklet on best practices for preventing MSDs. If you wish, they can publicize the name of your company and its involvement in this cutting-edge research.

For more information, please contact:

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- Peter Vi at 1-800-781-2726.

Innovations that can reduce MSDs in construction

Innovations for manual handling of tools and materials to reduce overexertion injuries

- **Wall lifter:** The powered wall lifter reduces the physical demands on workers because it helps them lift large, newly-constructed residential wall frames.
- **Silo mixer:** On-site silo is supplied with factory-prepared mortar/grout materials. The product is mixed with a built-in silo mixer or fed into a mixing machine. If you use a silo mixer, you don't need to lift concrete bags. It also improves the quality of mixed materials, and reduces waste from materials being exposed to weather.
- **Grout delivery systems:** In the masonry sector, mechanical grout delivery systems can eliminate repetitive manual shovelling or the use of large buckets for dumping grout.
- **Hydraulic mixer:** This powered mortar mixer has adjustable legs so you can set it up at comfortable working heights. It can also raise and dump the bucket of mix with the push of a button. It reduces the physical demand associated with manual pulling of mixing buckets and lifting concrete bags above shoulder height.

Innovations for overhead work to reduce awkward shoulder and neck positions

- **Drill jack:** The drill jack is a foot-controlled, telescopic tool for drilling ceiling holes for anchors. It reduces the amount of static overhead work, exposure to vibration, and work on ladders or elevated work platforms.
- **Anchor jack:** The anchor jack is a telescopic tool that inserts an anchor into a pre-drilled hole without the need to work from an elevated work platform. It also reduces work on ladders and overhead work.

Innovations for work at ground or floor level to keep your back in a healthy position

- **Rebar tying machine:** About the size and weight of a large drill, this tool can automatically tie rebar and electrical conduit during concrete reinforcement work. The worker doesn't need to use pliers. The machine reduces forceful hand exertion and awkward back posture.
- **Stand-up auto-feed screw gun:** This is an extension device that allows workers to screw down sub floors without having to bend over. When the worker presses down on the tool, it drills a screw into the floor. Screws come in a strip, and advance one at a time.
- **Vibrating screed:** The vibrating screed allows workers to level wet concrete while standing. A vibrating aluminum frame levels the concrete. The tool's engine can be powered by gas or a battery.

Innovations for connecting plastic water lines to reduce forceful exertion of the arms and hands

- **Plastic water pipe systems:** Manual crimping of metal connections between water pipes, or manual stretching of plastic pipes, requires a lot of grip force. Two alternatives reduce such repetitive forceful exertion: a battery-powered crimping machine, and a pneumatic-powered stretching machine. These alternatives allow for quality pipe connections and reduce the stress on your hands.

Workplace participation to reduce MSDs on your site

- **Ergonomic change committee:** This is a joint health and safety committee specifically aimed at examining MSD issues and reducing MSD risk through cooperation between workers and management.