



Validating the Risks of Lifting Heavy Loads

Position and Size of Drywall on the Physical Demands for Drywall Installers

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Overview

Construction workers who perform drywall installation are at a high risk of various musculoskeletal injuries and disorders, especially to the low back and shoulder areas. Researchers from Southeastern Louisiana University conducted a study to validate this by using an integrated biomechanical modeling approach to investigate the effects of position and size of drywall on the physical demands for drywall installers. The results demonstrated that both drywall storage position and size affect the physical demand of the work and may contribute to injury. The required muscle contraction forces and joint reaction forces at the low back and shoulder reduced approximately 8% (with a range of 3.6% - 12.8%) if the drywall sheets were stored vertically and spiked if the size of drywall sheets increased. The results could be used as guidance to help ASTM (American Society for Testing and Materials) make recommendations about drywall. Specifically, those 4x12 and 4x16 sheets increase the physical burden for drywall installers and could expose them to a higher risk of musculoskeletal injuries.

Key Findings

- The application of computer-aided simulation to convert observational work sampling data into continuous variables as inputs for biomechanical modeling permitted a valid estimation of the physical loads on the low back and shoulder during drywall installation.
- If the drywall sheets were stored vertically instead of flat, it would reduce the required muscle contraction forces and joint reaction forces at the low back and shoulder approximately 8% on average during drywall installation.
- As a drywall stabilizing clip could be used to secure the sheets in a vertical storage position, more research is needed to examine how it is used in practice as well as how the work efficiency and productivity could be affected.
- The bigger size (e.g., 4x12 and 4x16) of drywall sheets increased the physical burden for drywall installers significantly and could expose them to a higher risk of musculoskeletal injuries and disorders. In some simulations the average low back lateral shear forces increased to 1674.7 N and 2152.2 N, respectively. These forces are significantly above the 1000 N recommended for a single lift.
- These results indicated that it would be physically too difficult or even impossible for one person alone to lift bigger and heavier drywall sheets. Therefore, sound engineering (e.g., lifting tables) and/or administrative (e.g., two-person team work) solutions to handling oversized drywall sheets are strongly recommended.

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See full report:

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