

# Survey Of Noise Pollution In Weaving Unit Of Parsabaft Textile Factory And Providing Some Noise Control Ways

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**ABSTRACT:** Introduction: One of the risks always threatening human is the workplace hazards disturbing his life in various forms. One harmful factor in textile industry is the noise pollution existing in almost all units, affecting the health of workers, area residents and environment negatively. Material and Methods: This is a field study investigating the risk of noise pollution in weaving unit, north part of the factory and administration office (which is located) next to the weaving unit in a textile plant in Tehran. To measure the noise environmentally we use A noise analyzer model "TES 1358" was used to measure simple noise and with frequency analysis in octave frequencies and also noise dosimeter model "TES 1355" was used to investigate individual exposure. Results: For this purpose, the level of noise was measured in 111 stations in different parts and the results were compared with standards defined in ACGIH and EPA and The level of pollution spread were demonstrated using GIS maps charts and based on justified charts. The results Showed that noise level in most Stations exceeded the permissible level authorized (higher than 85 dBA in production unit and higher than 65 dB in administration unit). Also, based on the questionnaire investigating the comfort and protection level of the helmets it was revealed that used helmets were not were used not able to protect the workers against the existing noise. Discussion and conclusion: To control noise it was designed and suggested to install a 3 layer KENAF partition surrounding winder machines and also suspended acoustic tile and foam on top of the machine. Thus, some plans and schemes were developed to decrease the level of the noise pollution. Proposition: Substitution some weaving machines (for example electronic machines that are 6 meter instead of electronic and mechanical machines that are 3 meter) or changing some parts of machines (using Teflon gears instead of metal gears), periodical services, some environmental renovations are needful for noise reduction

**Keywords :** Noise, noise pollution, Textile industry, noise control, weaving, partition, barrier, noise absorbent

## INTRODUCTION

Noise is one of the most common causes of hearing loss, and one of the most common occupational illnesses in the United States. A single shot from a large caliber firearm, experienced at close range, may permanently damage your hearing in an instant. Repeated exposures to loud machinery may, over an extended period of time, present serious risks to human hearing (Stansfeld and Matheson 2003). According to the National Institute on Deafness and Other Communication Disorders Every day, we experience sound in our environment, such as the sounds from television and radio, household appliances, and traffic. Normally, these sounds are at safe levels that don't damage our hearing (Zannin, Ferreira et al. 2006). But sounds can be harmful when they are too loud, even for a brief time, or when they are both loud and long-lasting. These sounds can damage sensitive



Simple thermometer to check the noise of textile machine in 29 stations  
 Sound check for the factories public sound in a disciplined way in 31 stations 5\*5

From these 16 stations, thermometer with frequency analysis in octave and in 15 station frequencies, sound checking was performed. Also 6 stations in the north and northwest area of environmental sound and factories in four stations, sound administrative unit was measured.

In order to assess individual exposure, for 3 persons of factory that was conducted in three different locations, 8-hour dissymmetry workshop were based.

The results of these measurements of 63 stations placed in respective tables and maps were drawn required. Also to be closely studied, for stations that have had sound frequency analysis, comparison charts based on occupational standards Ministry of Health and Medical Education, conducted and then drawn. The results of stations took on GIS charts to investigate different stations sounds and to get the results need to be achieved based on diagrams.

### RESULTS

The results of the first stage (background noise measurement)

Sound pressure level measure at three stations in the tissue salon in A, C nets (in a way that all the machines were off) because it is near to the ending factory and the noise comes from there to all the textile salon. According to the results, average of registered pressure levels are 54/2 decibels A in the hearing range and 69 decibels in the environmental.

Measuring sound pressure level of textile machines

Table 1. average of sound pressure level in textile machines

Row	machine name	SPL	Leq
1	average of (LP) textile 3 meters electronic old machine	82/6	84/5
2	average of (LP) textile 3 meters electronic new machine	80/7	84
3	average of (LP) textile 6 meters electronic old machine	78/7	81/6
4	average of (LP) textile 3 meters electronic mechanical machine	84/1	84/7
5	average of (LP) textile 3 meters electronic platinum machine	84/1	85/4

Measuring sound pressure level of Duke Restorer machines

Table 2 . average of sound pressure level of Duke Restorer machines

Situation	SPL dBA	Leq
Average (LP) of one-side Duke Restorer machine	89	90/1
Average (LP) of two-side Duke Restorer machine	90/3	91/2

Information and result of sound check in third phase

Measuring the sound pressure level in 31 stations of textile salon, in A,C networks (in the disciplined network way and in machines ordinary function situation) and stations upper than 85 dB frequency analyses was done in 1/1 octave. The result of their average of sound pressure level is in the following chart.

