

## Experimental Investigation of Visual Comfort Requirement in Garment Factories and Identify the Cost Saving Opportunities

**Authors :** M. A. Wijewardane, S. A. N. C. Sudasinghe, H. K. G. Punchihewa, W. K. D. L. Wickramasinghe, S. A. Philip, M. R. S. U. Kumara

**Abstract :** Visual comfort is one of the major parameters that can be taken to measure the human comfort in any environment. If the provided illuminance level in a working environment does not meet the workers visual comfort, it will lead to eye-strain, fatigue, headache, stress, accidents and finally, poor productivity. However, improvements in lighting do not necessarily mean that the workplace requires more light. Unnecessarily higher illuminance levels will also cause poor visual comfort and health risks. In addition, more power consumption on lighting will also result in higher energy costs. So, during this study, visual comfort and the illuminance requirement for the workers in textile/apparel industry were studied to perform different tasks (i.e. cutting, sewing and knitting) at their workplace. Experimental studies were designed to identify the optimum illuminance requirement depending upon the varied fabric colour and type and finally, energy saving potentials due to controlled illuminance level depending on the workforce requirement were analysed. Visual performance of workers during the sewing operation was studied using the 'Landolt ring experiment'. It was revealed that around 36.3% of the workers would like to work if the illuminance level varies from 601 lux to 850 lux illuminance level and 45.9% of the workers are not happy to work if the illuminance level reduces less than 600 lux and greater than 850 lux. Moreover, more than 65% of the workers who do not satisfy with the existing illuminance levels of the production floors suggested that they have headache, eye diseases, or both diseases due to poor visual comfort. In addition, findings of the energy analysis revealed that the energy-saving potential of 5%, 10%, 24%, 8% and 16% can be anticipated for fabric colours, red, blue, yellow, black and white respectively, when the 800 lux is the prevailing illuminance level for sewing operation.

**Keywords :** Landolt Ring experiment, lighting energy consumption, illuminance, textile and apparel industry, visual comfort

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