Research Article

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EVALUATION OF WHOLE BODY VIBRATION IN WEAVING FACTORY

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ABSTRACT: Mankind in the century we left behind technological developments with the development of mechanization although he succeeded in adapting, such constructive like the vibration that the developments threaten their own health. inability to cope with side elements It's true to say. Vibration; people in the short run stress and stress that causes fatigue and loss of attention burdens, and in the long run, serious health causes problems.

In this study, detailed information was obtained about whole body examinations in sampling. For this purpose, first of all, it was evaluated in relation to being examined, and a detailed examination was made in its evaluation by evaluating it to be measured. In order to benefit from the exposure by the weaving process, it is tried to eliminate the deficiency in the literature used without using it.

Keywords: Vibration, Weaving, Whole Body, Exposure

1. INTRODUCTION

The fact that the weaving industry has an important place in employment in our country means that the responsibilities of employees and employers increase in direct proportion to this. As is the case with other sector workers, textile sector workers are also faced with many occupational health and safety threats today. Since relatively large industrial machines are used in the weaving sector, many accidents occur due to these machines, resulting in loss of limbs. And also; occupational diseases occur due to vibration.

Vibration effect both in terms of human health and working comfort as well as in terms of work efficiency, work quality and work safety is important. In determining the vibration magnitude, exposure action and exposure limit values are taken into account is taken. Exposure action value; exceeded in this case, from the worker's exposure to vibration. controlling the risks that may arise from if the required value is the exposure limit value, employees should definitely not feel a vibration above this value represents the value that should not be exposed[1-4].

Figure 1. Weaving machine

Vibration; describes oscillatory motions in a mechanical system. In other words; It is the conversion of potential energy into kinetic energy and kinetic energy into potential energy. Vibration in the working environment adversely affects the working efficiency, health and safety of the person. Two types of vibration are mentioned in the industry. The first is hand-arm vibration, the second is whole-body vibration.

Whole body vibration; It is a form of vibration that, when transferred to the whole body, poses a risk to the health and safety of workers, causing discomfort especially in the lumbar region and trauma to the spine. There are three different components of vibration. These; exposure

surface, frequency of vibration and exposure time to vibration. Depending on these factors, the vibration exposure of the person also varies.

Vibration causes mental and physical fatigue. Due to the negative effects it has on the nervous system, digestive and circulatory systems, it causes decreases in work efficiency. There are also occupational diseases caused by vibration. The most known of the occupational diseases caused by exposure to hand-arm vibration for a long time is 'white finger' disease. White finger disease is mainly caused by mining, forestry, construction, etc. It occurs as a result of vibration in work lines, especially when working with vibrating/power tools. The disease, which causes numbness and loss of function in the hand, can progress to gangrene[5-9].

2. METHOD and DEVICE USED in MEASUREMENT

In vibration measurements, TS EN 1032+A1 standards were used for Testing Moving Machines for the Determination of Vibration Emission Value, one of the standards prepared by the relevant technical committee established by the Engineering Services Preparation Group of the Turkish Standards Institute[5]. In the evaluation, the Regulation of the Ministry of Labor and Social Security on the Protection of Employees from Vibration-Related Risks, which was published in the Official Gazette dated 22.08.2013 and numbered 28743, was taken into consideration[10-13].

2.1. General Principles of Measurement

• During the vibration measurements, care is taken not to create any artificial vibrations that will affect the measurements of the device.

• During the vibration measurement, care is taken not to change the working conditions of the measuring device.

• Risk analyzes, if any, should be used in determining the points or sections to be measured[9-10].

In Figure 2-3-4, the average values of the operator during a shift are shown graphically and the peak values are examined.