Table 3.results of sound pressure level of textile salon in Parsabaft factory

	SPL	SPL	Frequency HZ							
	dBA	dB	octave 1/1							
			63	125	250	500	1000	2000	4000	8000
Average(LP)	91/1	91/7	73/5	72/4	74/8	82/6	83/9	85	83/7	79/5

Figure 1- graph of sound pressure levels in all stations with frequency analysis in octave-band frequencies centers and comparison with the relevant standards (ACGIH and the Center for Environmental Health and the Ministry of Health and Medical Education) in textile salon of Parsabaft factory-2014. information and results of sound check in fourth phase (checking the amount of worker's confrontation with noise)

To check the amount of worker's confrontation with noise, we use a dissymmetric way and the results are in the following chart.

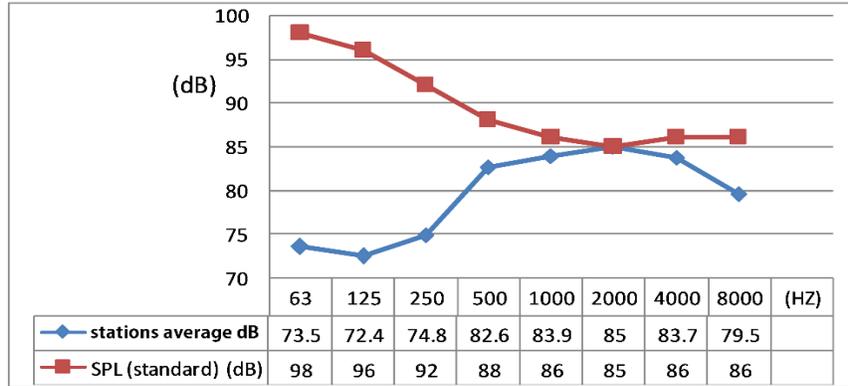


Figure 1.

Table 4. the dissymmetric results of textile salon workers in Parsabaft factory- Ordibehesht 93

Duty	Confrontation Period (hr)	Confrontation Noise pressure level(dB)	Equivalent level of noise confrontation (dB)	Standard noise
Duke restorer operator	11	90/1	91/5	85
Textile operator in south-east of factory	11/5	87/1	88/7	85
Textile operator in north-west of factory	11/5	85/4	87	85

Spindles restorer approximate operator level is equal by workers in 8 hours with the balance of 5/91 dB confrontation

The balance of textile operator is equal by the worker in 8 hours with 88/7 dB level confrontation

The balance of textile operator is equal by the worker in 8 hours with 87 dB level confrontation

In order to better show the state of noise, sound and ISO Sonic map was drawn based on GIS software. In this display, the measurement results to determine the sound pressure level of the studied area, instead of the color code, by contour lines (ISO Sonic) is shown.

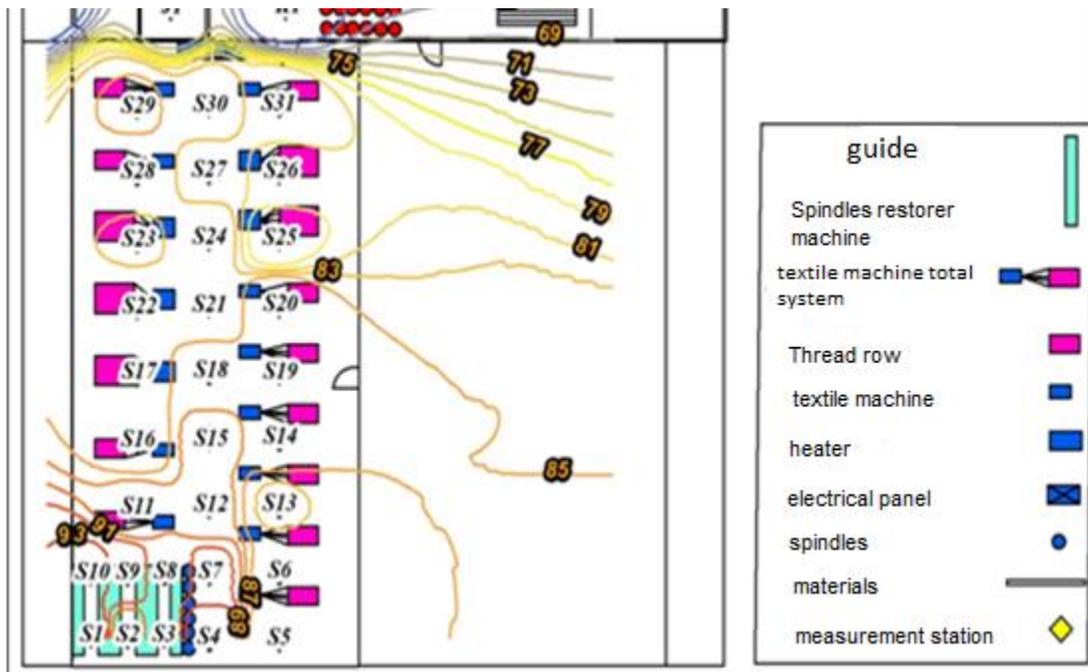


Figure 2. Chart of sound level of the hall and the northern area of Parsabaft factory -2014

Orange lines represent the values of sound pressure level in the curves model.

