

Ergonomics Intervention in a Printing Press with Participative Ergonomic Approach and of ILO Ergonomic Checkpoints

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Abstract- The ergonomic assessment has been carried out to recognize aspects contributing to discomfort to the workers working at Mudrankan Printing Press and identify ergonomic recommendations to reduce them. To prevent MSDs resulting from the ergonomic risk factor and bad work organization and hence to improve the productivity, safety and health the ergonomic intervention is the right choice. To meet diversifying ergonomic needs, participatory steps reviewed are found to usually follow a good practice approach easily adjustable according to local needs. These steps are found to usually focus on low cost improvement. In this paper, we scrutinize several ergonomics issues pertaining to reduce the WMSDs among the workers, in the propose system we introduce the participative intervention approach and use the ILO checkpoints.

Keywords- Participatory ergonomic (P.E), Ergonomic intervention, Ergonomics risk assessment, ILO ergonomic checkpoints, low cost solution.

I. INTRODUCTION

In recent years the ergonomics trend is shifting from micro-ergonomics to the macro-ergonomics. To meet diversifying ergonomic needs, participatory steps reviewed are found to usually follow a good-practice approach easily adjustable according to local needs. (1) These steps are found to usually focus on low-cost improvements.

They can thus lead to concrete results particularly by addressing multiple technical areas together. Further, the review confirms that the participatory methods are always modified according to each local situation. This is done by developing a group-work toolkit comprising action checklists and illustrated manuals and by building a support network of trained trainers. (2) It is suggested that participatory methods taking a good-practice approach by multi-area low-cost improvements through the group use of locally adjusted toolkits are effective for improving small-scale workplaces including those in developing countries.

The other aspect for improving condition is using ILO checkpoints. Ergonomic checkpoints are intended for those wishing to apply practical improvements to existing working condition. It covers all the main ergonomic issues at the workplace material storage and handling; hand tools productive machine safety; improving workstation design; lightning premises; control of hazardous substances and agents (3)

II. LITERATUR REVIEW

Definition of participatory ergonomic by Wilson and Haines (1997):

“The involvement of people in planning and controlled of their work activities, because they have sufficient knowledge and power to influence both processes and outcomes in order to achieve desirable goals.” (4)

Participatory ergonomics “is the workers active involvement in implementing ergonomic knowledge and procedures in their workplace. This worker effort is supported by their supervisors and managers, in order to improve their working condition and product quality. Participatory ergonomic starts by organizing a project team to solve the ergonomic problems in the workplace. The team then learns ergonomic principles and procedures for analyzing and implementing ergonomics.

A. Requisites of participatory ergonomic:

1. *Participation*: participative activities of people lead to shared understanding of the problem facing them, to team building and to a self-involved feeling in the decision-making. participation also has the benefit of the workers accepting the redesigned jobs which they improved.
2. *Organization*: in order to implement successful participative ergonomics in industries, the organization must support and prepare for it.
3. *Ergonomic method and tools*: The knowledge ergonomic include : (i) the structure of the human body movement (ii) An ergonomic implication of working posture; (iii) fatigue and prevention (iv) know how of improve jobs.

B. Interventions of participative ergonomics and ILO checkpoints:

The aim of this intervention is to implement basic ergonomic through a participatory ergonomics intervention process that can support a continuous learning process and lead to an improvement in health and safety.

The methodology of international labor office (ILO) ergonomic checkpoints could be used as a continuous program for the ergonomics intervention process.

III. METHODOLOGY

Participation, organization ergonomics tools and job design are the foundation pillars for participatory ergonomic. Following are the necessary steps which had taken in this intervention.

