



## INDUSTRIAL NOISE EFFECT ON HUMAN BODIES

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### Abstract

The problem of noise in the industries around Saharanpur has been examined in this study; and noise measurement and survey studies have been carried out at concrete traverse, cement, iron and steel and textile factories located in this region. A questionnaire was completed by 256 workers during this study in order to determine the physical, physiological, and psycho-social impacts of the noise on humans and to specify what kind of measurements have been taken both by the employers and workers for protection from the effects of noise.

It has been specified, during the surveys, that the noise levels detected in all the industries are much above the 80 dBA that is specified in the regulations: 74.83% of the workers in these industries are disturbed from the noise in their workplaces, 61.96% of them have complaints about their nervous situations, 32.96% of these workers are suffering hearing problems although they had not had any periodical hearing tests and they are not using ear protection equipment.

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### Introduction

Noise is one of the physical environmental factors affecting our health in today's world. Noise is generally defined as the unpleasant sound which disturbs the human being physically and physiologically and cause environmental pollution by destroying environmental properties.

The general effect of noise on the hearing of workers has been a topic of debate among scientist for a number of years. Regulations limiting noise exposure of industrial workers have been instituted in many places. For example, in the U.S., the Occupational Noise Exposure Regulation state that industrial employers must limit noise exposure of their employees to 90 dBA for one 8-h period. This permitted maximum noise exposure dose is similar to the Turkey Standard, which is less than 75dBA for one 7.5h period.

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 effect of noise on human being is generally of a physiological and psychological nature. Hearing losses are the most common effects among the psychological ones. It is possible to classify the effects of noise on ears in three groups: acoustic trauma, temporary hearing losses and permanent hearing loss. Blood pressure increases, heart beat accelerations, appearance of muscle reflexes, sleeping disorders may be considered among the other physiological effects. The psychological effects of noise are more common compared to the physiological ones and they can be seen in the forms of annoyance, stress, anger and concentration disorders as well as difficulties in resting and perception. A great majority of people working in industries are exposed to noise. Therefore, in this study, the effect of noise on human beings has been investigated with respect to the level of noise they are exposed to. In this context, measurement and questionnaire studies have been conducted at concrete traverse, cement, iron and steel and textile industries around Saharanpur.

### Material and methods

#### Industrial Noise Measurement Technique

This study has been carried out at concrete traverse, iron and steel, cement and textile factories around Saharanpur. Actual noise level in these industries has been measured and their maximum and minimum values have been placed in the associate tables. A sound level measuring instrument (TES 1350 Sound Level Meter) was used in these measurements. Measurement results have been recorded by holding the instrument at a height of 1.6m from ground in living and working environments of the workers in order to determine the noise levels to which the workers are exposed.

Iron and steel industry was not operating during this study, but a survey has to be conducted also in this industry due to the high level of noise incorporated and large number of workers involved in the iron and steel industries. A survey also has been carried out at the iron and steel factory at Saharanpur to determine the effect of noise on human beings.

A 29-question questionnaire has been applied in the context of the study.

Purpose of the questionnaire

1. To learn whether losses in workers originate from any factors other than noise (a hereditary illness, effect of medication, exposure to sudden non-professional sources of noise, etc)



2. To determine effects and complaints other than permanent hearing loss that may occur due to the noise.
3. 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.
4. To determine the factors that is effective on workers exposed to noise.
5. For specifying worker comments on protection from noise.

Questionnaire results were compiled using Minitab statistical program software. The data were evaluated using the  $\chi^2$  test. Additionally, some important results have been also demonstrated in the associated Tables.

### Measurement and questionnaire results

#### Noise Measurement Results

As shown in Table 1, the highest noise among these industries was detected at the cement (105 dBA) and concrete traverse (106 dBA) factories. Comparison of these results with the standard taking place in the Noise Control Regulation shows that none of industries subject to this survey are meeting the associated standards.

#### Questionnaire Results and Evaluation

The questionnaire has been applied to 256 workers selected from all industries. Distribution of the participants has been examined with respect to their ages, servicing periods and departments. Distribution of the workers according to their industries is:30% concrete traverse, 15% cement, 37% iron and steel and 18% textile factories.

**Table 1 industrial noise measurement results**

Industries	Max(dBA)	Min(dBA)
Textile	98	74
Iron & Steel	101	76
Cement	105	71
Concrete Traverse	106	79

In the concrete traverse factory, 28% of the workers in the production department are exposed to a noise level of 106 dBA while 74% of the workers in the whole factory also were exposed to a noise level much above the standard specified in the Noise Control Regulations. In the textile factory, 60% of the workers were exposed to a noise level of maximum 105dBA and they are working at the mill department.

At textile and cement factories, the majority of the workers are working in very noisy environments. As shown in Table 2, the concrete traverse factory among these industries is one with the highest level of disturbance from noise (maximum of 106 dBA). The rate of disturbance was never below 60% in any one of the factories, indicating that the problem of noise exists in all these industries.

**Table 2 Annoyance levels of industrial workers**

Industries	Annoyance from noise					
	Yes		No		Total	
	N	%	N	%	N	%
Textile	35	78.78	10	23.22	45	19.4
Iron & steel	70	73.91	26	26.08	96	37.1
Cement	24	60.54	15	37.54	39	15.2
Concrete traverse	60	79.94	16	20.05	76	28.3
total	189	74.83	67	26.16	256	100

$\chi^2=4.484$ , D.F.=3,  $P > 0.05$

N̄: working number, D.F: Degree of freedom

As shown also in Table 3, the rate of disturbance from noise among the workers working for 5-10 years is 73.66% while this rate is 100% among workers working for more than 21 years.



