International Journal of Recent Advances in Multidisciplinary Topics
Volume 3, Issue 10, October 2022
https://www.ijramt.com | ISSN (Online): 2582-7839

Ergonomics in Sewing Section

S. Darsani[1*], G. Vinoth Kumar[2], A. Ashok Kumar[3]
[1,2]Student, Department of Textile Technology, Bannari Amman Institute of Technology, Erode, India
[3]Assistant Professor, Department of Textile Technology, Bannari Amman Institute of Technology, Erode, India

***Abstract*: The textile and clothing industry accounts for about 1 % of industrial production, % of GDP and 13% of the country's export earnings. India's garment sector employs more than 12 million people in factories, and millions more work at home, according to a University of California study. Ergonomics is important in the clothing industry to improve production and worker well-being. The sewing department is the heart of the garment industry. Sewing is the dominant process in the assembly of clothes, which is still the best way to achieve the strength and flexibility of the seam and the flexibility of the production method. This study focuses on the analysis of the ergonomic factors of the sewing part. Solutions to correct ergonomic factors are given in this analysis.**

***Keywords*: Ergonomics, Garment, Export, Industry, Clothing.**

1. Introduction

Ergonomics studies the interaction between workers and their work environment. Ergonomics is a multidisciplinary field that combines the study of human anatomy, psychology, physiology, anthropometry, biomechanics and industrial engineering. The purpose of ergonomics is to study and adapt to working conditions, work tools, work process and human work product psychologically, physiologically and anatomically, instead of adapting the worker to human needs. Ergonomist's goal is to optimize the relationship between the employee and the work environment and thus improve productivity and well-being at work. The work environment includes all factors affecting the workplace and work performance, even if they may not be directly related to the activity. The purpose of ergonomics is to change work systems in such a way that the activities carried out in them are adapted to the characteristics, abilities and limitations of a person, so that work is efficient, comfortable and safe.

2. Problems Observed in Sewing

A. Lightning

The lighting required at the workplace is in the range of 10-2000 lx for work without special requirements with an accuracy of 50-100 lx. for work in workshops and offices where high precision 100-300 lx and 300-2000 lx is needed for very precise work

Proper lighting of workspace should:

- Protect eyesight
- Reduce fatigue of eyesight and nerve- muscle tension
- Provide high accuracy at work and reduce the number of errors
- Increase productivity in all activities and
- Reduce the risk of injuries

Fig. 1.

Different lighting in the workplace leads to different occupational accidents. Accidents have been found to increase after dark, at the end of the day and before fully artificial lighting. Some experts estimate that about 20% of all workplace accidents can be caused by an accident or a dark environment that leads to an incorrect action or reaction. Higher frequency of accidents at work in the night shift occurs only when the lighting is insufficient. Poor lighting strains the eyes. When artificial lighting is good during the night shift, Vernon Horace Middleton found that the frequency of work accidents is 17% lower than during daylight hours. However, if there is poor lighting during the night shift, the number of injuries and eye damage increases.

B. Hygienic Conditions

Hygiene protection includes the measures of hygiene aiming to protect the health of workers and their being in good shape, and to eliminate potential causes of possible diseases.

The cleaning and regular hygienic maintenance of the production buildings is always carried out according to the needs of the employees (daily, weekly, monthly) when the employees come to work and when they leave the workplace.

The Cleaning includes vacuuming and washing hard and soft floor coverings, cleaning work and office supplies (desks, computers, copiers, sewing machines, knives, irons, etc.), emptying trash cans, cleaning toilets, washing glass surfaces, removing cobwebs. and other dirt from the walls and ceiling.

*Corresponding author: darsani.tx19@bitsathy.ac.in

Fig. 2.

C. Zone of Reach on Sewing Machines

Reaching far to reach, place or move material stresses the shoulder and elbow joints as well as the back. Resting your hands or wrists on the sharp edges of a table cuts off blood flow and compresses nerves, increasing the risk of hand and arm injuries. Sitting or standing in an uncomfortable position for a long-time tire and strains the legs and back.

