

A case study on Optimization of Manual activities through Ergonomics interventions

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Abstract

Success of any industry greatly depends on the Quality, delivery and uptime. In order to achieve this industry should implement new techniques which will increase the quality, productivity and decrease worker fatigue. One such technique is ergonomics. This paper is a study on Optimization of Manual activities through Ergonomics interventions at the complex. The case study focuses on the application of ergonomics aspect in improving the quality of work system design, reducing musculoskeletal disorders and increasing productivity. By conduction walk-through survey, the existing manual activities and workstation design were studied and the suggestion was given to improve the method for productivity by reducing strain and fatigue to the workforce.

Keywords: Ergonomic workplace Evaluation, Musculoskeletal Disorders

INTRODUCTION

The word Ergonomics comes from two Greek words: ERGO: Natural, NOMOS: meaning law of work, Ergonomics can be defined simply as the study of work. More specifically, ergonomics is the art and science which deals with the designing the job to fit the worker, rather than physically forcing the worker's body to fit the job. Adapting everyday jobs, workstations, tools, and equipment to fit the worker can help lessen physical stress on a worker's body and reduce or eliminate many potentially grave, disabling work-related musculoskeletal disorders (MSDs). Ergonomics covers all aspects of a job, from the physical stresses it places on joints, muscles, nerves, tendons, bones and the like, to environmental factors which can affect hearing, vision, and general comfort and health, when there is a difference between the physical requirements of the job and the physical capacity of the worker, work-related musculoskeletal disorders (WMSDs) can result. Physical stresses include repetitive motions such as those caused by typing or continual use of a manual screwdriver. Other physical stresses could be tasks involving vibration such as using a jackhammer, or tasks which involve using too much force, such as lifting heavy boxes. Types of work which pose ergonomic hazards are Manual handling, Manufacturing and production, Heavy lifting, Twisting movements, and Long hours of working in awkward positions.

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OBJECTIVE

The Objective of Ergonomic Assessment is to evaluate the ergonomic concerns and the risk associated with manual operations and tasks considering posture, effort and repetition.

The survey was aimed towards:

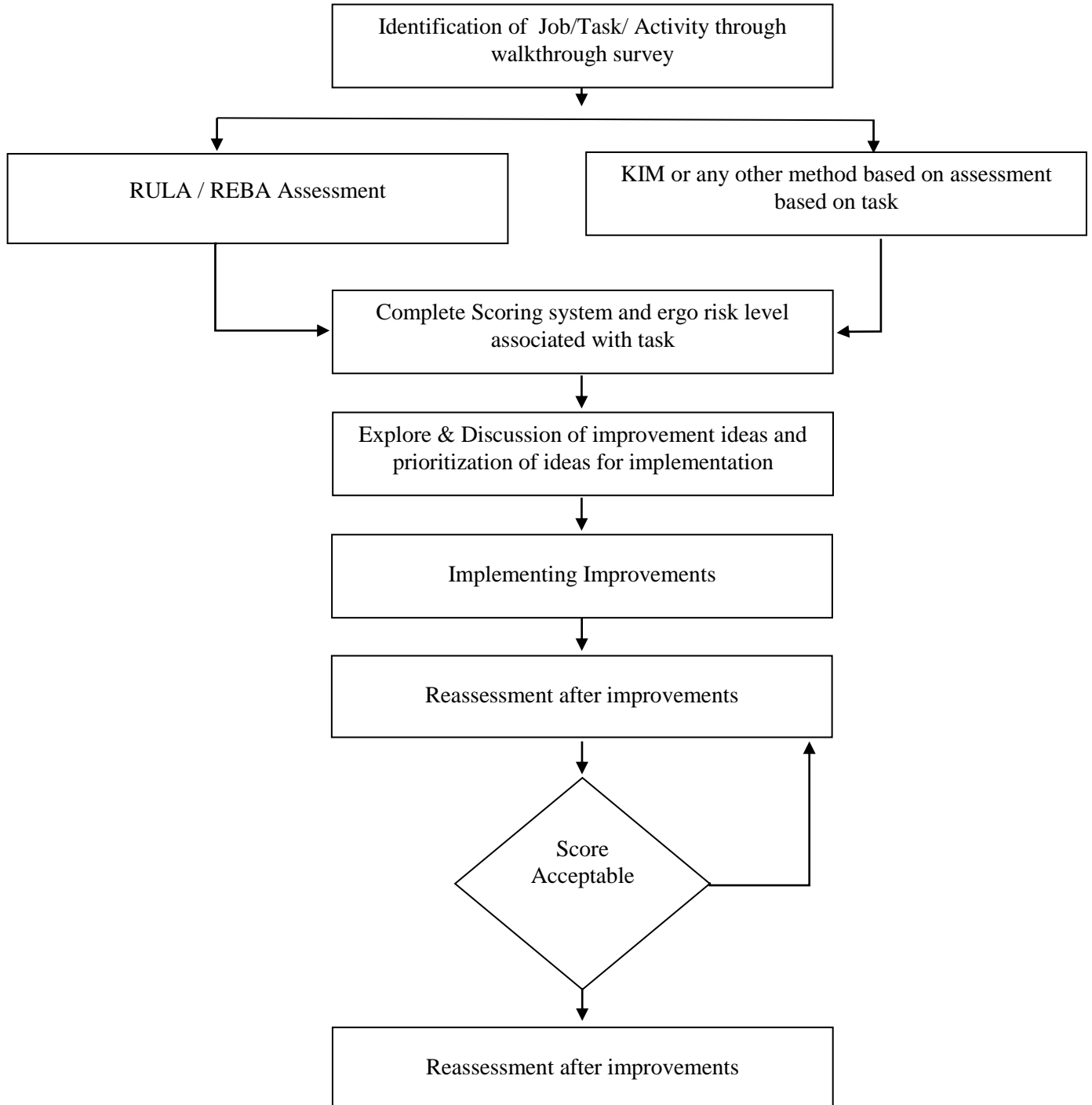
- ♣ Qualitative identification of activities, tasks, jobs which involved manual and semi-mechanized material handling.
- ♣ To identify the problems working posture confronted in the manual tasks in order to assess the working posture by making right judgment during analysis postural.
- ♣ To optimize the integration of man and machine in order to increase productivity with accuracy.
- ♣ Based on the assessment, suggestions recommended for safe working practices towards a reduction in material handling and ergonomics issues.
- ♣ Attempts to minimize the risk of injury, illness, accidents and errors without compromising productivity.

