Assessment of Exoskeletons for the Rehabilitation of Industrialized Construction Workforce

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ABSTRACT

Industrialized construction revolutionizes the construction industry by transferring the majority of onsite activities to controlled, offsite manufacturing facilities. However, the prefabrication processes are still labor-intensive. Construction workers perform repetitive and physically demanding tasks that can cause severe injuries and musculoskeletal disorders. Previous studies have proven the success of medical exoskeletons in physical rehabilitation. Nevertheless, there is a scarcity of research on their efficacy in industrial environments. This research introduces a criteria-based framework for assessing the use of exoskeletons for the rehabilitation of injured and disabled workers in industrialized construction. The proposed research reviews the state-of-the-art and state-of-the-practice in medical exoskeletons to evaluate their readiness for construction tasks. A criteria-based decision matrix captures the relationship between the identified exoskeletons and industrial construction tasks. The present research is expected to address the unprecedented skilled labor shortage facing the construction industry. It will provide construction professionals with preliminary guidelines for integrating medical exoskeletons in factory-based settings, thereby retaining and rehabilitating Gen X workforce.