Ergonomic Intervention Studies for Productivity Improvement in Small Scale Utensils Manufacturing Industry

Veeresh
Student, Industrial & Production Engineering Department
P.D.A.College of Engineering
Kalaburagi, Karnataka, India
veereshb4464@gmail.com

Qutubuddin S.M.
Associate Professor, Industrial & Production Engineering Department
P.D.A.College of Engineering
Kalaburagi, Karnataka, India
syedqutub16@gmail.com

Kajal, Aishwarya K., Sampati Bai
Students, Industrial & Production Engineering Department
P.D.A.College of Engineering
Kalaburagi, Karnataka, India
kajalkukanur8@gmail.com, koraaishwarya@gmail.com, sampatikori136@gmail.com

Abstract

Ergonomics is concerned with the design of equipment, workstation, facilities and work environment to match the human capability and limitations. Most of the Small Scale Industries (SSIs) are characterized by several ergonomic deficiencies such as poor work station design, layout problems, awkward postures, excessive noise, heat and poor illumination. The present study is focused on the ergonomic deficiencies in a small scale utensils manufacturing industry. The typical manufacturing process consists of melting, molding, rolling, plate cutting, circle cutting, press work, spinning, polishing & packing. The work in characterized by repetitive activities involving awkward postures, frequent twisting, bending, stretching, carrying loads, contact stress and vibrations. 45 workers from different sections were selected for study and administered Modified Nordic Questionnaire to know the prevalence of MSDs. Ergonomic assessment tools Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA) were used to determine the postural risks. NIOSH lifting equation determined the lifting index in manual handling tasks. Environmental parameters were measured by appropriate instruments. Digital Human Modeling (DHM) approach using CATIA software was used to model the human postures and conduct RULA analysis. The working postures are again built in CATIA to show improvements. The results indicate prevalence of MSDs among more than 50% workers. Postural analysis results in 47% postures in high risk indicating immediate change. Ergonomic Interventions in workstation design is shown through DHM, which results in reducing the risk of postures. Some of the manual lifting tasks indicated scores between 1 and 3 showing moderate risks due to lifting. Several ergonomic interventions were recommended to improve the productivity and safety of employees.

Keywords
MSD, RULA, REBA, NIOSH, Digital Human Modeling.

Biographies

			
Veeresh	**Kajal**	**Aishwarya K.**	**Sampati Bai**

Veeresh, Kajal, Aishwarya K. and Sampati Bai are students in Industrial & Production Engineering Department, P.D.A.College of Engineering, Kalaburagi. They are student members of IEOM Student Chapter in our institute. Apart from academics they are a part of the research group in Human Factors and Ergonomics Laboratory. They are also actively involved in organizing various events and local industrial visits under IEOM student chapter, and have competed in Best Student Chapter competition at 11th Annual IEOM International Conference at Singapore. 7-11 March 2021.

Dr.Qutubuddin S.M., currently working as Associate Professor, Industrial and Production Engineering Department, P.D.A.College of Engineering, Kalaburagi. He has more than 30 years experience in teaching and research and has published more than 35 papers in International and National journals and Conferences. Under his supervision 01 research scholar has completed PhD and 02 are undergoing. His research interest include Human Factors and Ergonomics, Occupational Health and Safety; Production/Operations Management. He has introduced the course Human Factors and Ergonomics in the curriculum in under graduate engineering and has developed laboratories such as Industrial Engineering Laboratory, Human Factors & Ergonomics Laboratory and Quality Control Laboratory. He was actively involved in getting NBA accreditation for the department. He is a life member of ISTE, IIPE, IAENG and IEOM Society USA. He has started a student chapter of Industrial Engineering and Operations Management Society (IEOM) Michigan, USA in the institute. The chapter was awarded the best student chapter in the year 2019 at IEOM International conference in Bangkok, and in 2020 at IEOM International conference held at DUBAI. He is serving regularly in various capacities as a Reviewer, Track Chair, Session Chair and Technical Committee member in IEOM International conferences since 2015. Under his guidance UG students have participated and presented papers in International Conferences in India and abroad.