



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : Surendra Kumar
Roll Number : 126105004
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Thesis Title : **Impact of Low Illumination and High Noise Level on Occupational Health of Indian Handloom Weavers: Special Reference to Bargarh District of Odisha**
Name of Thesis Supervisor(s) : **Dr. Sougata Karmakar**
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SHORT ABSTRACT

Locally designed handloom workstations with indigenously developed accessories are prevalent in Indian handloom and cottage industries. This handloom sector is highly decentralized and covered under the category of the small-scale cottage industry. Recommended standards pertaining to environmental variables are not followed in work-shed of handloom clusters in Indian scenario. Moreover, the weavers were ignorant about the impact of these environmental factors as well as about the use of personal protective devices. Hence, the weavers of small-scale cottage industries or informal sectors are suffering from different types of psycho-physiological issues leading to poor occupational health. Following literature review, it is found although a lot of work has been done on the indoor environmental issues including noise and illumination in various industrial sectors including the power-loom but scanty or negligible information is available about the work done with respect to handloom sector. Studies on ergonomic evaluation in terms of occupational health, MSD & handloom modification have been carried out in the field of handloom but work on impact of prevalent level of illumination and noise on occupational health of the weaver has never been reported in the context of Indian handloom sector. Illumination and noise are the two crucial parameters which might affect the performance, productivity and psycho-physiological wellbeing of the weavers engaged in handloom sector. Among all the environmental variables, noise and illumination are the two key variables which are persistent throughout the year irrespective of seasonal variation. Thus, the current study aims to investigate the prevailing levels of illumination and noise in handloom workstations and explore their impact on occupational health and wellbeing of the weavers in terms of physical, physiological and cognitive aspects. For conducting the research, it was hypothesised that prolonged exposure to high level of noise and low level of illumination (either

solitary, or a combined impact) would significantly affect the physiological and psychological health of the weavers engaged in handloom workstations. In present research, Bargarh district of Odisha was selected as the study location due to the abundance of (8 number. out of the total 18 number) 'A' category handloom clusters here along with the highest production of Ikat sarees. Illumination level was measured using the Lux –meter and noise level by using sound level meter following standard protocol. Questionnaire was developed for collecting the responses of the weavers against the questions related to their socio-demographic characteristics; impact of noise and illumination level on physical, physiological and cognitive aspects of the weavers. Before administering to the respondents, the reliability of questionnaires was analyzed for validity and test-retest reliability using Cronbach's Alpha (α) and calculated the Friedman's Chi-Squared (χ^2_F) tests for independence of association along with correlation between environmental factors and their subjective perception by using Spearman's correlation coefficient (r). After the statistical analysis of the collected data, it was observed that the illumination level in handlooms was significantly poor and far below the recommended standards whereas the levels of noise near the right ear of the weaver was high throughout the year. The results of Spearman's correlation analysis indicated significant correlations between the recorded illumination level and noise levels with perceived job performance. Spearman's correlation coefficient (r) for correlation of illumination level and corresponding subjective responses to questions in the questionnaire on the impact of illumination revealed that there was differential significant ($P < 0.001$) inverse correlation between illumination and the physical, physiological and psychological discomfort factors whereas some physiological discomfort factors such as sensation of light on loom, sensation of light around loom, illumination satisfaction level on loom and effect of light on job performance evinced highly significant ($P < 0.001$) direct correlation. Correlation of noise level and corresponding subjective responses to questions in the questionnaire on the impact of noise revealed that there was highly significant ($P < 0.001$) direct correlation between noise and the physiological and psychological discomfort factors. All the objectives of the research work were fulfilled and the hypothesis was accepted. It is perhaps the first of its kind study to establish impact of environmental factors viz. illumination and noise on handloom weavers' perceived occupational health including physical, physiological and cognitive aspects. Suggestions towards rectifying prevailing level of illumination and noise and to reduce the impact of these factors on the occupational health of the weavers with specific affordable design interventions / recommendations for enhancing illumination level and some general recommendations for controlling the impact of noise in order to improve the overall wellbeing of the weavers has been proposed in the published literature of the present research. Handloom entrepreneurs, cooperative societies, master weavers and handloom workers interested in expanding or establishing new handloom manufacturing establishment at the small scale and village level would find the results of the current research endeavor highly beneficial.