

Relationship Between Ergonomic Assessment and Physical Discomfort of Workers in the Twining Process

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Abstract

Coir twine rope is a natural and eco-friendly alternative to synthetic ropes, which are utilized in various industries such as marine, agriculture, and construction. The coir rope twining industry in Quezon Province has been around for many years and has provided employment opportunities to its community. It is usually done through manual material handling, which is one of the leading causes of work-related musculoskeletal disorders in industrially developing countries like the Philippines. In this study, ten (10) workers of ABC Company, specifically their plant site located in Barangay Kanlurang Maligaya, Agdangan, Quezon, were assessed through observation using the Rapid Entire Body Assessment and Rapid Upper Limb Assessment to identify the level of risk associated with the twining process. They were also interviewed using the Cornell Musculoskeletal Discomfort Questionnaires to assess their physical discomfort. Results from REBA and RULA show very high-risk levels based on the different postures associated with the tasks, while the CMDQ results revealed that seven (7) out of ten (10) workers experience moderate discomfort, while the remaining three (3) experience severe discomfort primarily in the upper back (8.21%) and lower back (8.31%), as well as in the right and lower leg (6.55%). Spearman-Rho correlation analysis showed a significant relationship between the total RULA score and the physical discomfort of the lower arm at the 0.05 significance level. Thus, the researchers use the anthropometric measurements of five (5) workers to design an ergonomic twining machine that will reduce the risk levels and prevent workers from developing MSD.

Keywords

CMDQ, physical discomfort, REBA, RULA, twining process

Bibliography:

Dr. James Louie Meneses is an experienced professor, consultant, Industrial engineer, and researcher. As a professor, he teaches industrial engineering courses, including research, operations management, operations research, feasibility studies, and ergonomics. As a consultant, he works in industrial engineering designs, management, quality management systems, and data analysis. In his early professional life, he worked as a Quality control engineer and Management trainee in a Manufacturing company. Currently, he is working as a full-time professor and a research coordinator at Manuel S. Enverga University Foundation, Philippines. His role as a consultant is mainly related to the quality management system, quality, and system improvement. He works closely with researchers in data analysis, applying 1st- and 2nd-generation statistics (Structural Equation Modeling). His work as a researcher is mainly associated with using the lean six-sigma methodology, ergonomics design, and Partial Least Square Structural Equation Modeling (PLS-SEM). He holds a Doctor of Philosophy in Management at Lyceum of the Philippines Laguna and earned his master's in engineering majoring in Industrial Engineering at Adamson University. He presented his work in several research fora, where he has been awarded best presenter and research paper.

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