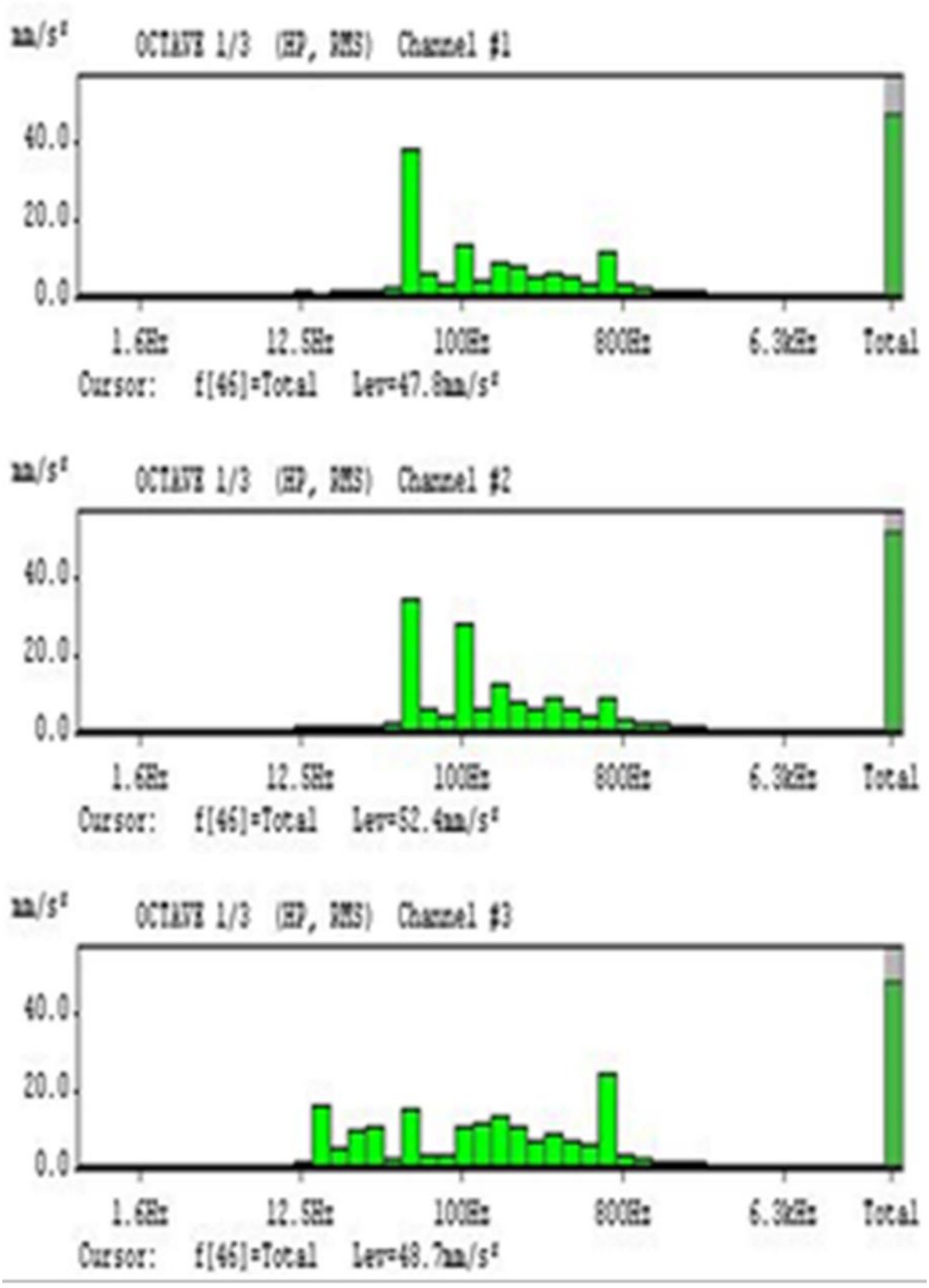

Figure 2. X, Y, Z Axis 1st measurement

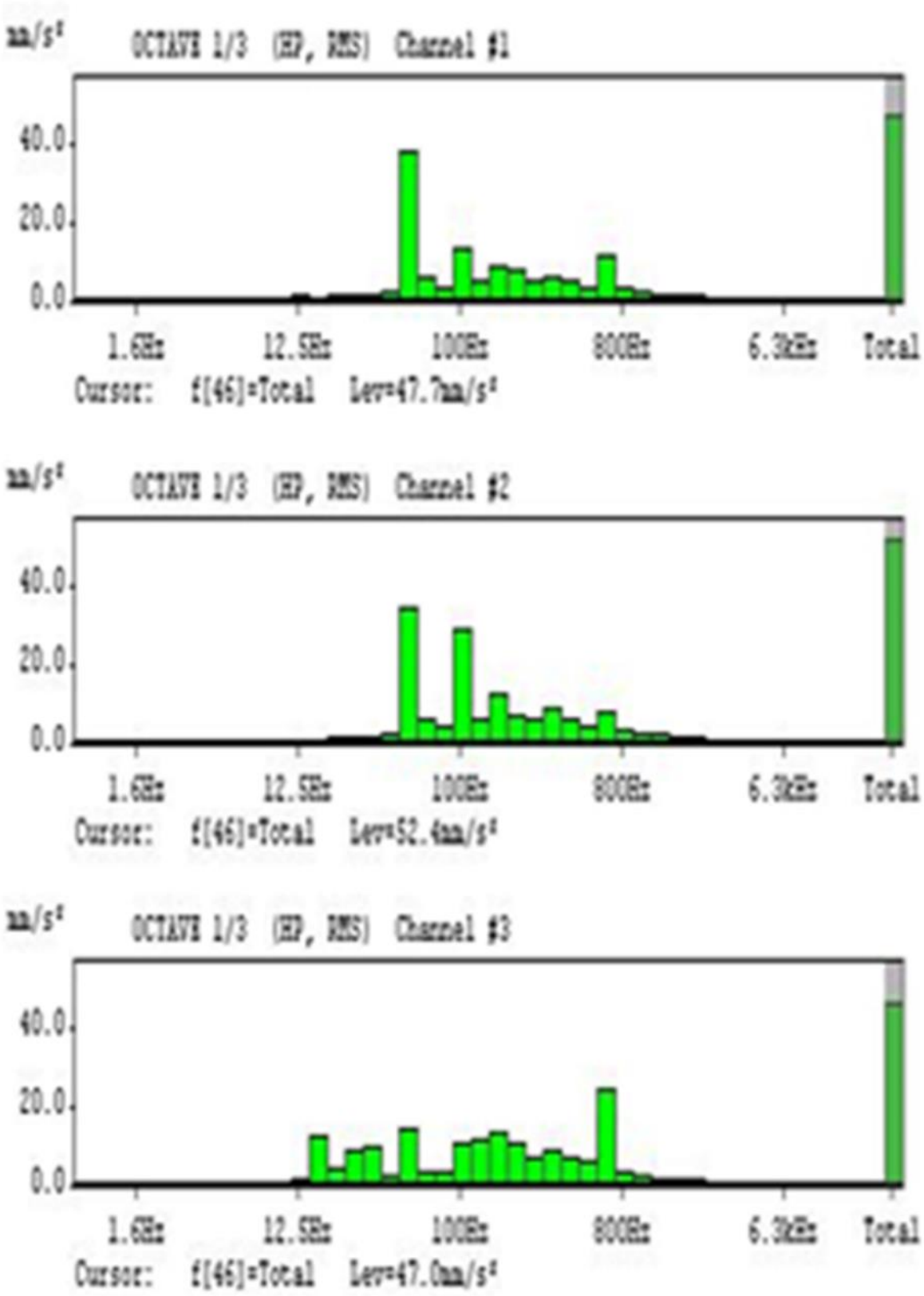

Figure 3. X, Y, Z Axis 2st measurement

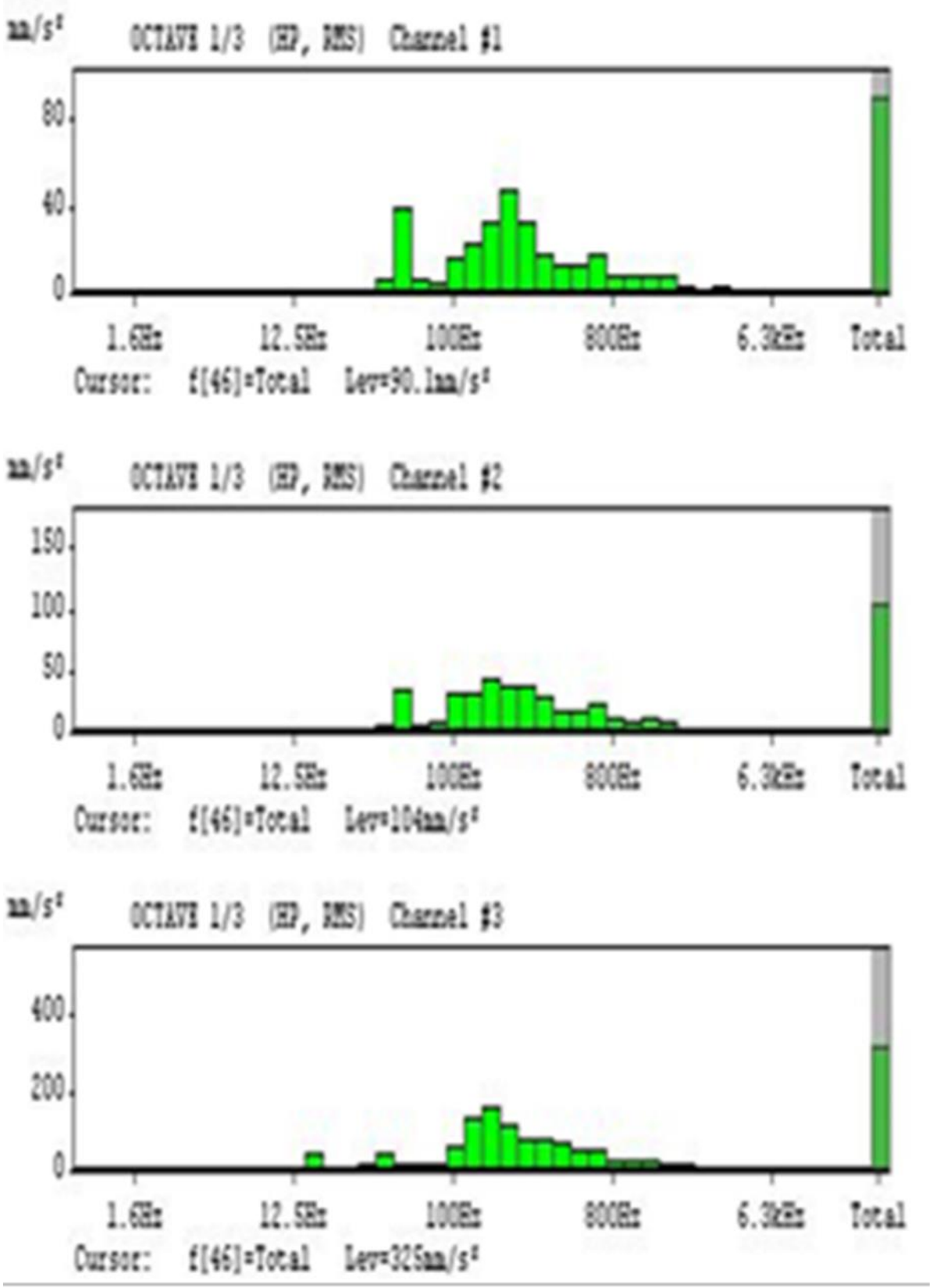

Figure 4. X, Y, Z Axis 3st measurement

After the necessary adjustments made on the device, the intensity of the vibration was measured for all three axes and the raw data were recorded on the device. Then, these data were taken from the device memory in the computer environment and evaluated by calculating time-weighted averages within the working and exposure times of the device with its own package program. The task-based vibration value obtained as a result of the measurements is given in the form of a table.

Table 1. Whole body vibration values (m/s2) and calculated daily exposure [(a(8) (m/s2)] value at workplace

Measuring Instrument	Measuring time (min)	Vibration levels of the axes (m/s2)	Duration of Work (min)	Personal Exposure (A(8)) [m/s2]
Weaving machine	3	*X:0,147 *Y:0,167 Z: 0,311	420	0,3105

*Values obtained by multiplying a factor of 1.4

In accordance with the provisions of the regulation on the protection of employees from risks related to vibration, the daily exposure limit value and daily exposure action value are not exceeded.

5. CONCLUSIONS

Vibration is a very important occupational health and safety factor in the weaving sector, as in all other sectors. In this study, personal vibration exposure values of weaving factory workers serving in the weaving branch of the textile industry were examined.

