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CONTRIBUTIONS TO THE EXPERIMENTAL STUDY ON THE SOUND POLLUTION IN INDUSTRIAL ENVIRONMENTS - MEASUREMENTS

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Abstract: *Through the work aims to carry out a quantitative noise assessment issued by equipment and machines in the industry. The second part of this study contains measurements and results interpretation in real situation inside the industrial environment. This paper is a part of the important study regarding the sound pollution evaluation in the industrial activity.*
Key words: *sound pollution, experimental study, industrial activity, measurements.*

1. TEMPORAL NOISE ANALYSIS

The simplest measurement made on the level of noise is **sound pressure level**. In most cases, the man perceives noise at a level lower than it really is. Therefore, devices designed for measuring the sound pressure level must adapt so that metering feature to detect the level of subjective noise, you called sound level, perceived by humans.

The action by which the sound pressure level (acoustic environment) is converted into sound level (perceived by humans), depending on the frequency, called **weighting**. Frequency weightings to consider modifying the sound level according to this parameter. In principle, a frequency weighting curve is plotted by reversing a curve of equal strength. Weighting in the level (in the same frequency range) lies in the definition of several weighting curves, each representing roughly the inverse of a given curve of equal strength. Weighting curves A, B and C are complementary to equal strength curves soundtrack 40 fon fon, 70 and 100 respectively, fon. Weighting curve D, defined in particular, are used in the context of measurements of noise produced by aircraft.

Weighting curves (Fig. 1) are used to measure noise whose sound levels are less than 55 (curve A), between 55 and 85 fon fon (curve B) and more than 85 (curve C). Most terrestrial noise measurements, including those produced by motor vehicles, are carried out with the weighting curve a. weighted sound power level of the curve is measured in dB (A) .

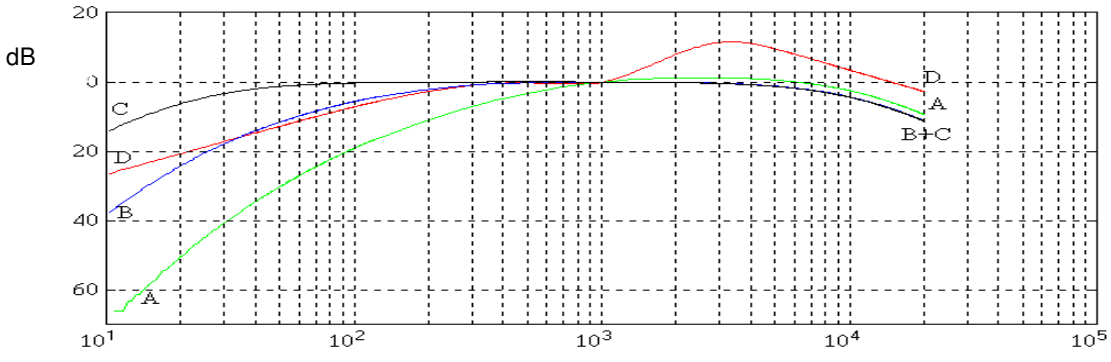

Fig. 1. Weighting Curves [ARG 08a]

Weighting filters (Fig. 11)) are used to model the specificity of the human ear, to be less sensitive to low frequencies and high. The most widely used filter (industry and transport) is the kind of (weighting curve) that measured in DB(a) actual sound sensation of the human ear. It is recalled that the actual sensation of the sound recorded by the ear is depending on sound pressure level and spectral composition. For example, if we consider two different frequency sounds 1000 Hz ultrapolling, respectively, and the same sound pressure, the 300 Hz is perceived lesser strength.

Filter or weight curve C is linear in a wide range of frequencies being used to measure sounds very powerful or very low frequency. Type B filter is rarely used in practice. Some devices have type D scale used for evaluating aircraft noise in their passage through the vicinity. [ARG, 08a]. The measurements in this paper are made with weigh curve A.

2. INDUSTRIAL PARK TERAPLAST

Reduction of sound propagation in air with noise indicators, calculation for the noise caused by industrial activities [ISO 9613-2] is a detailed procedure for calculating the environmental noise levels generated by point source, noise sources as: surface type and line type.

