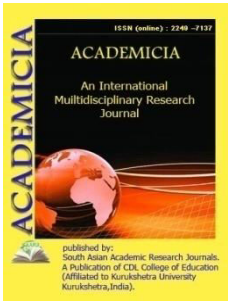
ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)



DOI: 10.5958/2249-7137.2021.02063.2

THE IMPACT OF VIBRATION ON THE HUMAN BODY

Bahriddinova Nasiba Muradovna*

*Assoc. Department of Industrial Ecology,
Bukhara Engineering Technological Institute,
Republic of UZBEKISTAN
Email id: qaxa8004@mail.ru

ABSTRACT

Vibration is a set of mechanical movements of elastic bodies, machines, machine tools, mechanisms and devices, repeated at regular intervals and spreading to building structures through supports, floors, etc. Vibration is characterized by amplitude, frequency, speed, and acceleration. These parameters determine the impact of vibration on humans, equipment, and building structures.

KEYWORDS: *Vibration, Determine, Humans, Equipment, Building Structures.*

1. INTRODUCTION

The human body is considered as a combination of masses with elastic elements having natural frequencies, which for the shoulder girdle, hips and head relative to the supporting surface ("standing" position) are 4 ~ 6 Hz, the head relative to the shoulders ("sitting" position) - 25-30 Hz. For most internal organs, natural frequencies are in the range of 6-9 Hz. General vibration with a frequency of less than 0.7 Hz, defined as rolling, although unpleasant, does not lead to vibration sickness. The consequence of this vibration is motion sickness caused by disruption of the normal activity of the vestibular apparatus due to resonance phenomena.[1-9]

When the vibration frequency of workplaces is close to the natural frequencies of internal organs, mechanical damage or even ruptures are possible. The systematic impact of general vibrations, characterized by a high level of vibration velocity, leads to vibration disease, which is characterized by disturbances in the physiological functions of the body associated with damage to the central nervous system. These disorders cause headaches, dizziness, sleep disturbances, decreased performance, deterioration in well-being, and cardiac dysfunctions.

Local vibration of low intensity can have a beneficial effect on the human body, restore trophic

changes, improve the functional state of the central nervous system, accelerate wound healing, etc.[10-15]

2. METHODS AND MATERIALS

With an increase in the intensity of vibrations and the duration of their impact, changes occur, leading in some cases to the development of occupational pathology - vibration disease.

Hand-held machines, the vibration of which has maximum energy levels at low frequencies (up to 35 Hz), cause vibration pathology with a predominant lesion of the neuromuscular and musculoskeletal system. When working with hand-held machines, the vibration of which has a maximum energy level in the high-frequency region of the spectrum (above 125 Hz), vascular disorders occur with a tendency to spasm of peripheral vessels. When exposed to low-frequency vibration, the disease occurs after 8-10 years, when exposed to high-frequency vibration - after 5 years or less.

Distinguish between hygienic and technical regulation of vibrations. Hygienic - they limit the parameters of vibration of workplaces and the surface of contact with the hands of workers based on physiological requirements that exclude the possibility of a vibration disease. Technical - limit vibration parameters not only taking into account the specified requirements, but also based on the vibration level achievable for this type of equipment today. Regulatory documents have been developed that establish permissible values and methods for assessing vibration characteristics, which include a special GOST SSBT (Occupational Safety Standards System).[16-22]

The assessment of the degree of harmfulness of vibration of hand-held machines is carried out according to the spectrum of vibration velocity in the frequency range of 11-2800 Hz. For each octave band within the specified frequencies, the maximum permissible values of the root-mean-square value of the vibration velocity and its levels are set relative to the threshold value equal to $5 \cdot 10 \sim 8$ m / s.

The mass of vibrating equipment or parts thereof, held by hands, should not exceed 10 kg, and the pressure force should not exceed 20 kg.