METHODOLOGY

- ♣ To conduct Ergonomics Assessment through both qualitative as well as quantitative methods.
- ♣ Administration of the questionnaire to a sample of workers from various departments/sections
- ♣ Initially, all activities were identified which were further divided/bifurcated into detailed tasks and jobs.

- ❖ On detailed bifurcation, the tasks and jobs were analyzed using methodologies like Rapid Upper Limb Assessment [RULA], Key Indicator Methodology [KIM]
- ❖ Based on the assessment, implementation of suggestions recommended for safe working practices towards a reduction in material handling and ergonomics issues.

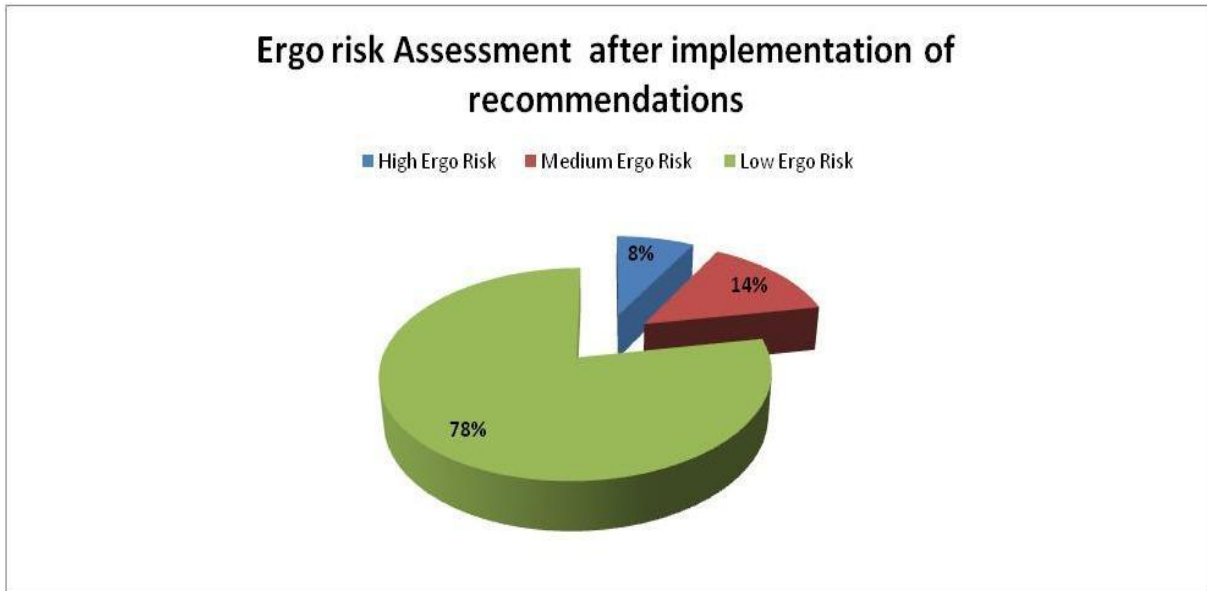
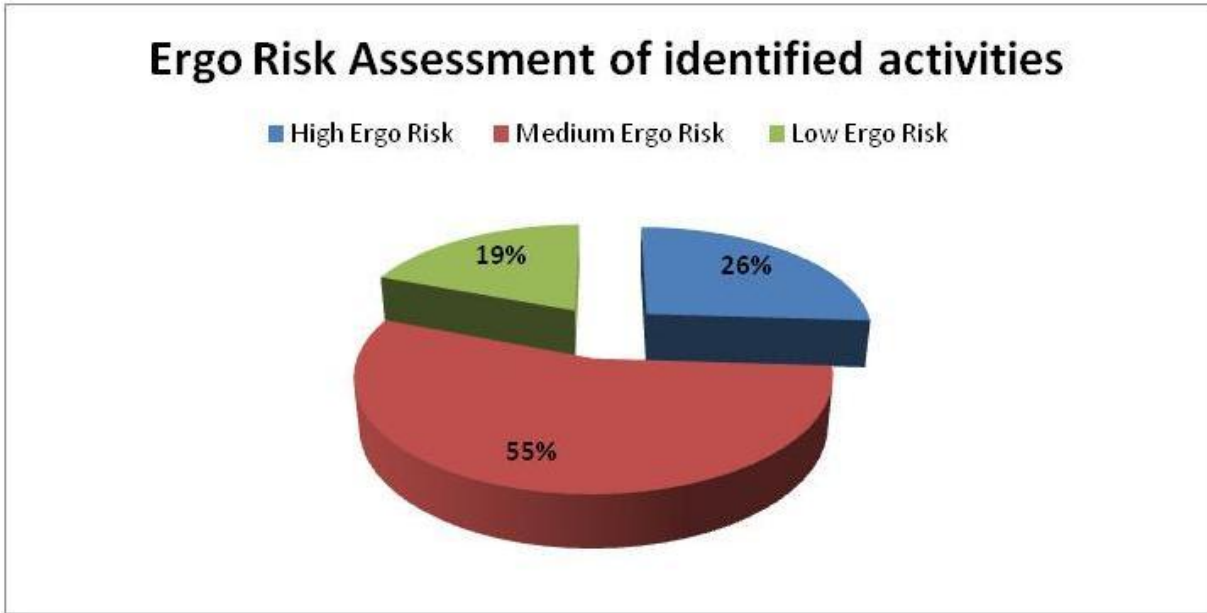
Systematic Approach to Ergonomic workplace Evaluation



