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Industrial noise pollution and its effects on workers in forging industry

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ABSTRACT

Noise pollution is a major problem in cities around the world. Noise is defined as unwanted sound. Environmental noise consists of all the unwanted sounds in our communities except that which originates in the workplace. The present study has been carried out in the forging industry in Kolhapur, Maharashtra. Noise levels at various Mechanical press and drop hammer forge were measured. In the present research work, the minimum noise recorded was 92 dB (A) and maximum as 104 dB (A), which was compared with OSHA and WHO (World Health Organization) standards. Result of this study shows that due high intensity of noise generated by Mechanical press and drop hammer forge at workplaces, workers were facing the mental and physical problems.

Keywords— Industrial noise, Forging industry, Hearing loss

1. INTRODUCTION

Noise is commonly defined as any unwanted or undesirable sound. The normal human ear and nervous system have the remarkable capacity to receive and perceive sound (and noise). However, numerous diseases can impair or completely nullify normal hearing capabilities. Sensorineural hearing loss is one such disease in which hair cells of the inner ear (stereocilia) lose the ability to transmit sound information to the brain. Noise-induced hearing loss, which is damage to stereocilia caused by exposures to hazardous levels of noise, is the second most common aetiology of sensorineural hearing loss. Although there are many sources of hazardous noise and types of hearing impairment, workplace noise exposures are the best predictor of hearing impairment other than age in. Sensorineural noise-induced hearing loss caused by exposure to hazardous levels of workplace noise has been termed Occupational Noise-Induced Hearing Loss (ONIHIL).

Exposure to continuous and extensive noise at a level higher than 85 DBA may lead to hearing loss. Continuous hearing loss differs from person to person with the level, frequency, and duration of the noise-exposed. Negative effects of noise on human beings are generally of a physiological and psychological nature. Hearing losses are the most common effects among the physiological ones.

Majority of people working in the industry are exposed to noise. Therefore, in this study, the effects of noise on human beings have been investigated with respect to the level of noise they are exposed to. In this context, measurement and questionnaire studies have been conducted at Forging Industry at Kolhapur.

1.1 Adverse Health Effects of Noise

The WHO has documented seven categories of adverse health effects of noise pollution on humans. Much of the following comes from the WHO Guideline on Community Noise and follows its format. The guideline provides an excellent, reasonably up-to-date, and comprehensive overview of noise-related issues, as do the other recent reviews on this subject.

- **Annoyance:** The feeling of discomfort, distraction, and irritation due to the exposure of noise by interrupting the conversation activity and disturb while resting is an annoyance. It is a psychological concept that tends to increase as noise exposure increases, changes in noise pitch and intermittency or other such features can also increase annoyance.
- **Hearing:** Chronic exposures to high noise intensity may lead to hearing loss. The increased noise levels can cause injuries to internal tissue structures of the ear which gives rise to irreversible hearing loss. According to WHO prolonged noise level exposure above 75 dB can cause the hearing impairment; it may also cause cognitive impairment in children.
- **Cardiovascular Effects:** High noise levels can contribute to the cardiovascular effects such as weakness in nerve, pain in internal tissues, heart problems, and even blood pressure in the long term. Long exposure to noise over 85 dB might be a dangerous

factor for high blood pressure, and it may induce major increases in diastolic blood pressure among sensitive individuals. Also other physiological problems like breathing, heart-beat rate, and pulse rate and blood cholesterol, etc; may affect.

- **Sleep disturbance:** It is also one of the major impacts on the health of people due to the high noise exposure due to which they become restless, lose concentration and presence of mind during their activities.
- **Mental Illness:** Psychological symptoms such as, anxiety and depression are also noise induced consequences.
- **Pregnancy Problem:** Unpleasant sound atmosphere makes lady workers of irritating in nature. Continuous and sudden noise causes abortion in female workers.

1.2 Noise Effects on Productivity

Because of higher noise level exposures, people cannot concentrate on their work, thus they require more time for completing the work and they feel tiring due to fatigue. This type of negative exposure to high levels of noise also brings different kinds of negative influences and deterioration in working efficiency and performance of the worker. As a result, it will cause an impact on the productivity of individuals.