Through instructions of ISO 9613-2 [ISO calculate the sound pressure level, A-weighted, continuously, equivalent, in weather conditions favourable to the propagation of acoustic emission sources are known, as well as sound pressure levels, weighted, averaged per period of time .

2.1. Experimental study area

The study was made at the industrial park from TERAPLAST, Bistriţa-Năsăud, a manufacturer of pvc pipes and pvc profiles. The aim of these measurements is to perform analysis of industrial noise inside the hall (Fig. 2). As shown in Figure 2 measuring points are:

- first measurement in workshop with feeding pumps (primary source);
- a second measurement near the line of pvc pipes;
- third measurement near the line of pvc profiles;
- the fourth metric in the workshop of plastic coated granules.
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Fig. 2. Industrial Park TERAPLAST

2.2. The level of noise at the measuring point 1-power-pump room

Noise values recorded at a distance of 1 m from the power pumps, have been unloaded in the NL-22PB1 processing of the data and graphical representation, were generated for the sound level for the period under review. Measurement time was 1 h (Fig. 3).

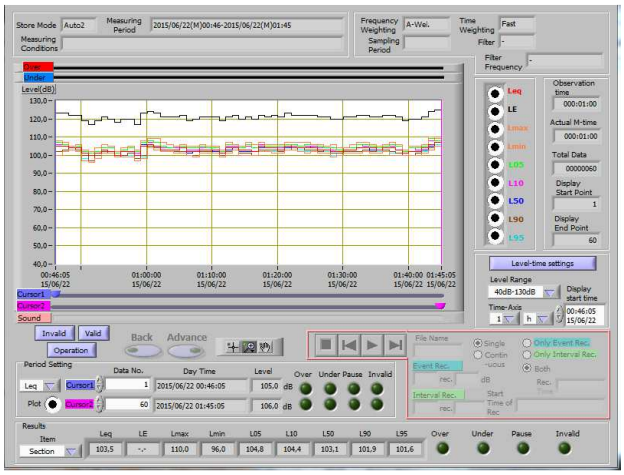

Fig. 3. The data measured at a distance of 1 m from the main source of the noise – power pump room.

The maximum level recorded is over 120 dB, which vastly exceed permitted inside the halls.

2.3. The level of noise at the measuring point 2 – near pvc pipe line

Measurements taken at a distance of 100 m from the main source to determine the noise level for a period of 1 h (Fig. 4).

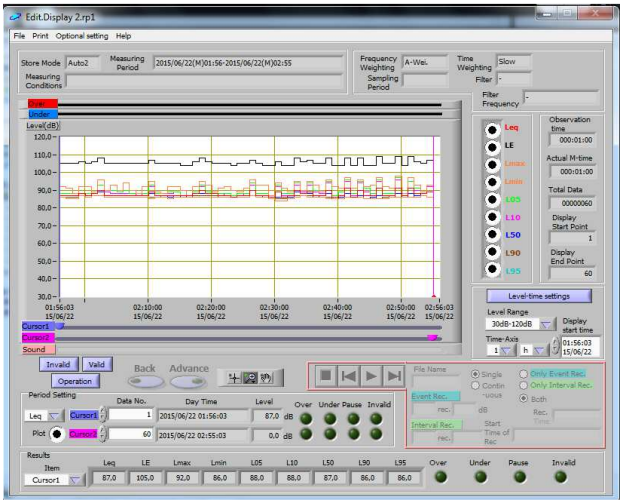

Fig. 4. The data measured near pvc pipe line

The maximum level recorded is over 100 dB, which vastly exceed the permitted inside the halls.

2.4. The level of noise at the measuring point 3 – near the line of pvc profiles

The values recorded for the noise indicators, measured at a distance of 400 m from the main source are shown graphically in Figure 5. The maximum level recorded is over 100 dB, which vastly exceed the permitted inside the halls.

