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EFFECTS OF NOISE ON WORKERS IN PRODUCTION SPACES

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ABSTRACT

The noise has the effects in a wide range from disturbing to distracting. The aim of this paper was to determine the influences of noise on workers in production spaces. Indoor measurements were carried out to select the workshops situated in Zeytinburnu district in Istanbul which have the high noise level according to National and International regulations. At the selected workshops, the questionnaire survey has been realized to determine the subjective evaluations. As a conclusion, it has been determined that, there was no high correlation between objective and subjective evaluation.

1 - INTRODUCTION

The negative effects of noise pollution on our activity and health are known as a very important problem in these days. The noise may affect almost all-different kinds of activities and may cause many health problems. Especially, in the production spaces like "ready to wear" and leather workshops, the noise problems have become more important because of the existence of the noise sources like machines and others. The detrimental effects of noise on working efficiency and production have been proved in industry. Workers can make more errors and production drops when exposed to a high noise level. In this study, aiming determinations of noise effects, objective and subjective evaluations have been investigated in the workshops situated in Zeytinburnu district, that have a lot of workshops.

2 - SELECTION OF PRODUCTION SPACES

In this study aiming to investigate effects of noise on the workers, first of all, indoor noise levels in the a lot of leather and ready-wear workshops have been carried out. After that, typical production spaces which indoor noise levels exceeded acceptable noise levels according to International and National regulations were determined. (Acceptable level for workshops is 70 Leq dBA according to Turkish Noise Control Regulation and WHO). The general information about selected production spaces and the measurement results can be seen in Table 1 and Table 2, respectively. These workshops generally located on the ground floor or basement of the residence and working places. Most of them are covered with the reflected surfaces. Therefore, the reflections from interior surfaces are being caused increasing in the noise level.

Workshop number	Square of workshop (m ²)	Number of workers	Number of machine	Age groups of workers
1	350	16	5	20-28
2	230	38	8	25-30
3	78	8	4	28-30
4	80	12	4	17-40
5	200	17	15	20-30
6	90	19	10	16-25
7	150	17	15	18-35
8	260	26	19	20-25
9	160	20	16	20-25
10	110	20	13	14-23
11	90	40	30	25-30
12	300	19	16	15-40
13	300	41	42	20
14	300	45	38	20-25
15	615	107	60	20-35
16	140	10	15	15-35
17	100	4	5	25
18	60	8	6	23

Table 1: Information of selected production spaces.

Workshop Number	Noise source	Sound pressure level (dBA)				
		Lmax	Leq	L10	L50	L90
1	Machine+music	85,8	79,4	76,2	74,0	70,3
2	Machine	87,9	78,7	82,0	76,5	68,5
3	Machine	89,8	76,9	80,5	74,0	65,5
4	Machine	89,1	75,1	79,0	72,5	65,0
5	Machine+music	85,1	75,2	72,0	70,4	68,5
	Machine	81,0	70,4	67,7	66,0	64,3
6	Machine+music	86,2	74,4	77,0	73,5	69,0
	Machine	78,8	69,3	73,0	67,5	62,0
	Background	75,3	64,6	62,5	61,0	57,6
7	Machine	81,4	72,6	76,0	69,5	64,0
	Background	75,6	64,8	62,3	60,1	56,8
8	Machine+music	86,9	77,7	80,0	77,0	74,0
	Machine	82,0	73,0	76,7	72,5	68,9
9	Machine+music	86,3	77,8	80,5	77,0	73,5
	Machine	83,2	72,8	76,2	73,2	69,0
10	Machine+music	89,9	81,6	84,5	79,5	74,5
	Machine	84,5	75,3	78,4	75,4	70,4
11	Machine+music	81,6	70,7	74,0	68,5	65,0
12	Machine	92,0	75,6	78,0	74,5	69,0
13	Machine	80,3	72,4	75,0	71,5	68,0
14	Machine	83,2	74,7	77,0	73,5	70,5
15	Machine	79,6	72,8	74,0	72,0	70,5
	Background	75,0	67,0	64,0	66,0	65,0
16	Machine	84,5	72,8	76,0	71,0	63,5
17	Machine	94,7	86,8	88,0	86,0	85,0
18	Machine	93,3	85,8	88,0	83,0	78,0

Table 2: Indoor noise levels.

3 - THE NOISE SOURCES IN THE WORKSHOPS

In all workshops, the noise sources that consist of sewing machine and related to function of workshops, tools which are being used for cutting, punching, sticking ext. cause increase in the noise level. Playing

music with the high level in the working hours is another matter. While the music is playing, its level became higher than the machine noise level. On the other hand, the speaking of workers have influenced the noise environment. In general, according to the size of the workshops, it is found that, the number of workers are more than the limits.

4 - THE QUESTIONNAIRE SURVEY AND EVALUATION OF THE RESULTS

In order to determine subjective evaluations of workers about noise environment of workshop and to compare the result of measurements with subjective evaluations, a questionnaire survey have been applied on 126 workers, with 10 questions. The results of six questions from the survey can be seen in Figures 1, 2, 3, 4, 5 and 6.