**Table 3. The relationship b/w working periods and level of annoyance of workers.**

Working period(years)	Annoyance of noise at working place					
	Yes		No		Total	
	N	%	N	%	N	%
5-10	81	71.67	32	28.38	113	44.65
11-15	77	77.75	22	22.20	99	39.14
16-20	28	73.66	10	26.30	38	15.02
20--	-	-	3	100.01	3	1.17
Total	186	73.51	67	26.52	253	100

$X^2=9.447$ , D.F=3,  $P<0.05$

When all the industries are considered individually, it has been specified that maximum level of nervousness complaint was determined at the cement having a noise level of 105 dBA(67.64%) (see table 4). Carelessness is the disturbance type with the lowest rate of appearance (3.07%). Looking at table 2, it is possible to state that the most significant disturbance caused by noise is nervousness.

**Table 4. Annoyances observed by workers in different industries.**

Annoyance	Industries									
	Textile		Iron & steel		Cement		Concrete traverse		Total	
	N	%	N	%	N	%	N	%	N	%
Nervousness	27	64.21	46	57.52	23	67.64	43	59.71	139	61.92
Dizziness	5	11.98	7	8.73	7	20.58	4	5.57	23	10.13
Insomnia	6	14.27	8	10.0	3	8.83	17	23.60	34	14.90
Tiredness	3	7.16	15	18.76	0	0	7	9.73	25	10.97
Carelessness	1	2.38	4	5	1	2.94	1	1.39	7	3.07
Total	42	18.42	80	35.08	34	14.91	42	31.57	228	100

$X^2=22.278$ , D.F=12,  $P<0.05$

Examination made on the type of hearing problems indicate that 30.86% of the workers are generally complaining about illnesses like ringing and leakage in the ears as well as hearing loss (Table 5). Distribution of hearing problems according to industries is 30.86% , 34.89% concrete traverse, 31.33% cement, 24.96% iron and steel and 39% textile factories. As seen in these results, the textile industries was the one where the highest level of complaints (39%) determined with regard to the hearing complaints among the industries at Saharanpur. Looking at the relationship between hearing problems and noise disturbance, it has been observed that complaints of 34.9% of the workers distributed from noise are related to hearing problems, indicating that noise is affecting the hearing members.

When workers were asked to answer the question "did you have any hearing tests before" it was determined that 44.90% of the workers had hearing test; and, with regard to the distribution to industries, it has also been determined that most of the tests had been carried out at the concrete traverse factory (Table 6). Factory manager's expressions about having such test each year support this fact. The rate of hearing test made in the iron and steel industry is 19.78% and it indicates that these test are not carried out there on a yearly basis. These results have also been found statically important ( $p<0.05$ ).

**Table 5. Hearing complaints at different industries.**

Industries	Hearing complaints					
	Yes		No		Yes	
	N	%	N	%	N	%
Textile	18	39	27	61	45	17.47
Iron & Steel	23	24.96	73	75.04	96	37.6
Cement	13	31.33	26	67.67	39	15.13
Concrete	25	34.89	51	66.11	76	29.78



traverse						
Total	79	30.86	177	69.14	256	100

$X^2=4.164$ , D.F.=3,  $P>0.05$

**Table 6. The level of hearing test in industries.**

Industries	Hearing test					
	To be done		Not to be done		Total	
	N	%	N	%	N	%
Textile	21	46.68	24	51.33	45	16.57
Iron & Steel	19	19.78	77	82.21	96	38.5
Cement	18	46.17	21	53.65	39	15.33
Concrete	57	75.00	19	25.20	76	29.78
traverse						
Total	115	44.90	141	55.08	256	100

$X^2=52.372$ , D.F.=3,  $P<0.05$

It has been observed that there are noise problems in all the industries at which these measuring and questionnaire studies have been conducted. For this reason, it has been necessary to make a survey on the level of using the ear protection accessories for protection against noise and it has been determined that rate of using them was 31.94%.

## Results

It has been determined during our measurements that the noise levels in all the above industries are much above the noise level of 80dBA specified in Noise Control Regulation.

According to results of the questionnaire applied to the above industries:

1. 74.83 of workers in the industries are disturbed from the noise in their workplaces.
2. Noise causes the problem of nervousness on workers at a rate of 61.96%.
3. 32.86% of the workers have ailment like ringing in the ear, hearing losses, etc.
4. Ear protection accessories are being used in the industries by rate of 31.94%. The rate of using ear protection accessories at the cement factory at which the noise level is the highest is at 7.68%. As indicated, the industries at Saharanpur have the problem of noise.

## Recommendations

1. The problem of noise should be taken into consideration during their establishment phases (construction of the building, allocation of machinery, etc.)
2. Use of the latest technology should be provided in the industries.
3. New workers who will work at noisy workplaces should to hearing tests and other tests regarding related illnesses.
4. Suitable protection accessories should be provided for the workers who will work in noisy environments and they should be trained on regular usage of such accessories.
5. Employers and workers should be trained on noise and its effect on human health.

## Reference

1. MELNICK,W. Hearing loss from noise exposure, Hand book of noise control, Harris, C. M(Ed.). Mc. Grow Hill, New York, 15, 1, 1979.
2. JANSEN G. Effect of noise on human being. VGB (German) 72 (1), 60, 1992.
3. JOHNSON D. Field studies: industrial exposure.J. Acoustsoc. Am 90 (1), 170,1991.