General vibration is normalized taking into account the properties of the source of its occurrence and is subdivided into vibration:

• Transport, which arises as a result of the movement of cars on the ground and roads;

• transport and technological, which occurs during the operation of machines performing a technological operation in a stationary position, as well as when moving around a specially prepared part of the production facility, industrial site or at wholesale depots;

• Technological, which arises during the operation of stationary machines or is transferred to workplaces that do not have sources of vibration

3. RESULTS AND DISCUSSING

High demands are made in the regulation of technological vibrations in rooms for mental labor (management, control room, accounting, etc.). The hygienic vibration standards are established for a working day lasting 8 hours (Table 1).

TABLE 1. INFLUENCE OF VIBRATION ON THE HUMAN BODY

Vibrationvibrationamplitude, mm	**Vibrationfrequency, Hz**	**Impactresult**
До 0,015	different	Does not affect the body
0,016-0,050	40-50	Nervousexcitementwithdepression
0,051-0,100	40-50	Changes in the central nervous system, heart and hearing organs
0,101-0,300	50-150	Possibledisease
0,101-0,300	150-250	Causesvibro-disease

The given rates are the same for horizontal and vertical vibrations. The continuity of their impact should not exceed 10-15% of the working time. The amplitude of oscillations, the speed and acceleration of oscillatory movements can be increased no more than three times. Sanitary standards establish the maximum permissible vibration values in the production premises of enterprises (Table 2).

TABLE 2. PERMISSIBLE VALUES OF VIBRATION IN INDUSTRIAL PREMISES OF ENTERPRISES

Vibrationvibrationamplitude, mm	**Vibrationfrequency, Hz**	***Oscillatoryspeed, cm / s***	***Acceleration of oscillatory movements, cm / c²***
0,6-0,4	***До 3***	***1,12-0,76***	***22-14***
0,4-0,15	***3-5***	***0,76-0,46***	***14-15***
0,15-0,05	***5-8***	***0,46-0,25***	***15-13***
0,05-0,03	***8-15***	***0,25-0,28***	***13-27***
0,03-0,009	***15-30***	***0,28-0,17***	***27-32***
0,009-0,007	***30-50***	***0,17-0,22***	***32-70***
0,007-0,005	***50-75***	***0,22-0,23***	***70-112***
0,005-0,003	***75-100***	***0,23-0,19***	***112-120***
****1,5-2****	***45-55***	***1,5-2,5***	***25-40***

To reduce the impact of vibrating machines and equipment on the human body, the following measures and means are applied:

• Replacement of tools or equipment with vibrating working bodies for non-vibrating ones in processes, where possible (for example, replacing electromechanical cash registers with electronic ones);

• The use of vibration isolation of vibrating machines relatively basic

• The use of remote control in technological processes (for example, the use of telecommunications to control a vibratory conveyor from an adjacent room);

• Use of automation in technological processes where vibrating machines operate (for example, control according to a given program);

• Use of hand tools with vibration-proof handles, special shoes and gloves.

In addition to technical means and methods to reduce the impact of vibration on a person, it is

necessary to carry out hygienic and treatment-and-prophylactic measures. In accordance with the regulation on the working regime of workers in vibration-hazardous professions, the total time of contact with vibrating machines, the vibration of which complies with sanitary standards, should not exceed 2/3 of the working day. Production operations should be distributed among workers so that the duration of continuous exposure to vibration, including micropause, does not exceed 15-20 minutes. At the same time, two regulated breaks are recommended (for active recreation, industrial gymnastics according to a special complex of hydro procedures): 20 minutes - 1-2 hours after the start of the shift and 30 minutes - 2 hours after the lunch break`[23-28]

Persons who are at least 18 years of age, who have received the appropriate qualifications, who have passed the technical minimum according to safety rules and who have passed a medical examination, are allowed to work with vibrating machines and equipment.