## DISCUSSION AND CONCLUSION

Because the given background noise (2/54 dB) is more than 10 dB and less than the noise level of workshop (7/91 dB), the background sound doesn't have enough effect on the source sound, therefore its effect is not considered. According to the reports of Ministry of Health, the sound pressure level of the sound made by sources with a wide range of bass frequencies, has been measured within the scope of caution and risk assessment. Average levels of electronic audio devices, is lower than the average sound level of mechanical devices. The average sound levels of 6 meters' electronic machines, is lower than average levels of 3 meters' audio electronic machines. The average sound levels on unilateral, is lower than average levels of bilateral spindles restorer machines. According to the average sound levels of old electronic devices (6/82 dB) and average sound levels of new electronic devices (7/80 dB) and with checking the difference of about 2 dB it seems to be particularly significant relationship between noise pollution caused by old machines do not exist. According to the results of measurements and calculations showed that the dominant frequency in the workshop, is the frequency of 2000 Hz (85 dB) sound pressure level. With using the texture Workshop sound interference level with conversation we will get these results: the sound of workshop in a way causes an interference, in a way that to hear the speakers you should be 7 centimeters near by the listener's ears or it is needed to shout instead of talking. Because the sound pressure levels are not so different in different stations, so we can conclude the reflected waves from the surface in these workshops is high and therefore we can lower voice through some implementation of control.

The results of Dosimeter, all workshop workers are confronted by noise beyond the standard limits noise (85 dB).

Confrontation time of the spindles restorer (according to the results of dosimeter), in the workshop is as follows:

$$T_a = \frac{8}{2^{[0.331 \times (91.5 - 85)]}} = 1.8 \text{ hr}$$

It means Less than 2 hours, the worker is allowed to confront to the sound of spindles restorer without the use of personal protective equipment. Weaver's confrontation time (according to the average dose measurements) in the workshop is as follows:

$$T_a = \frac{8}{2^{[0.331 \times (88 - 85)]}} = 4 \text{ hr}$$

It means, in maximum 4 hours, the worker is allowed to confront to the sound of spindles without the use of personal protective equipment in the sound workshop.

The following suggestions are recommended to reduce confrontation to noise.

1. In order to reduce confrontation of personnel, their presence hours reduce in the textile salon.
2. Workers instead of two 12-hour shifts, three shifts of 8 hours or in 6 shifts of four-hour work in workshops.
3. It is better for workers to work in other units that are quieter for some hours.
4. Pre-employment and periodic examination, and follow-up care and necessary measures should be done.
5. It is recommended that workers to go at meal time and rest time in a quiet place away from the noise.
6. in the corner of the workshop, make acoustics room for time of rest in this place of comfort.
7. Replaced old mechanical devices with new electronic models.
8. Replacement of mechanical and electronic 3 meter old machines with 6-meter electronic appropriate ones.
10. Recommended the proper, carefully maintenance of machines.
11. Periodic Repairs, lubrication and grease gears devices and the spindles should be done regularly, even daily.
12. After removing any plugs and protective barriers of the machine in order to perform repairs or other services, immediately put the pieces of plugs or protection in place again.
- 13-to parts of the machine that is currently lacking doors or guards, build plugs or protection on other devices such as samples.
- 14- of-drop any device on the device to be avoided.
- 15 devices oil-leakage could be resolved as soon as possible. The failure to prevent oil leakage from the device on the floor, the non-metallic containers should be used.
- 16-After repairs and grease, knives, bearings, grease the base and the base Shaver bullets back in place carefully adjusted.
- 17-loosening due to vibration of machine screws and parts, using wrench arranged all the necessary connections seem.

- 19 The machine is working with less engine RPM. To create less noise.
  20. under the basic units of machines use neoprene vibration damping fitted with metal spring.
  - 21- New models of textile machines are being suggested instead of metal gears of polymer gear used such as Teflon.
  - 22-replace required number of narrow belts instead of flat belts in motor-driven devices and Foley.
- Proposed
- 30-it is suggested to cover the metallic surfaces of ventilation channels by using polyurethane foam.
  - 31- Increase the absorption level of salon with adding suspended tiles.
  - 32- Cover the levels of metal doors with suitable absorbent material.

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