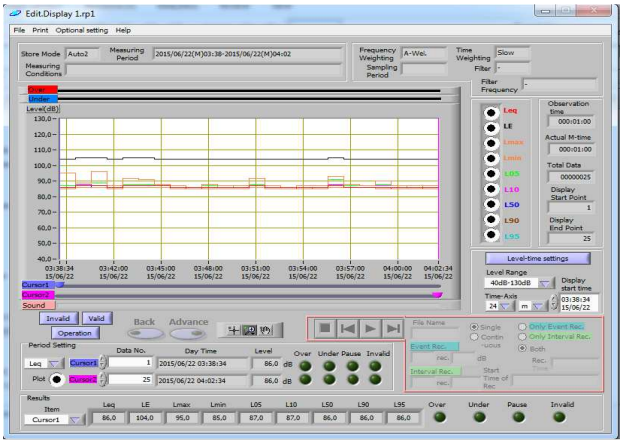

Fig. 5. The data measured near the line of pvc profiles

2.5. The level of noise at the measuring point 4 – workshop plastic coated granules

In Figure 6, there are represented the noise indicators from measurements made in the workshop of plastic coated granules where noise is continuous, and reaches a value of 102-105 dB.

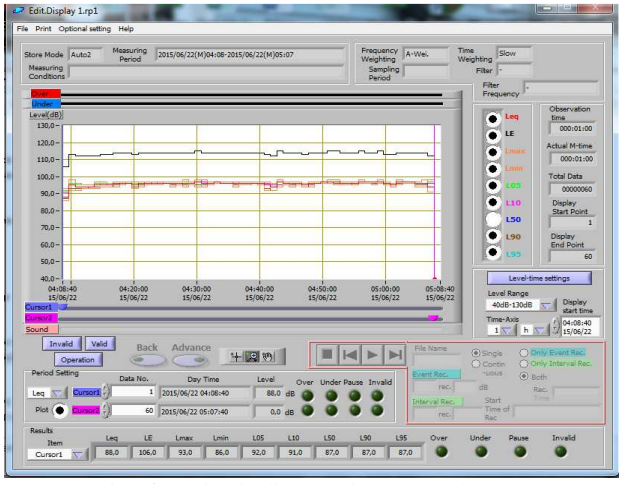

Fig. 6. Noise indicators in the workshop of plastic coated granules

2.6. Exterior noise levels related the industrial hall

There are four figures noted 7, 8, 9, and 10 in which are ploted the noise levels outside the industrial hall.

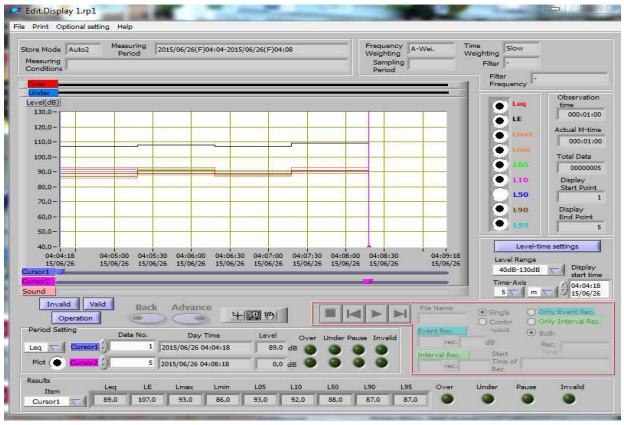

Fig. 7. The data measured outside the hall with feeding pumps, at 1 m near the wall

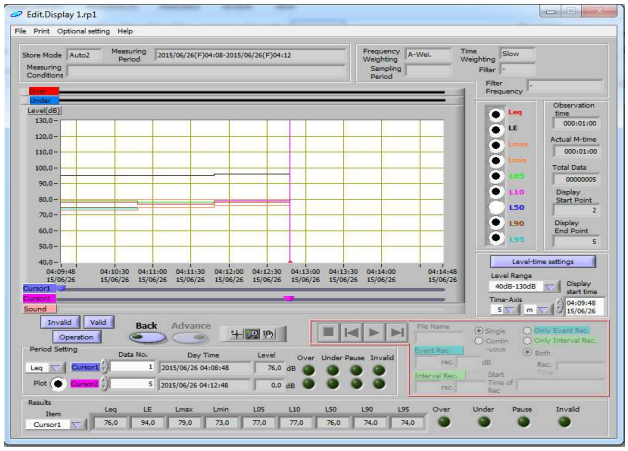

Fig. 8. The data measured outside at a distance of 150 m from a main source of noise – hall with feeding pumps