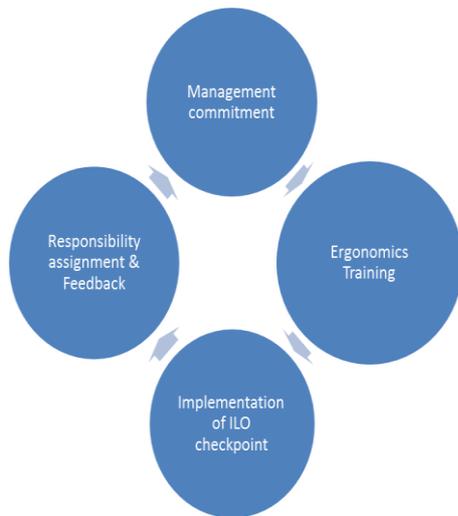
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A. Management commitment-

In order to implement successful P.E. in industries, the organization must support and prepare for it. The company management has shown enthusiasm and commitment for the ergonomics work undertaken with an objective of improvement in safety, health and working conditions. The management played a supportive role in this intervention by providing necessary infrastructure and use of other resources.

Formation of committees-

With the support of management, the foremost step in the P.E. program is the formation of ergonomics committees. Two such committees were formed- a steering committee and a working group. The steering committee consists of Heads of respective department's like-, Production, Quality, Safety and Maintenance, and top management. The working group was featured with the active involvement of the workers from machine shop, and rework/inspection area, along with the supervisors is considered. Thus, a steering committee of 5 people was guiding and mentoring the activities of the working group of 5 personnel's.

The working group committee was formed with an objective to identify the ergonomic problems at workplace and the risk factors, and to find out necessary solutions to have a control on them. The purpose of workers active involvement in this group is to take advantage of their skills and hands on experience for understanding of the ergonomic problems and to get remedies. (5) Thus this endeavor was qualifying the constraint of P.E. - an active participation of all necessary players for improvement. The group meeting was scheduled twice in a month- for the training, walkthrough surveys, and discussion on ergonomics issues.

B. Ergonomics training-

Basic ergonomics training-

To create awareness about ergonomics among the participants, a training program was conducted. The focus of this training program was on the basic ergonomics concepts and ergonomics risk management methodology to prevent WMSD's. The participants were given inputs regarding the basic ergonomics concepts like- Human anatomy, energy expenditure during work, risk factors- causes and effects, forms of MSD'S as well as the ergonomics risk management methodology. For the office staff, a training session on the office ergonomics was also conducted. For the workers in the team, a presentation of NIOSH guidelines for safe work was

given. Thus, these training sessions were helpful in creating the awareness and understandings of ergonomics.

C. Implementing ILO checkpoints

After the training program, the next target for the working group was actual implementation of the ILO ergonomics checkpoints at the workplaces. The methodology for its adoption is as follows

1. *Knowing the workplace-* The team has many walkthrough surveys at the workplace to understand the work at each place. The queries/ doubts have been getting cleared from the concern person/manager. The tasks are recorded by photo/video as per requirement. Thus the working group was with sufficient proficiency regarding the workplace to be assessed.
2. *Locally adopted checklists-* Though, ILO has prepared an extensive list of 132 ergonomics checkpoints, it is not necessary to consider all these checkpoints for assessment. Some points become irrelevant or not suitable candidates for working environment of this company. Also, it is more practical to deal with these checkpoints with respect to the existing functional areas. So the locally adopted checklists were prepared for the four functional areas in the company like- Machine shop, Stores-rework-dispatch area and Management considerations. Each checklist consisting of 30-40 points each and the relevant illustrations and examples were also appended to these checklists. Thus the working group was ready with the tailor made brochures of the ILO ergonomics checkpoints.
3. *Workplace assessment-* Four teams were formed among the working group and each team has been assigned one functional area each. The team had a survey at their respective workplaces and wrote the check results on the checklists clearly stating the problem, need of action and priority to it. Through this exercise, many ergonomics problem at the workplaces came to the surface. The awkward postures of the operators at machine shop bending and twisting while lifting the jobs, improper housekeeping, and backtracking, oily and slippery surface, insufficient lighting and unhealthy work practices (rework area), lack of proper rest place are some of the illustrative examples.