RESULTS AND DISCUSSION

By conducting the walkthrough survey total, 177 activities identified for ergonomics risk assessment.

Analysis of Ergonomics Risk Assessment by using appropriate risk assessment method based on task/activity/job



Some examples of improvements done with the interventions of ergonomics

Activity - Stacking of 50 kg finished product bags at godown platform

Risk Assessment method: Key Indicator Methodology [KIM]

Before : (Risk Rating - 55)

- Taking 50 kg bags from conveyor belt on head
- Carrying bag from chute to godown area
- Offloading the bag from head to godown floor



After mechanization (Activity through palletizer machine & Forklift) (Reduced Risk Level : 3)

- Placing of empty bags in palletizer machine (only one operator is required)
- Automatic filling & packing of finished product
- Placing of finished product bags on pallet by palletizer machine
- Shifting and stacking of finished product bags at godown area



Activity - Loading of 50 kg bags into truck from godown

Risk Assessment method: Key Indicator Methodology [KIM]

Before : (Risk Rating - 65)

- Bending and tacking 50 kg bag on head from stack
- Carrying bag from stack to truck
- Offloading the bag from head to truck



After mechanization (Activity through truck loader) (Reduced Risk Level: 7)

- Hold Head of the truck loader
- Guide the 50 kg bag coming from truck loader
- Offloading the bag from truck loader to truck



Major Outcome/Benefits

- Minimum risk and less fatigue
- Increased bag handling by using such loader

CONCLUSION

This study aimed to test the efficacy of an individual workplace intervention of workplace evaluation among workers by evaluating musculoskeletal disorders (MSDs), body posture, muscle activity and psychosocial factors were tested. The ergonomic study carried out at workstations based on qualitative exposure assessment, the changes made were based on the interview with the operators, evaluation, observations and consultation with experts.

The proposed ergonomics interventions effectively reduced MSDs, improved body posture with increasing productivity and bring better result in various areas. On implementation of ergonomics principles along with traditional safety aspects, there is an improvement in the organizational safety performance also. These ergonomics aspects and their training support the employees in new gestures of postures for the working environment to get a good quality product operated at the first time by eliminating waste.

Tangible Benefits:

- Effective Ergonomic interventions express a genuine concern for workforce by management.
- Greater employee loyalty, commitment and “good citizenship” behavior.
- Improved corporate image: Less governmental scrutiny, better community relations.

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