Weaving machines are complex machines consisting of moving parts and can be operated at 600 revolutions per minute depending on the type of work done. Regularly lubricating the moving parts of a machine that operates at such high speeds and three shifts a day, 24 hours a day, will reduce friction and reduce the amount of vibration that will occur.

Weaving machines are large machines. A significant amount of vibration may occur due to their operation at very high rotational speeds. Failure to fix the machines to the floor securely and not placing shock absorbing wedges between the machine and the floor during fixation may lead to an increase in the daily whole body vibration exposure of the employees due to the vibration that will occur.

As the statistical analyzes and graphics show, there are serious correlations between the dimensions of the place where the weaving machines are located and the daily personal vibration exposure of the workers. In this context, the design of the space where the weaving machines will be located should be carefully considered while it is still under construction.
Spring systems can be used to prevent vibration at its source. The use of rubber equipment with shock absorbing properties other than spring systems is one of the effective methods for reducing vibration.

Risks that may arise from exposure to mechanical vibration are eliminated or minimized at the source, taking into account the feasibility of combating risks at their source and technical developments.

If it is determined that the exposure action values are exceeded; The employer establishes and implements an action plan that includes technical and organizational measures to minimize exposure to mechanical vibration and the risks it may cause, taking into account in particular the following: Appropriate ergonomically designed work equipment should be selected, taking into account the work done, appropriate ergonomically designed work equipment should be selected, provide seating and auxiliary equipment that effectively reduce whole body vibration to reduce exposure to vibration, appropriate for the workplace, workplace systems and work equipment apply maintenance programs, design the workplace and working environment appropriately, provide employees with the necessary information and training to use work equipment correctly and safely in order to reduce their exposure to mechanical vibration, Limit exposure time and level, arrange working times with adequate rest breaks, exposure limit determines the reasons for exceeding the value, and in order to prevent its recurrence, necessary measures should be taken for protection and prevention.

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