Working with vibrating equipment, as a rule, should be carried out in heated rooms with an air temperature of at least 16 ° C, with a humidity of 40-60% and an air speed of no more than 0.3 m / s. If it is impossible to create such conditions (work in the open air, underground work, etc.) for periodic heating, special heated rooms with an air temperature of at least 22 ° C, a relative humidity of 40-60% and an air speed of 0.3 m / s.

4. CONSOLATION

To increase the protective properties of the body, working capacity and labor activity, special complexes of industrial gymnastics, vitamin prophylaxis (2 times a year a complex of vitamins B, C, nicotinic acid), special food should be used. It is also advisable to carry out in the middle or at the end of the working day, 5-10-minute hydrotherapy, combining baths at a water temperature of 38 ° C and self-massage of the upper extremities.

REFERENCES

1. Bakhriddinova N.M., Sulaimonov S.S. "Safety of life" Bukhara-2021
2. Bakhriddinova N.M., Sadikov I.Sh., Avizov S.R. Ways and solutions to information security problems. International scientific journal "Global science and innovations 2020: Central Asia", Nur-sultan, Kazakhstan, June-july 2020. P. 118-123
3. Bakhriddinova N.M., Sadikov I.Sh., Analysis of epidemic safety of drinking water of the Bukhara region. Academicia An International Multidisciplinary Research Journal. Volume 10 - Issue 4, April 2020. Impact Factor: SJIF - 6.549. P. 33-38
4. Bakhriddinova N.M., Tursunova N.N. First aid measures organization. International Journal of Innovations in Engineering Research and Technology (IJIERT). Volume 7 - Issue 4, April 2020. P. 243-245
5. Bakhriddinova N.M. Psychology and Economic Aspects of Life Safety. International Journal of Academic and Applied Research (IJAAR), Vol. 4, Issue 7, July - 2020, Pages: 32-37
6. Baxriddinova N.M., Zaripova M.Dj. PROTECTION OF PRODUCTION SHUMA I VIBRATION European ScholarJournal (ESJ) Available Online at: https://www.scholarzest.com Vol. 2 No. 5, MAY 2021, ISSN: 2660-5562.

7. K.S.Rakhmonov. Influence of leavens of spontaneous fermentation and phytoadditives on the provision of microbiological safety of bread //T. I. Atamuratova, N. R. Djuraeva, I. B. Isabaev, L. N. Haydar-Zade//Journal of Critical Reviews //2020, Vol.7, Issue 5,pp. 850-860.

8. S.K. Jabborova.Application of products of processing mulberries and roots of sugar beet in the production of cupcakes//I.B.Isabaev., N.R. Djuraeva., M.T. Kurbanov.,l.N. Khaydar-Zade., K.S. Rakhmonov//Journal of Critical Reviews //2020, Vol.5, Issue 5,pp. 277-286.

9. K.S.Rakhmonov.Application of phito supplements from medicinal vegetable raw materials in the production of drugs//T. I. Atamuratova., M.E. Mukhamedova., N.K.Madjidova., I.Sh. Sadikov//Journal of Critical Reviews //2020, Vol.7, Issue 12,pp. 934-941.

10. Djurayeva N, Mixtures of Vegetable Fat as a Potential Raw Material for Bakery// Barakayev N, RakhmonovK,Atamuratova T, Mukhamedova M, MuzaffarovaKh. // International Journal of Current Research and Review// october 2020, Vol.12, Issue 19, pp. 140-148. DOI: http://dx.doi.org/10.31782/IJCRR.2020.12192

11. Djurayeva N, Plant-fat mixtures as a potential raw material for bakery production// Rakhmonov K,Barakayev N, Atamuratova T, Mukhamedova M, MuzaffarovaKh. // Plant Cell Biotechnology and Molecular Biology 2020 21(45-46), pp. 29-42

12. Ravshanov S.S, The impact of ultrasonic activated water on hydrothermal processing of wheat grains grown in dry climate conditions // Rakhmonov K.S.,Amanov B.N. // Plant Cell Biotechnology and Molecular Biology 2020 21(45-46), pp. 29-42

