Submission for the Symposium on Construction Ergonomics IEA 2000

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BIOMECHANICAL ANALYSIS OF VARIOUS BRICK SIZES

Due to increasing concerns from the bricklaying industry, a study was conducted to determine the biomechanical stresses on the upper extremity and lower back regarding various size bricks used primarily in the residential housing sector.

Four different sized bricks (Metric Modular, CSR, Max and Jumbo) were initially analysed objectively via videotape of the participants' work postures in a controlled environment and on actual job sites. Additionally, approximately 100 questionnaires were distributed to workers to obtain subjective feedback on their musculoskeletal concerns.

Preliminary results from the videotape analysis indicate that the mid-size brick (CSR) was the optimum brick when accounting for relative risk of injury and productivity. Presently, a larger size brick (Max) is used primarily in the Ontario residential sector. **Analysis using the Seth et.a. (1999) model, showed that by using the Max brick vs. the CSR there is approximately a 50% increase in relative risk of injury to the upper extremity and only a 5% increase in productivity.**

Response rate to the questionnaire was approximately 80%. Preliminary questionnaire results indicate that workers' experienced elbow pain primarily in the brick hand and more predomninately wrist and hand pain (primarily arthritic type symptoms) in the trowel hand. Further statistical analysis will be performed to obtain more specific data from the questionnaire. Workers also reported that they feel they have less time to complete a job and feel more tired at the end of the day compared to a few years ago and that they did not have sufficient recovery time.

Recommendations include limiting the size of bricks, advocating use of the shorter trowel (no more that 10 and a half inches) and educating the workers on proper working postures to minimise the stress on their joints. Additionally, allowing the workers sufficient recovery time and controlling the work pace was seen to be important in the workers' perception of minimising their musculoskeletal risks.