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Assessing Light Positioning in Sacred Heart Chaplaincy Producer Cooperative (Garments)

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Abstract

The purpose of this study was to examine how different lighting situations affected rag production in a tailor shop. This was assessed using a time study method and measuring the tailors' work performance. The study provided important data sheets for analysis, organized in a data table with corresponding gathered information. The results added to the body of knowledge on lighting conditions in tailoring shops, guiding potential design modifications to optimize tailor performance in their work environment. The incorporation of top lighting and the light attached to the sewing machine streamlined the tailoring process and emphasized the crucial role of a well-lit workplace environment. This dual-lighting approach improved visibility and precision by minimizing shadows and offering comprehensive illumination as it reduced the need for rework and contributed to a more seamless workflow. This not only saved time but also minimized the likelihood of mistakes that could compromise the overall quality of the finished product.

Keywords: Ergonomics, Workplace Environment, Rag Production, Time Study Method, Tailors, Tailoring Shop

1. Introduction

The Sacred Heart Chaplaincy Producers Cooperative (Garments), located at Sacred Heart Chaplaincy in Jagobiao, Mandaue City, Cebu, was established in 2019 by Rev. Fr. Nestor Gaspe. Their working environment is at the bottom of the church structure, predating World War II. This area accommodates tailoring production, where tailors engage in various tasks related to fabric conversion into finished products such as rags. Additionally, the design of the working environment in which they operate presents particular challenges regarding lighting positions.

In a workplace environment, ergonomics significantly enhances and provides comfort among workers (Afroz & Haque, 2021) [1]. The positioning of lighting within the work environment is usually overlooked but significantly impacts worker performance. It aims to explore the problem by examining the impact of light positioning on the production of rags in a tailoring shop.

By understanding the factors contributing to optimal lighting positions, tailoring shops can optimize their work environment, increasing productivity and performance (Berlin *et al*., 2017) [3]. Additionally, adjusting lighting positions can provide tailors with control over the intensity and direction of the light, ensuring optimal lighting positions for the tailoring process (Afshari *et al*., 2014) [2].

A time study method was conducted to gather data to understand the problem comprehensively. This method allows for systematically analyzing the tailors' performance, especially in productivity, using different lighting positions (Konstantzos *et al*., 2020) [5]. Through the observations, the study aimed to determine the best light position on tailors' productivity performance.

2. Materials & Methods

This quantitative investigation explored the impact of varying light positions on rag production. In assessing this influence, a diverse set of tools is employed, including a stopwatch/timer to meticulously track the duration of each tailoring step under different lighting conditions. Additionally, data collection sheets capture time measurements, task descriptions, and relevant observations about the tailoring process. The lighting manipulation equipment enables experimentation with various light

positions, intensities, and angles from the sewing machine, contributing crucial insights into the intricate relationship between light and productivity in rag production. The chosen methodology utilizes the time-study method as the primary data source. Time study can be defined as the works of directly observing and measuring the time needed to perform a specific task. In time study, the entire task is divided into small activities known as elements. Each element's performance time is recorded. As a result, the time required to complete each task (Mbawankar, 2023) [7]. The researcher used this method to measure the time to stitch the ten rags in different lighting positions. Step 1: Switch on the top light that has 40 wattages and is 160 cm from the sewing machine, and turn off the light attached to the sewing machine with 25 wattages. Then, let the sewer/worker stitch the ten rags, and the recorder records the time consumed. Step 2: Switch off the top light turn, turn on the light attached to the sewing machine, and let the worker stitch ten rags, then record the time consumption. Step 3: Turn on the two different positions of the light, the top light and the light attached to the sewing machine, and let the sewer stitch the ten rags, then record the time consumption. By quantifying the time spent under various lighting conditions, researchers can employ statistical techniques to analyze the data and determine the significance of lighting positions in the workplace.

Fig 1: Shows the measurement of wattages and the area of the sewing machine from the top light

3. Results and discussion

The results obtained from using the time study method to measure the time of each ten rags to finish using 1. Top lighting is on 2. The light attached to the sewing machine is on 3. The top lighting and the light attached to the sewing machine are on. The data gathered in the time study will help us answer the problem and give conclusions about the topic.

Table 1: Shows the gathered data from the tailoring using time study

	Time of Each Rag to Finish (second/s)										
Lighting Position	1	2	3	4	5	6	7	8	9	10	Ave.
Top lighting is on	14.32	13.46	13.15	13.04	13.05	12.28	13.20	13.52	12.36	12.40	13.078
Light attached in the sewing machine is on	12.31	11.68	12.00	12.49	13.05	12.16	12.29	12.37	12.86	12.92	12.413
Both Lights are on	12.58	12.73	12.56	11.85	12.74	12.48	12.61	12.25	12.23	11.42	12.345

As shown in Table 1, the combination of top lighting and light attached directly to the sewing machine is an ergonomic consideration that maximizes visibility, reduces eye strain, enhances comfort, and improves productivity. Moreover, combining top light and light attached to the sewing machine enhances productivity and efficiency. With increased visibility, tailors can easily navigate their projects, reducing errors and making faster progress, not only saving time but also minimizing the chances of mistakes that could compromise the overall quality of the finished product.

Additionally, the top light should not be directly placed above the tailor; it should be at an angle of 25 degrees; this can result in an accurate measurement of rags. Moreover, the light attached to the sewing machine should always be linked when using the machine to make a rag to avoid physical hazards to the tailors. This combination ensures that tailors can work efficiently and comfortably by providing optimal lighting positions, enhancing workers' performance, and resulting in fewer injuries. Further, it has a total of 65 watts of light, equivalent to 800 lux, which is suitable to the standard luminance of 500 to 1000 lux (Kulappurath & Shamey, 2021) [6].

The reduction of eye strain and potential fatigue associated with prolonged sewing tasks underscores the importance of investing in optimized lighting solutions within the tailoring industry. Moreover, the positive impact on precision and overall workflow efficiency further supports the argument for adopting this integrated lighting approach as a standard practice in tailoring workshops, potentially leading to good work performance productivity.

As a result, it balances a good lighting position that helps to focus on doing the task in order to accomplish it quickly while producing a good quality of rags within its working environment (Karlen *et al*., 2017) [4].

4. Conclusion

The integration of top lighting and the light attached to the sewing machine streamlines the tailoring process and underscores the critical role of a well-lighted workplace environment. This dual-lighting approach enhances visibility and precision by minimizing shadows and providing comprehensive illumination, reducing rework and contributing to a more seamless workflow.

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