IMPACT OF NOISE AND VIBRATION OF MACHINES USED IN THE COTTON INDUSTRY ON THE HEALTH OF OPERATORS

Xusanova Nigina Abduxamidovna
PhD, Associate Professor Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan, Tashkent

Shamsiev Islom Rabbim ugli
PhD, Associate Professor Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan, Tashkent

Matkarimov Bekzodbek Umirbek ugli
Student, Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan, Tashkent

Akhmadalieva Marjona Akbarali kizi
Student, Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan, Tashkent

Ismoilova Maftuna Sharofiddin kizi
Student, Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan, Tashkent

Abstract
The article presents an analysis of the negative impact of noise on the health of machine operators at primary cotton processing plants. The causes of industrial noise in the production shops of cotton ginning enterprises are studied. Permissible noise levels in the workplace are identified in order to eliminate them as much as possible and improve the working conditions of workers. The consequences of vibration exposure to workers and the nature of the violation of physiological functions of the body are determined. The issues of the impact of vibrations on technogenic processes (stability, seismic resistance, service life, etc.) occurring in the production buildings of cotton industry enterprises are considered.

Keywords. Noise, vibration, cotton industry, human health, safety of activities, types of noise, types of vibration, machines.

Introduction
In the 20th century, noise and vibration were recognized as occupational hazards. The impact of noise is mainly determined by the following criteria: hearing impairment, psychological stress of a person, masking or external influence on speech communication. The above-mentioned criteria have been developed based on a large number of scientific, technical, medical, legal, sociological, and economic studies by scientists of the world today. Their influence on the labor productivity of machine operators

and professions in terms of compliance with the norms established by state standards for manufacturers and operators has been studied in detail in a number of works.

Noise is normalized according to a complex of hygienic, physiological, and clinical indicators, taking into account its hygienic significance.

Under the influence of noise, the normal functioning of various organs and systems is disrupted, for example, digestion (changes in the secretion of gastric juice), blood circulation (increased blood pressure), etc.

Noises are mainly of three types according to their origin[1]:

1. Industrial noise;
2. Transport noise;
3. Household noise;

Noise can also arise as a result of the movement of gases and liquids. Such noises are called aerodynamic. Textile industry enterprises are not exempt from noise. Workers working in high-noise workshops often experience occupational illness called "noise sickness." At the same time, "vibration sickness" occurs as a result of chronic vibration of certain workplaces.

Currently, many developed countries have regulatory documents on noise and vibration control. Due to the different approaches to noise assessment in different countries, there are different noise standards. When designing cotton industry enterprises and workshops of light industry and textile enterprises, an important task is to determine the levels of noise pressure that may arise in these industrial enterprises and workshops

Noise assessment mainly includes the following tasks[2]:

1) The noise pressure level of the noise source, which can emit noise at a certain point and has clear noise characteristics, is determined;
2) The noise pressure level of the noise source, which can emit noise at a certain point and has clear noise characteristics, is determined;
3) Measures to bring noise to the permissible level;

It was noted that when the sound level was reduced from 96 to 86 dB (A), the labor productivity of excavator operators increased by more than 10% [18; 39-41 b].Thus, a high level of noise affecting the operators of various machines, including cotton MTAs, is not only a harmful factor of the production environment, but also a natural decrease in labor productivity. In addition, the high noise intensity of various links and mechanisms of cotton MTA actively uses the sound of various links and mechanisms to control the activity of the latter and the technological process. This reduces the reliability and quality of cotton MTA operation.

The International Organization for Standardization (ISO) has developed recommendations for noise normalization based on the sound pressure limit (DB) at the average geometric frequencies (Hz) of octave lines or limit spectra (FC), where the (FC) index is set at a frequency of 1000 Hz within the permissible sound pressure level.

In a number of countries, including Romania, Great Britain, France, Austria, Switzerland, and Finland, ISO indicators (curves) are used to standardize noise and vibration [37;11-14b]. In addition, the standards for which the sound level dB (A) is chosen as the maximum permissible value are also applied. Many years of research by scientists have shown that when noise is exposed for 4-5 hours, a disruption in the dynamics of nervous regulation of the body begins, which in some cases leads to an increase in worker morbidity. According to noise interpretations, the noise level that does not cause these phenomena should not exceed 80 dB (A) (PS-75). According to GOST 12.1.003-2014, the permissible noise level in cotton MTAs being redesigned and permitted for serial operation in Uzbekistan is 31.5; 63; 125; 250; 500; 1000; 2000; 4000; The average geometric frequency of 8000 Hz determines the levels of sound pressure, measured in dB (see Table 1.1).According to SanPiN RU, No. 0325-16, the permissible levels of sound pressure at the workplaces of mechanic-drivers on cotton harvesters are 31.5; 63; 125; 250; 500; 1000; 2000; 4000; According to the average geometric frequencies of 8000 Hz 107; 95; 87; 82; 78; 75; 73; 71; Should not exceed 69 dB. With a maximum sound level of 80 dB (A) operating for less than 4 hours, changes are made to the permissible sound pressure levels: 1-4 hours (+6 dB); 1 hour (+12 dB). In order to further improve working conditions, taking into account the category of work intensity and strain, the permissible sound level at workplaces is reduced.