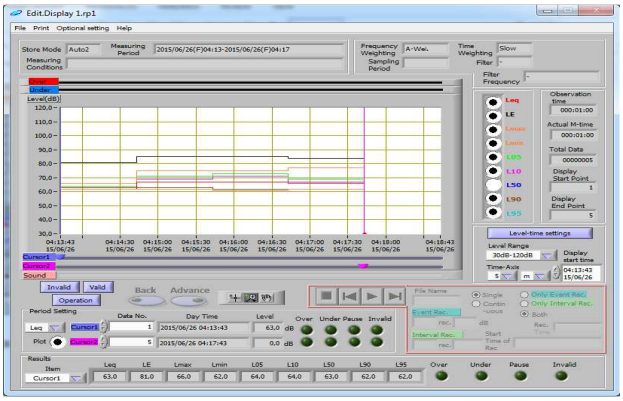

Fig. 9. The data measured outside at a distance of 300 m from a main source of noise – hall with feeding pumps

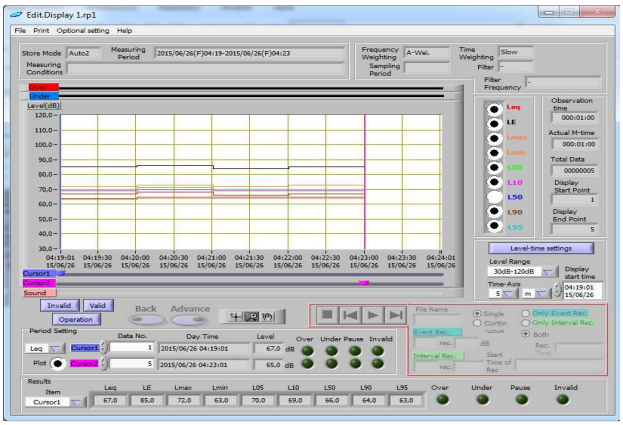

Fig. 10. The data measured outside at a distance of 200 m from a main source of noise – hall with feeding pumps

4. CONCLUSIONS CONCERNING THE MEASUREMENTS

Measurements in industrial park tries to highlight the problem of Teraplast noise pollution in the industrial environment.

A. Inside the hall, there are the folowing results:

- pump room, the noise level was measured at 120 dB;
- next line of pvc pipes, registered noise level was 100dB;
- next line of pvc profiles, registered noise level was 100dB;
- in the workshop of plastic coated granules, registered noise level was 100dB;

B. Ouside the hall, there are the following results:

- in Figure 7, the maximum measured level = 100dB;
- in Figure 8, the maximum measured level = 95 dB;
- in Figure 9, the maximum measured level = 80 dB;
- in Figure 10, the maximum measured level = 85 dB.

C. In any position was sound, noise levels recorded by the device exceeds the permissible level [11617-90], with so much industrial park is a strong source of sound pollution in Bistrita municipality area.

5. BIBLIOGRAPHY

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[ISO 9613-2] ISO 9613-2 *Poluarea acustică în mediul industrial*

[11617-90] STAS 11617-90 Metode pentru determinarea nivelului de zgomot şi limite admisibile

Contribuţii la studiul experimental asupra poluării sonore în mediul industrial. Măsurători.

Rezumat: *Prin lucrarea prezentă se doreşte să se realizeze o evaluare cantitativă a zgomotelor emise de echipamentele şi utilajele din industrie. Cea de a doua parte a acestui studiu conţine măsurătorile efectuate în mediul industrial şi analiza poluării sonore a utilajelor. Această lucrare este o parte a unui studiu important în ceea ce priveşte evaluarea poluării sonore în activitatea industrială.*

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