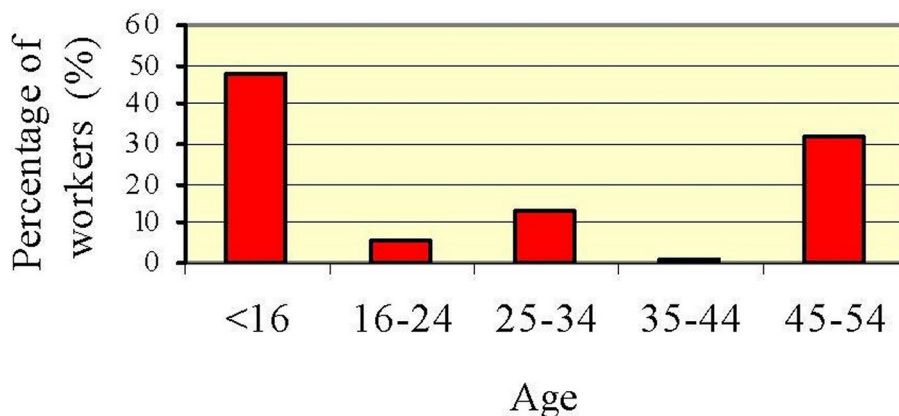


Figure 1: Ages of workers.

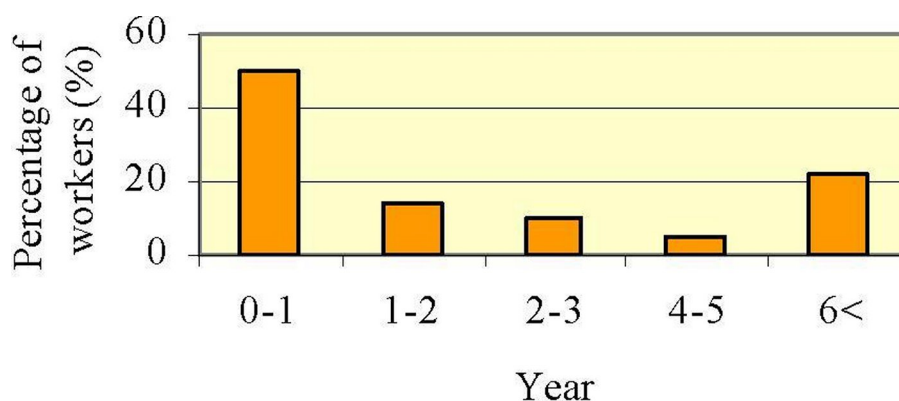


Figure 2: Working time of workers.

Figures 4, 5 and 6 indicate that, the noise in workshops is not a significant problem when looking from workers point of view. The main reasons of this result can be explained as shown below:

- Generally, the workers are very young. So, they are not aware of that noise has negative influences on their health.
- The workers ignore that the music sound masking machine noise can cause hearing loss and other harmful effects with time.
- The workers are afraid of losing their occupations if they complain about noisy working environment.

On the other hand, as shown in Table 2, noise levels exceed the acceptable levels in a considerable amount in all of the workshops included in the sampling process (exceeded levels are between 3-17 dBA). Moreover, observations and investigations indicate that, there are rather noisy environment in the workshops. Although they did not complain about noise, in fact, the workers are being affected from noise negatively.

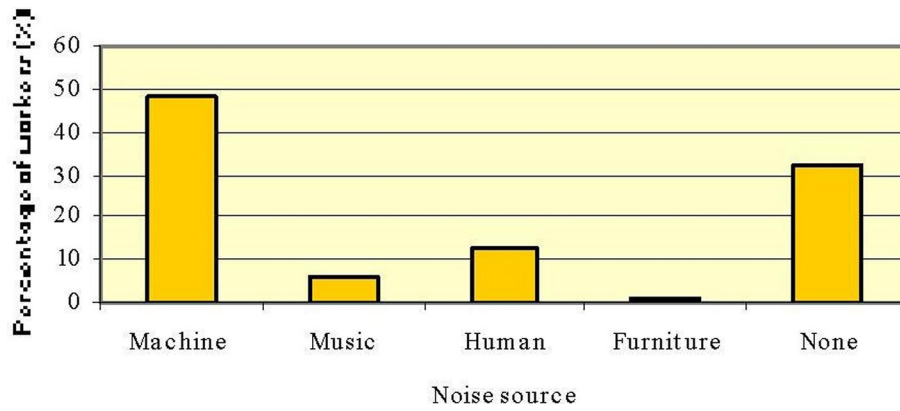


Figure 3: Noise sources in the workshops.

