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Ergonomics Solutions for the Construction Trades

Workers employed in the construction trades have to perform various physically demanding tasks as part of their work routines. According to data published by the Bureau of Labor Statistics (2021), on average, construction laborers are required to lift or carry 58.8 pounds and use heavier strength levels compared to other occupations. In addition to manual material-handling activities, construction trade workers must often stoop, kneel, twist, grip, reach overhead or work in awkward positions. This puts them at increased risk of developing over-exertion injuries and work-related musculoskeletal disorders (MSDs).

Injury risk is managed proactively when work is designed with considerations for efficiency and employee capabilities. This results in a larger percentage of the workforce performing work tasks safely. Implementing ergonomic controls in construction tasks also makes the tasks more inclusive and accommodates workers of varying strengths and experience.

This guide provides an overview of high-injury risk exposures and process efficiency challenges and discusses potential solutions to improve conditions for construction trade workers.

1. **Manual handling and transfer of material:** General contractors, roofers, and electrical and mechanical contractors often spend a significant amount of their time lifting and carrying awkward, heavy and fragile materials. This manual transfer of material is not only strenuous on the body but also performed repetitively without consideration for efficiency. Workers routinely make multiple trips from staging areas to installation points, increasing the time and labor requirements associated with the jobs.
   - When pre-planning work, consider the path workers will take from the staging areas to installation points. Reduce the number of trips required to transport material using forklifts, carts, dollies or conveyor systems (e.g., placing material on the roof).
   - Utilize mechanical moving and lifting equipment whenever possible and emphasize team lifting for tasks where equipment is not available.
   - When lifting and carrying awkward and heavy materials such as air-handling units, workers may twist their bodies. This is especially common while working in tight spaces. Limit the need to carry, twist and lift by utilizing a lifting cart to transfer and place awkward and heavy materials. Ensure adequate clearance that allows workers to work with their arms in front of them.
2. **Installation of material and equipment:** Construction trade workers spend significant time performing installation-related tasks. Often, these are performed in standing or sitting positions, with the upper limbs raised overhead and reaching toward the installation points. This places a large amount of stress on the shoulders and increases the complexity of the tasks, which can result in longer completion times.
   - Utilize platform/podium ladders or mini boom lifts to allow workers direct access to the installation areas, limiting their need to reach while in a standing position.
   - Use appropriate ladder height or lift the boom platform to perform work below shoulder height, reducing overhead work.
   - Use boom lifts to decrease the need to climb up/down the ladder. This reduces the amount of time associated with the work task and decreases employee fatigue. When using step ladders for tasks such as sweating joints at ceiling level, ensure proper staging of tools, equipment and materials in the work area to limit walking and excessive reaching.

- Consider exploring new technology, such as exoskeletons, for prolonged overhead installation work. This will reduce fatigue in the upper arm and shoulder muscles, allowing workers to perform tasks more comfortably and at a faster rate.

3. **Tool use:** Construction workers use a plethora of hand and power tools. To be effective on any construction site, workers need to choose the right tools designed for their tasks. Using power tools with inadequate dampening measures can expose workers to excessive vibration, and relying heavily on non-powered or inappropriate tools for repetitive tasks causes exposure to forceful hand motions and awkward postures.
   - Review your worksite to identify commonly used tools that can benefit from an upgrade to a powered version. For example, replace hand-tool tin snips with electric tin snips for cutting sheet metal ducting.
   - Consider using battery-powered tools that are lighter and more powerful and have a lower vibration impact. Since such tools are cordless, they are easier to maneuver and do not need cord management. Additionally, cordless tools allow more efficient movement around installation points and reduce associated trip hazards.
   - Consider tool modifications that allow a more diverse population to use them safely. Some examples include adding external grips to hand tools to reduce contact stress, providing an adjustable pipe jack to accommodate workers of different heights and encouraging neutral postures.
4. **Fatigue:** Fatigue can be a significant cause of error, accidents and increased safety risks. When workers are fatigued, they can experience reduced alertness, slower reaction time, impaired mental acuity and compromised physical strength.
   - Utilize pre-fabrication strategically for cost savings, increased labor productivity and reduced schedule times. Pre-fabrication allows work to be performed at ergonomic working heights with the appropriate tools and clearances around the working areas. This reduces the number of wasted motions associated with walking and reaching and allows process-efficient tools to be used, which can be difficult to implement at a jobsite.
   - Ensure all manufactured products have stickers with jobsite identification, install floor/location, length and weight for easy field identification of how to accurately move the material and source the appropriate handling equipment in the install area.
   - Long periods of walking and standing add to construction worker fatigue. For workers in pre-fabrication areas, consider installing anti-fatigue mats. Alternatively, consider providing workers with cushioned insoles to reduce the strain on their legs and lower back.
   - For highly repetitive tasks, explore the use of job rotation to reduce exposures that can cause mental and physical fatigue. When considering job rotation as a control, rotate employees to job tasks that use alternative muscle groups. This will allow affected muscle groups to recover and rest periodically.

Additional Challenges

Many other factors can significantly influence work efficiency, productivity and ergonomics, including rework, lack of skilled labor, retention of skilled labor, supply chain challenges and project management inefficiencies. Companies can leverage the solutions mentioned above to address these challenges. Additionally, CNA offers construction consulting solutions such as Motion is Money, which supports our clients' specific needs and provides ways to improve process efficiencies and reduce the risk of injury.

For more information, visit cna.com/riskcontrol.