2. METHODS AND MATERIAL

A study has been carried out at Forging Industry at Kolhapur. Actual noise levels in this industry have been measured and their maximum and minimum values have been placed in the Tables. A sound level measuring instrument (Lurton Model: SL- 4010 - Sound Level Meter) was used to get measurements. Noise Measurements have been recorded by holding the SLM at 1.5 m from Ground. For this purpose, noise levels corresponding to the forging industry have been carried out to determine the effects of noise on human beings. 18-question questionnaire has been applied in the context of the study.

Purpose of the Questionnaire:

- To know whether hearing losses in workers originate from any factors other than noise (a hereditary illness, the effect of medication, exposure to sudden non-professional sources of noise, etc.)
- To determine the effects and complaints other than the permanent hearing loss that may occur due to the noise.
- To determine rates of using ear protection equipment used to decrease the level of noise influencing workers at workplaces, and expressing the complaints and positive comments on using them.
- To determine the factors that are effective on workers exposed to noise.
- For specifying worker comments on protection from noise.

3. NOISE MEASUREMENT

As shown in table 1, the noise was measured at the forging industry during its operation at different Press Machine and drop forge hammers. The noise measured varying from 92 dB to 104 dB. Comparison of these results with OSHA or WHO standards shows that the industry is not meeting the associated standards.

Table 1: Average Noise Levels Calculation for Press Machines and Drop Hammer

Press Machine Model	Noise Measurement Readings (dB)						Average Noise Level at the workplace due to the source (L_p) in dB
	First Shift			Second Shift			
MF-MP-01	97	94	92	96	93	92	94
MF-MP-02	100	95	92	98	95	93	96
D. F. 0.5 T	94	94	93	93	93	93	94
D. F. 1 T	101	97	93	99	97	90	97
D. F. 2 T	102	99	92	100	98	93	98
D. F. 2.5 T	103	101	90	103	96	95	99

4. PROBLEMS FACED BY THE WORKERS DUE TO NOISE POLLUTION

The workers were facing problems due to noise pollution, it was observed during the visit of the forging industry and interviews with the workers that most of the workers were either un-educated or primary educated. Due to their illiteracy, these peoples were very much reluctant to undertake measures to protect themselves from the consequences of high noise levels. The information which was provided by the workers regarding the problems, they were facing due to excess noises of the machines and other factors are Hearing Loss, Annoyance, Speech Interference, and Irritation.

4.1 Hearing problems, Irritation, Annoyance and Speech Interference

Figure. 1 indicates that the workers are facing problems as Hearing problems, Irritation, Annoyance and Speech Interference at the workplace. It has been observed that all (100%) workers were facing the problem of speech interference. 38% of workers were facing irritation problem and 62% of workers were facing a hearing problem and 52% of workers facing Annoyance.

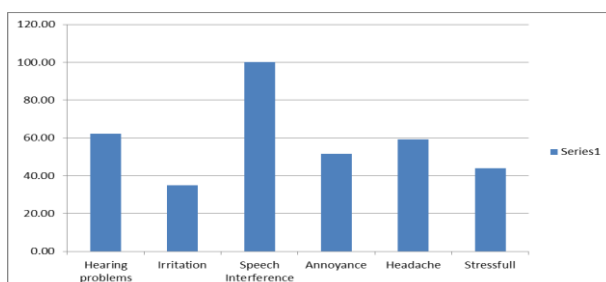


Fig. 1: Hearing problems, Irritation, Annoyance and Speech Interference

5. USE OF PERSONAL PROTECTIVE EQUIPMENT

To overcome the problem of high noise the management has undergone the awareness program of using personal protective equipment for workers. 100% of workers have been using personal protective equipment like earplugs during their work hours. 56% of workers fill this equipment are limiting their communication and getting irritated after using them for a certain time.

5.1 According to the results of the questionnaire applied to the Forging industry

- 73.03% of workers in the industry are disturbed by the noise in their workplaces.
- 42.54% of workers feel stressful due to high noise.
- 61.56% of the workers have a hearing problem.
- Ear protection accessories are being used in the industry. The administration made it compulsory to all workers.

6. CONCLUSION

Noise pollution is a serious but neglected issue in the forging industry. It causes a health hazard. From the present study, it has been observed that the sound level was above the permissible limit in the forging industry. So, necessary actions are needed to be taken to reduce the sound level. The findings of this study should be taken into consideration by the decision makers in formulating policies and guidelines regarding the control of noise pollution and the hearing problem of the workers. This is the proper time to build a social movement and create extensive awareness against sound pollution like other environmental pollution. Prevention is better than cure is a wise saying. So this is the right time to control the noise pollution.

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