Vibration affects a person during direct contact with equipment, devices, machines, and mechanisms that work with vibration.

Vibration is also used in blind cases, to intensify production processes, for example, to reduce the resistance of tillage machines, to increase labor productivity, to increase labor productivity, in improving the quality of grain cleaning machines, etc. Accordingly, vibrations are divided into transport, transport-technological, and technological types [3].

Transport vibrations occur during the movement of machines or tractors. If this machine or MTA performs a technological process simultaneously with movement, transport-technological vibration occurs. Technological vibrations arise during the operation of stationary machines, mechanisms, and devices. Prolonged exposure to tremors can cause two types of illnesses: general and local. Almost all parts of the human body experience vibrations of varying frequency. For example, the head, neck, and parts of the heart of a person can be considered as a system of vibrations: it has its own weight and causes vibrations with the help of spring-like means, and there are also groups of resistance that try to extinguish these vibrations. If these vibrating parts are exposed to external vibrations of the same frequency, resonance can occur in the body, which leads to an increase in vibration by several tens of times. This, in turn, causes displacement in the body parts. For example, when working standing, the vibration of the head, shoulders, neck, and spine is 4-69 Hz. When working sitting, the head's vibration relative to the shoulder is around 25-30 Hz, and the vibration of most internal organs is around 6-9 Hz. Exposure to vibrations of the same frequency can cause serious complications, sometimes leading to mechanical injuries.

Constant exposure to vibration leads to the development of vibration sickness. In this case, as a result of the impact of tremors on the central nervous system, the physiological functions of the body are disrupted. These disorders can manifest as headaches, dizziness, sleep deterioration, decreased work capacity, and cardiac dysfunction. Partial tremors cause spasms in the blood vessels.

This condition mainly starts from the fingers, which are the final parts of the body, spreads to the entire hand and worsens the flow of blood coming from the heart, thereby reducing blood supply. At the same time, vibration impairs the function of the external nervous system, which leads to a decrease in skin sensitivity, stiffening of the tendon sheaths, salt accumulation in the joints, and impaired joint mobility. These conditions especially intensify during cold seasons.

Those who work with manual electrical and pneumatic devices (manual grinding tools, electric drills, concrete compacting vibrators, etc.) are partially exposed to vibration. Often, workers are exposed to both vibrations. Frequencies of total vibration less than 0.7 Hz do not cause vibration sickness at all, but vibrations at such a frequency can cause seasickness, since they are similar to sea waves. In this case, a disruption of the balance of internal organs is observed.

Vibration standards

Vibration standards are established in accordance with GOST 12.1.012-78, according to which the root mean square values of vibration velocity or its logarithmic degrees in octave lines with a frequency of 5·10^ (-8) m/s relative to the standard zero limit are hygienic characteristics that determine the impact of vibration on a person[4].

Table 1

Tremor type	Vibration normalized direction	Average geometric frequencies of octave lines (Hz), Logarithmic degrees of vibration velocity, dB										
		1	2	4	6	16	31,5	63	125	250	500	1000
General transport	Vertical Horizontal	132 122	123 117	114 116	108 116	107 116	107 116	107 116	- -	- -	- -	- -
Transportation technology	Vertical Horizontal	-	117	108	102	101	101	101	-	-	-	-
Local	Along each of the axes	-	-	-	115	109	109	109	109	109	109	109

In conclusion, it can be said that the processes of cotton production and processing include many mechanical devices and technological processes, which can cause a high level of noise and vibration. In the cotton industry, noise sources mainly come from cotton ginning machines, wheels, conveyors, fans, and other technological equipment. These devices can cause very high noise levels. For noise reduction in cotton production, it is necessary to equip machines with acoustic insulation materials, sound-absorbing elements, and modern technologies. In addition, it is important to control noise and take safety measures at workplaces.

In the cotton industry, vibration sources mainly come from large machines and technological equipment. These devices cause vibration during continuous operation, which poses a risk to the stability of equipment operation and workers. Vibration analysis helps to assess the seismic stability of devices and equipment in the cotton industry. A high level of vibration can reduce the quality of machine operation and lead to rapid wear and tear. This can slow down production processes and lead to equipment malfunctions.

References

1. T. Ganiev. "Labor Protection in the Textile Industry." Revised and expanded 2nd edition 2013
2. A.Qudratov, T.G'aniyev, O'.Yo'ldashev, F.Yo.Yormatov, N.Xabibullayev, A.D.Xudoyev "Life Safety" (5.2) Impact of Vibration on Humans. Vibration standards. (5.8) Noise calculation.
3. N. Khusanova. Study Guide. Safety equipment of the cotton industry. Tashkent. 2024.
4. S.Tukhtabaev. Textbook. Ensuring the technology, equipment, and safety of primary wood processing. Ta.