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Analysis and Causes of Traffic Noise on Automobile Roads and Measures to Reduce Them (with sample on automobile roads)

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ABSTRACT: In this article analyzes the main indicators of noise from vehicles on roads passing through residential areas, its main sources and impact on the human body. The article also provides recommendations for reducing noise on public roads in the Republic of Uzbekistan.

KEY WORDS: noise**,** traffic noise, source, decibel, negative impact of noise, barriers, landscaping works to reduce noise.

I.INTRODUCTION

Requirements for designing transport and engineering-communication infrastructure networks for the future development of the economy in regions of the country are rapidly increasing. In particular, the Decree of the President of the Republic of Uzbekistan dated September 11, 2017 No PP-3262 "On measures to improve the system of architectural-landscape construction and landscaping of highways" was signed [1].

The resolution includes radical improvement of the architectural and artistic quality of the road structures, radical improvement of the quality of forming works on the roads and landscaping of the Republic on a unified system and complex basis in accordance with modern requirements of road safety and environmental protection [2].

In accordance with the requirements set out in this resolution, one of our main objectives is to ensure the environmental protection of highways that are located in densely populated areas and to provide them with comfortable living conditions.
As a result of increased traffic flow from densely populated areas or intercity highways, noise levels from these vehicles are also increasing. It negatively affects the health of the population.

II. SIGNIFICANCE OF THE SYSTEM

The paper mainly analyzes the main indicators of noise from vehicles on roads passing through residential areas, its main sources and impact on the human body. The article also provides recommendations for reducing noise on public roads in the Republic of Uzbekistan. The study of literature survey is presented in section III, analysis in section IV, and section V discusses the future study and Conclusion.

III. LITERATURE SURVEY

First of all, what is the noise? How does it come about? The following is a summary of the answers to the questions:

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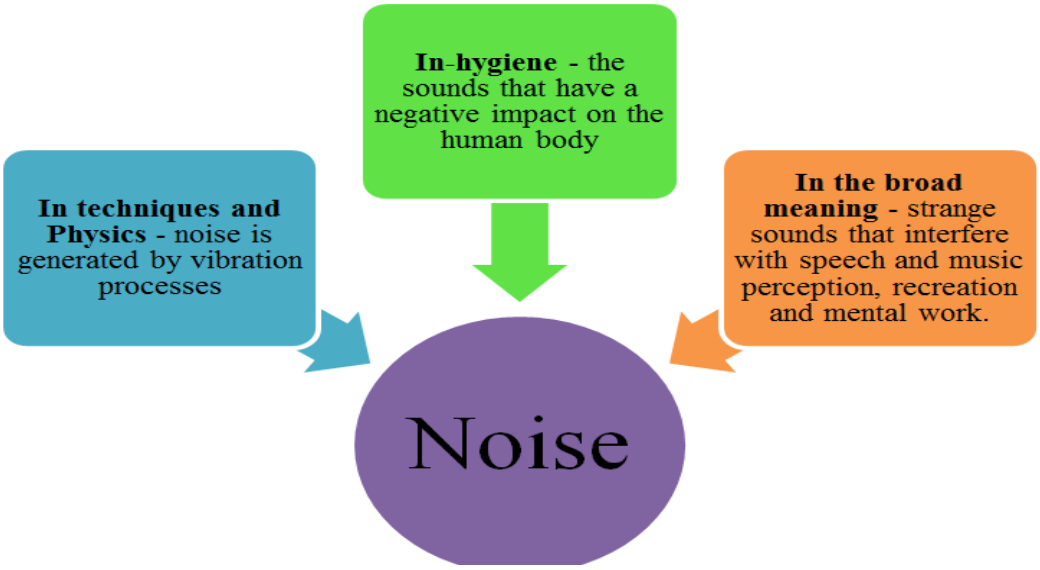

Fig1.Information about sound generation

The amount of noise is measured by decibel (a unit measured by the logarithm of two homogeneous physical sizes - energy, sound pressure and others) [3].

The main sources of external noise are traffic flow in cities and other settlements, train trains, subway trains (on open lines), air vehicles, substations of electric transformers, industrial plants (Figure 2).

