


Chapter 32

An Ergonomic Analysis on Working Postures of Construction Site Workers: A Framework for Construction Site Workers

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ABSTRACT

Risk factors related to work activity and ergonomics can enhance the probability that some persons may develop a MSD (musculoskeletal disorder). Usually the MSD develops due to high task repetition, forceful exertion, and repetitive/sustained awkward postures. MSD is also found in some cases where workers are engaged with working in awkward postures, cold temperatures, contact stress, heavy load, static postures, and vibration, etc. Many studies explain the problems for MSD, but in this chapter an effort is taken to rank the maximum body movement and body parts as per the different types of work flow system such that ergonomics design can be planned. Physical disorders can be avoided by finding and ranking the difficult task and the affected body part due to that kind of work. The prioritization of task will help the organization to think of sustainable designs of working procedure or instruments or machines to provide maximum comfort to humankind. It may also help to frame policies for occupational safety and hazards in workplace.

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INTRODUCTION

Rapid development in industrialization methods and technology demands higher production rates. Modern technology increases the demand for products and makes industries competitive. To survive in the business human race has to deal with sophisticated machines and processes. This interaction between human and machine interaction or ergonomics uses the principle of natural laws of work to solve anatomical & physiological problems between man & machine. Many companies like construction, manufacturing, mining demand more human interactions. Basically, construction companies play a vital role and act as the building blocks for the development of a country. Improper management in the workplace will reduce the productivity of construction company and ergonomic performance of various workers. To study the ergonomic performance of workers in heavy working conditions like construction company a questionnaire-based survey is conducted. The send questionnaires are classified under the following three primary classifications or factors: (a) human/labor related factors; (b) task-related factors; and (c) equipment/tools-related factors based on various age groups and occupations of the construction workers by literature review. Industry practitioners and researchers can use the primary outcomes of this study in developing systems to enhance and improve health and safety of the construction workers for effective management of construction labor workforce and to achieve a competitive level of quality and a cost-effective project. Again, the body parts and various body movements of Carpenter, Plumber, Welder & Masons anthropometric analysis is done to improve worker protection and avoid ergonomic risk factor. Some important physical motions like stress, strain, and overexertion, including vibration, awkward postures, forceful exertions, repetitive motion, and heavy lifting etc are conducted and workers are ranked by studying their body parts and body movement with multicriteria decision-making techniques like fuzzy AHP and a framework is designed by QFD.

LITERATURE REVIEW

Ergonomic design can be achieved but its evaluation can be varied. This varied needs and results can be further experimented and scrutinized in a very controlled environment. But the very big problem is also the relationship between eco-friendly effectiveness and restriction of autonomous values. To carry out a lot of experiments is also difficult. But with the use of new supercomputers and by running direct diagnosis one can find results by running computational experiments with a virtual set up. The basic objective of ergonomics is to fit man and machine together to improve the worker's performance, reduce stresses and fatigue at work. Application of ergonomics is very significant in an area where manual activities directly affect the physical and mental health of the employee (Parkes et al., 2005). Kushwaha and Kane (2016) have discussed that intervention of ergonomics in the workplace reduces the mismatch between man and machine and makes workplace comfortable for work. Ramos et.al.(2016) have developed a model to perform a financial and economic cost-benefit analysis related to OSH projects was developed and it was applied in the case of the prevention of WMSDs in a Portuguese hospital. An analysis of the accidents and corresponding costs has been made in six of the services of the hospital. Financial and an economic cost-benefit analysis have been made and the benefit-cost ratio (B/C) has been calculated. Charles et.al. (2012) have suggested that a brief hazard perception test could potentially be used in the assessment of drivers across the adult lifespan. Ergonomics is not only analyzed for construction, industries but also it is useful for all types of sectors.(i.e.education,health sector etc).Many modifications are also done in

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