D. Operation of Sewing Machine Pedals

Working on the pedals of the sewing machine contributes to diseases of the musculoskeletal system of the legs and feet. The worker's foot must be able to operate the pedal easily. The angle of the knees should be slightly greater than 90º and the thighs should be horizontal.

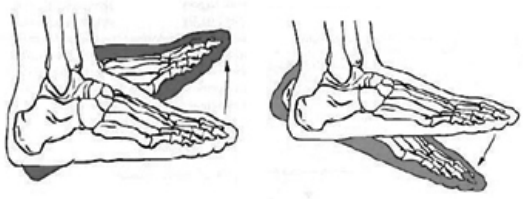

Fig. 3.

Work should be organized so as to use both hands simultaneously whenever possible. Hand should be freed from work whenever possible and serving the tools or machines done by feet (work on special sewing machines)

Fig. 4. Work on special sewing machines whenever possible

A study of 132 US apparel manufacturers found that the companies that invested in ergonomic sewing equipment increased both productivity and quality.

In order for the movement to be as economical as possible, it is necessary to use sufficient muscle mass. Sewing workstations are designed with the assumption that the worker has good visual skills, i.e. a favorable working position consisting of a slightly arched upper back with a field of view that can include a flexible front of the head in a comfortable position of up to 30. °. and an additional 10° eye rotation. This position allows a field of view with a viewing angle of ± 1°, which achieves the high sharpness required for precise control of sewing operations. It determines the height of sitting, the height and size of desk machines, the location of pedals, the distance between chairs, the required vision and visual acuity, and the ability to make simultaneous movements of the arms, legs and body.

E. Designing of Workplace in Sewing

The design of the sewing room workplace requires the determination of the angles of the kinematic system, in which the proper position of the foot on the pedal of the sewing machine is at an angle of 90°-100° and the angles are suitable for the joints below. the knee - the upper knee angle is 90°-110° and the upper body 90°-95°. In this way, an ergonomically functional and physiologically correct sitting position is realized with the correct arrangement of tools and equipment, the correct viewing angles, sitting distances and heights.

F. Ergonomically Designed Chairs

Chairs with ergonomic design increase the adjustability and comfort of the workplace. Sewing chairs should have adjustable height and good back support. Recently ergonomically designed sewing tables have adjustable armrests where workers can rest their arms. 10°-15° tilting work surfaces keep materials in view and reduce awkward hand, neck and body positions.

Fig. 5.

The main task of quality control is to control production and find out if products meet certain standards, which prevents certain manufacturing errors. The director must stop the wrong space and alert the workers about the quality of the materials and clothes produced.

3. Conclusion

Preventing stress in the workplace requires a lot of cooperation between the employee and management. To save the health of employees, recommendations were given for healthier work arrangements, work postures and movements.

Different prevention methods have been developed to prevent accidents and occupational diseases, such as continuous training of employees. However, some solutions may work in different industries.

References

[1] Blåder S, Barck-Hoist U, Danielsson S, Ferhm E, Kalpamaa M, Leijon M, et al. (1991) 'Neck and shoulder complaints among sewing machine operators: A study concerning frequency, symptomatology and dysfunction', *Applied Ergonomics*, 22(4), 251–257.

[2] Jana P. (2008) 'Ergonomics in apparel manufacturing - II, Work place ergonomics in apparel industry', *Stitch World*, 6, 42–49.

[3] Hiba JC (1998) Improving working conditions and productivity in the garment industry, ILO, Geneva.

[4] Mehta R (2012) 'Major health risk factors prevailing in garment manufacturing units of Jaipur', *J Ergonom,* 2, 102.

[5] Parimalam P, Kamalamma N, and Ganguli AK (2006) 'Ergonomic interventions to improve work environment in garment manufacturing units', *Indian Journal of Occupational and Environmental Medicine*, 10(2).

[6] Nag A, Desai H. and Nag PK (1992) 'Work stress of women in sewing machine operation', *Journal of Human Ergology*, 2, 102.