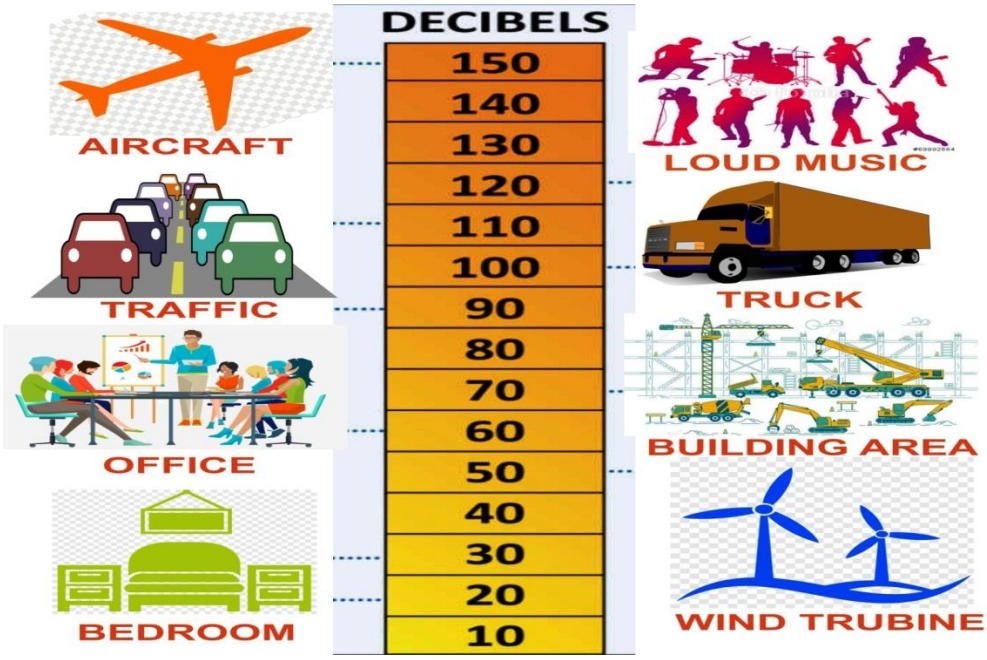

Fig2. The main sources of noise.

As you can see from the picture above, one of the main drivers of the noise is motor transport. The main drivers of car noise are: [4]

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- Automobile Engine Structure;
- Cooling system of the engine;
- Transmission (car gearbox);
- Aerodynamic noise during movement;
- Wheel, brake system and noise during transportation.

Sound is molecular in nature. In nature, the notion of sound speed is characteristic. When the air temperature is + 18ºC, the sound speed is 340 m/s [5].The human ear can receive from 16 to 20,000 Hz. Ultrasound sounds areconsidered to be over 20,000 Hz. These sounds cannot be perceived by the human hearing system. If the sound frequency is 1000 Hz, its power is assumed to be 1 dB [6; 7; 8; 9].

The negative impact of noise on a person is a fact that does not require evidence from many years of research. The first negative effects of noise are disturbance of the population, disturbance of peace, impairment of working ability, sleep, rest, perception and speech changes [6; 10].

Austrian scientist Robert Cox estimates that noise can cause 30 to 100 premature aging and reduce the lives of people living on highways by 8-12 years [11].

IV. ANALYSIS

Prolonged exposure to noise can lead to disturbance of the central nervous system, vascular tone, digestive tract, endocrine system and other organs, ear weight and deafness. Under the influence of noise the exact balance of movement is disrupted and labor productivity decreases. Excessive noise can weaken a person both physically and spiritually. 20-30 decibels per person are harmless. This is normal. A total of 55 decibels are allowed per person [2, 6, 12]. The noise of 130 decibels causes pain in the ears, reaching 150 decibels is hard to tolerate, and even 180 decibels can choke metal. In the 70s of the last century the noise in city streets was 60-70 decibels, and in the beginning of the 21st century due to the sharp increase in the number of vehicles, this figure reached 100 decibels.

It can also be used on maps with noise values to determine the amount of noise in residential areas adjacent to highways. In accordance with the existing regulations, it is necessary to design the buildings taking into account the noise volume.

In urban areas and cities adjacent to highways, traffic control should be addressed in the following areas:
- in technical and organizational ways (direct detection of noise sources);
- urban planning and construction-acoustic requirements (designing the area from noise source to construction site);
- on the basis of engineering solutions that absorb noise and eliminate it [13].

Transport is the main source of noise in the residential areas adjacent to the highways. Most of the objections received from the population are in motor transport (cars, buses, trucks). The increasing number of vehicles is also contributing to the increased noise levels on the roads, which in turn affects the wellbeing of the population.

Taking into account the above, it is necessary to design and construct new facilities, design highways, to control the volume of vehicles moving there, as well as to create comfortable living conditions for the people living around the road.

V. CONCLUSION AND FUTURE WORK

As a conclusion one can say that it is necessary to design residential areas not far from noise sources, and to use barriers that interferes with and overlaps between residential areas. It is also necessary to properly organize landscaping works to reduce noise. One of the means to reduce this noise is the noise-absorbing and absorbing screens. Noisy barriers are now used in countries around the world in Germany, Italy, Belgium, Slovakia, Poland, England, Belarus, Russia and East Asia. In the future, the use of such noise barriers in the Republic of Uzbekistan will, of course, allow people living near the highways to live comfortably and without any adverse health effects.

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