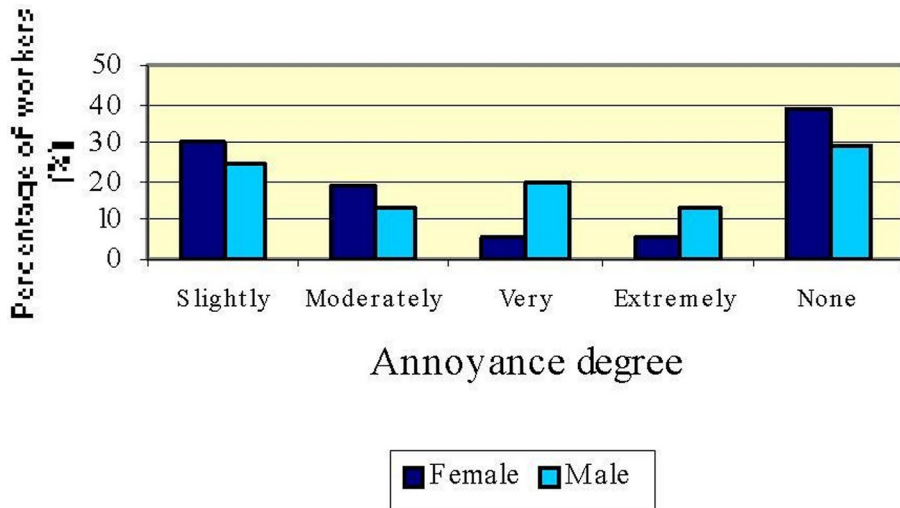


Figure 4: Annoyance from noise.

5 - CONCLUSION

It is obvious that, there exist noisy environment in most of the workshops placed in Zeytinburnu. It has been observed that, in most of the workshops, there is not any prevent taken against noise and vibration. In order to prevent the reaction of workers to noise, listening music with high level is allowed, moreover, fast tempo music is being selected for making them work faster. On the other hand, the precautions have to be obtained to create appropriate acoustic conditions according to National and International regulations. Especially, noise control has to be taken into consideration by employers. Also, the workers have to be aware of noise's harmful effects and that these effects can be preventable. The workers must know that they have legal rights for defending themselves to the negative effects of noise. Because of this, employers must satisfy the conditions that is necessary for their employees' health. As it is seen in all the fields, the precautions against noise must be taken in the workshops and the verbal principles should be put into practice according to National and International Regulations.

REFERENCES

1. Anon., Noise control regulation of Turkey (in Turkish), *Official journal*, Vol. 19308, pp. 23, 1986
2. D.H. Schwela, Announcement of new world health organization guidelines on community noise, In *Internoise 99*, pp. 1159-1164, 1999
3. N.Y. Akdag, Gürültüden etkilenme ve gürültü kontrol yönetmeliği, In *Yapıda Ses ile İlgili Önlemler ve Çözüm Önerileri*, pp. 80-91, 1996

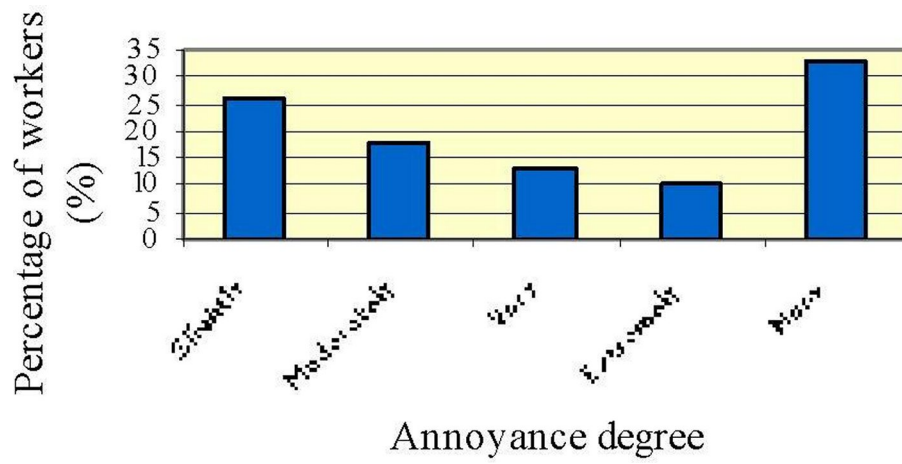


Figure 5: Annoyance from noise.

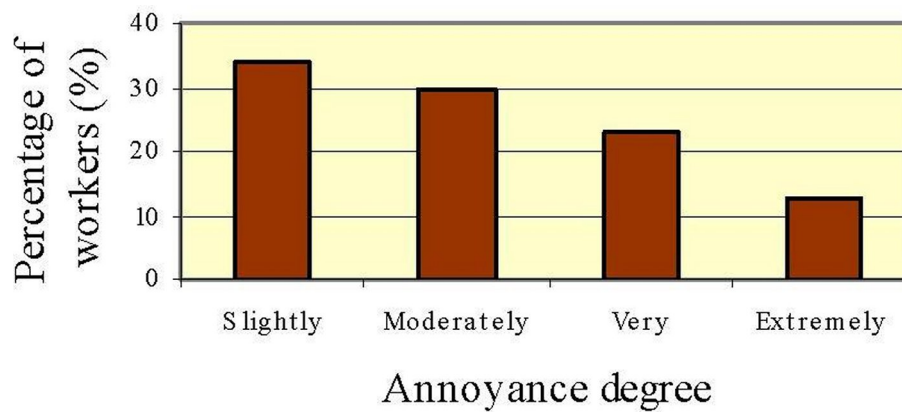


Figure 6: Annoyance from machine noise.