D. Brainstorming and getting the solution-

The P.E. and ILO checkpoint implementation generally calls for low-cost solutions and a continuous improvement for the ergonomics problem at workplaces.(6) After the checklist exercise, the working group has undergone the brainstorming sessions, which seeks the practical remedies for the problems enlisted. For every problem, alternate solutions were generated and assessed on the basis of criteria's like-technical aspects, feasibility, cost and potential benefits. And a feasible solution is then proposed for each of the issue.

1. *Approval of the steering committee-* The steering committee was being reported timely regarding the progress in the ergonomics program. After implementation of ILO checkpoints, the results (in terms of the problems at workplace and potential solutions) were presented to the steering committee and top management.

The committee approved on the results with some modifications and the top management was agreed to take action immediately on the PRIORITY 20 items.

The responsibility for implementation of the solution to the ergonomics problem at workplace was assigned. And the process was reviewed periodically.

IV. ILO ERGONOMIC CHECKPOINT

Sr No	Checkpoint	Responsibility	Do you propose action?			comment
			No	Yes	Priority	
1	Keep aisles and corridors wide enough to allow two-way transport	Sawant		•		
2	Make the surface of transport routes even, not slippery, and without obstacles.	Sawant		•	•	At printing dept. due to oil leakage
Sr No	Checkpoint	Responsibility	Do you propose action?			comment
			No	Yes	Priority	
3	Improve the layout of the work area so that the need to move materials is minimized.	Sawant	•			Product layout
4	Use multi-level shelves or racks near the work area in order to minimize manual transport of materials.	Dilip	•			
5	Provide handholds, grips or good holding points for all packages and containers	Prakash	•			
6	Eliminate tasks that require bending or twisting while handling materials	Prakash		•	•	Inadequate height of platform at printing and storage
7	Combine heavy lifting with physically lighter tasks to avoid injury and fatigue and to increase efficiency	Vinod		•	•	Weight based height platform
8	Provide a "home" for each tool	Sawant		•	•	No proper storage of the tools at many workstations
9	Make emergency controls clearly visible and easily accessible from the natural position of the operator	Dilip				

10	Limit the number of foot pedals and, if used, make them easy to operate	Vinod				Need to fix position of foot pedal
Sr No	Checkpoint	Responsibility	Do you propose action?			comment
			No	Yes	Priority	
11	Use markings or colors on displays to help workers understand what to do	Dilip	•			The displays are self-explanatory
12	Inspect, clean and maintain machines regularly including electric wiring	Sawant				Weekly monitoring of maintenance
13	Adjust the working height for each worker at elbow level or slightly below	Vinod		•	•	Excessive bending for job set up & inspection at many places
14	Provide standing workers with chairs or stools for occasional sitting	Vinod		•	•	
15	Use height adjusted computer workstations and arrange related computer peripherals within easy reach	Sawant	•			Not required
16	Light up the work area evenly to minimize changes in Brightness	Sawant	•			Not required
17	Provide local lights for precision or inspection work	Sawant				
18	Increase the use of natural ventilation when needed to improve the indoor climate	Sawant		•	•	Ventilation are not proper
19	Make sure that noise does not interfere with verbal communication and auditory signals	Sawant		•	•	Sound level not ok

20	Label and store properly containers of hazardous chemicals to communicate warnings and to ensure safe Handling.	Dilip		•		Labels required for the chemical bottles.
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The implementation status will be review periodically. Thus, it initiated the process of continuous improvement this ergonomic intervention is featured with the team work assessment of the problems and solution by involvement is featured with the team workers, supervisors and engineers. Thus the organization is benefited with the ergonomics intervention by using P.E approach.

V. CONCLUSION

Participatory ergonomics is the practical ergonomic with participation of necessary actor in problem solving. The methods for P.E do not form a coherent set of conceptual tools.it is rare collection of techniques and approaches in solving workplace and organizational problem in conducting the working group. From the case study it is clear that, the ILO ergonomics checkpoint is an effective technique for safety. Health and improved working condition at the workplace which is well been used with the participatory techniques.it is also support the salability argument that P.E process is capable of achieving the realistic understanding of the ergonomics problem at the workplace and converts it into suitable information for the job design.

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