13. KulievN.SH, Udk 664.8 baking properties and quality expertise wheat flour// Rakhmonov K.S. //*European Journal of Molecular & Clinical Medicine*, *2020,* Volume 7, Issue 2, Pages 6333-6340

14. Ravshanov S.S, The Effect Of Drinking And Activated Water On Field Scales Of Wheat Grains Grown In Arid Climatic Conditions// Rakhmonov K.S. Ergasheva H.B., Yuldasheva Sh. J.//*European Journal of Molecular & Clinical Medicine*, *2020,* Volume 7, Issue 3, Pages 3065-3070.

15. Rakhmonov K.S., Confectionery Products for Therapeutic and Preventive Purpose with Medicinal Herbs Uzbekistan// L.N. Khaydar-Zade., N.SH. Kuliev, G.H.Sulaymonova // Annals of the Romanian Society for Cell Biology, Vol. 25, Issue 2, 2021, Pages. 4126 – 4140.

16. Ravshanov S.S., Influence of the Use of Activated Water during Hydrothermal Treatment on the Quality of Bread// Rakhmonov K.S.,Radjabova V.E., Pardayev Z.T. // Annals of the Romanian Society for Cell Biology, Vol. 25, Issue 2, 2021, Pages. 4091 – 4102

17. Barakaev, N., Justification of the parameters of parts of a walnut cracking machine// Mirzaev, O., Toirov, B., Alimov, A.// Journal of Physics: Conference Series, 2021, 1889(2), 022061.

18. Azim Oltiev., The role of catalysts in fat transesterification technology//MatlubaKamalova.,KakhramonRakhmonov.,OrifjonMamatqulov//IOP Conf. Series: Earth and Environmental Science 848(2021) 012220

19. Rakhmonov KS, Spontaneous fermentation starter cultures - an effective means of preventing the potato disease of bread // Isabaev IB. // Journal "Storage and processing of agricultural raw materials" .- M., 2011.- No. 12.- P.23-25.

20. Rakhmonov KS, Influence of the substrate of the nutrient medium on the composition of the populations of microorganisms in the starter cultures of spontaneous fermentation // Isabaev IB, Akhmedova ZR // Journal "Storage and processing of agricultural raw materials". M, 2012 ..- No. 9.- P.40-43

21. Rakhmonov KS, Analysis of typical sources of microbial contamination of bread // Buxorodavlatuniversitetiilmiyaxboroti. // 2014.- No. 3.- P.37-43.

22. Rakhmonov K.S. Potato Bread Disease and a Method for Its Prevention // T.I. Atamuratova // Russian Bakery Magazine. M, 2014.- No. 5.- P.37-38.

23. Rakhmonov KS, Biotechnological aspects of ensuring the microbiological purity of bread // E. Muratov, T.I. Atamuratova // Kimyovakimyotexnologiyasi. 2015.- No. 2.- P.64-68.

24. Rakhmonov K.S. Wheaten ferments spontaneous fermentation in biorechnological methods// Isabayev I.B. // Austrian Journal of Technical and Natural Sciences. 2016. - № 7-8. - P. 9-12.

25. Rakhmonov KS, Methods for improving the composition of the nutrient medium of sourdough cultures for bakery products from wheat flour // T.I. Atamuratova. Isabaev I.B. // Bakery of Russia. 2016. –№2. - P.22-24.

26. Rakhmonov KS, Optimization of the recipe composition of wheat breads using spontaneous fermentation starter cultures // Isabaev IB, U.M. Ibragimov, Molchanova E.N. // Bakery of Russia. 2018. –№3. - S. 33-37.

27. I.B. Isabaev, The use of feed flour as a substrate for the nutrient medium of wheat starter cultures in the production of bread // T. I. Atamuratova., Rakhmonov K.S. // Buxoro davlat universiteti ilmiy axboroti.- 2018. No. 2.- P.24-30