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BASIS OF PARAMETERS MEW on health and safety

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In the article the results of testing the agricultural MEW safety.
Tool, work trials.

Problem. Noise at work bridges tractors assessed in dB sound levels and sound pressure levels in octave bands obtained in some instances machines. Such assessment (even identity test conditions) leads to biased conclusions as noise machine parameters identical marks taken from the same batch after their release by the manufacturer vary considerable extent.

Analysis of recent research. Since the system test centers in the country estimate only single copies of a tractor brand, now no reliable data on shumonavantazhennya jobs tractors [1], produced for agriculture, leading to biased determine the economic benefits of creating a new shumonebezpechnoyi agricultural machinery , inhibits the development work in the field of noise control in agricultural machines [2]. Objective understanding of the characteristics of noise in the workplace tractors particular brand can provide a statistical estimate obtained from the measurement noise on the party machines [3].

The purpose of research. This article discusses methodological aspects and results of the statistical evaluation of noise levels in the workplace tractors HTZ-17 121.

Results. Determining the actual noise levels tractors HTZ-17 121 was carried out in the following sequence:

- the sample of small volume held justify the estimated sample size studied trust machines;
- Experimental study of noise characteristics of machines installed in the volume of the sample;
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To make a statistical evaluation of noise levels in the workplace HTZ-defined confidence 17,121 sample size (Table. 1) under the assumption that the noise levels are allocated to the normal law. To do this in advance of noise measurements carried out on tractors coming down the assembly line, in a small sample (about n = 10).

1. The sound level in dB obtained in terms of the tractor HTZ-17 121 (sample $n := 10$***).***

Number s / n	1	2	3	4	5	6	7	8	9	10
dBA	94	95	89	94	91	87	89	88	88	87

For well-known formulas determined by the first and second central moments of the distribution:

$$\overline{x} = \frac{\sum_{j=1}^{n} x_1}{n} = 90,2 \qquad \sigma_b^2 = \frac{\sum_{j=1}^{n} \left(x_i - \overline{x}\right)^2}{n} = 9,51$$

where x_i - The value of the measured sound level in i-So tractor; i = 1, 2, 3, ... 10.

Trustee sample size:

$$n_q = \frac{t^2 \sigma_{\Gamma}^2}{\left(m_x - M_x\right)^2} = \frac{2^2 \cdot 9,51}{1^2} = 38,04 \approx 38,$$

where t - Student test; σ_{Γ}^2 - Standard deviation (second time) the general sample; $\left(m_x - M_x\right)$ - Reject the expectation of real sample of the expectation of a normal distribution.

The magnitude σ_{Γ} taken appropriate size σ_B obtained in terms of a small sample, ie $\sigma_{\Gamma}^2 = \sigma_B^2 = 9,51$. For a given confidence probability P = 0.98, the error is no more $\left(m_x - M_x\right) = 1$ by Student test, $t = 2$ and $\sigma_{\Gamma}^2 = 9,51$ confidence sample size was 38 tractors.

Tests were subjected tractors HTZ-17 121 issued by the conveyor manufacturer, which were in full technical malfunctions have been run-in in accordance with the technical documentation, approved in due course. Measurements of noise subject to the following parameters: noise levels in dB; sound pressure levels (RZT) in octave bands at frequencies sredneheometrychnyh 31.5; 63; 125; 250; 500; 1000; 2000: 4000; 8000 Hz.

Measurements were made with regard GOST 12.2.002-7-1 "Agricultural machinery. Methods for estimating the parameters of working conditions "when the engine rpm nominal mode (n = 2100 rev / min) with no load. In the cockpit were two people.

Mode of operation of machines and test conditions remained unchanged throughout the cycle intentions noise characteristics of tractors. After excluding two machines with the minimum and maximum noise levels in the workplace (exceptions blunders) left 38 tractors, which corresponded to the calculated sample size. Measurements noise characteristics are shown in Fig. 1.

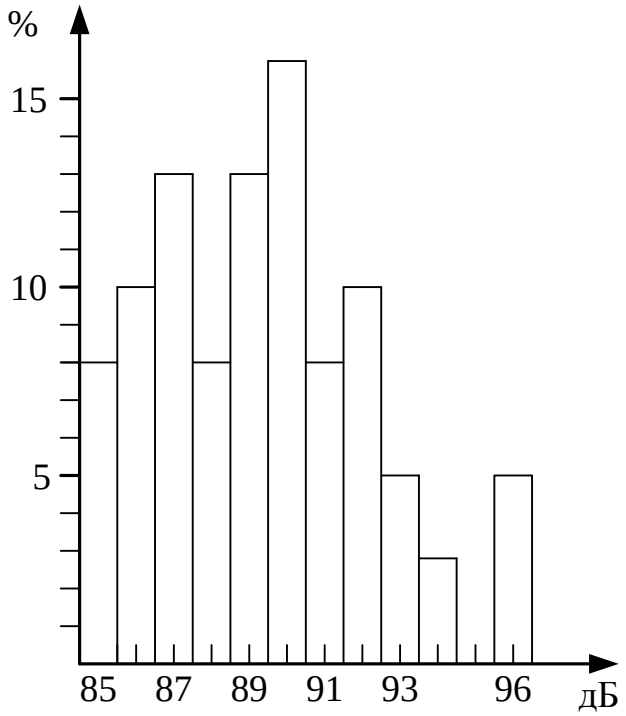

Fig. 1. Histogram of distribution of sound levels in dB workplace series tractors HTZ-17 121.

Analysis of the measurement noise characteristics tractors HTZ-17 121 showed that the sound levels in workplaces surveyed tractor ranges of 85-90 dBA. From the histogram distribution of sound levels in the workplace (Fig. 1) shows that the vast majority of tractors HTZ-17 121, produced by the plant, sound levels exceed allowable values for 1-11 dB and only three tractors, representing 8% of the total sample size, meet regulatory requirements for sound level in dB.

Because the sample size calculation of the confidence held in the assumption that the noise level on tractors, which are produced by the plant, subject to the normal law, the following set of experimental data, subject to verification of this hypothesis using W -kryteryya (Wilks test). The experimental data do not contradict the hypothesis put forward by a normal distribution if $W_{екcп} > W_{\alpha n}$ Where $W_{екcп}$ - Determined but experimental data; $W_{\alpha n}$ - Theoretical value (for a given level of significance and the sample size is relevant tables on Khan-Shapiro.

By inequality $W_{екcп} > W_{\alpha n}$ defined probability, which can pass a law of normal distribution, the probability that specifies the guaranteed error with confidence sample. If inequality by criteria is not met, then based on experimental data determined the true distribution law and based on the last performed statistical analysis of experimental data. Verification calculation showed that with a probability of 0.66 can adopt a normal

distribution of noise on tractors HTZ-17 121. Then the refined probability of a guaranteed ± 1 dB error at sample 38 tractors will $P_{ym} = 0{,}66 \cdot 0{,}98 = 0{,}64$. Since the probability sample of the population, normally distributed exceeds P = 0.5, we can conclude that the assumption of a normal distribution in this case is acceptable. The most probable value of the measurand usually acquire its mean value, the calculated number of all measured values. In order to determine the most likely noise levels in the workplace tractors HTZ-17 121 on the known formulas calculated expected value and the value of the mean square error for sound levels in dB in each octave band. Calculated statistical characteristics are given in Table. 2.

2. Statistical characteristics of the noise to the party tractors HTZ-17 121 (sample n = 38).

Size	Sound level dB	Srednoheometrychna frequency Hz octave band								
		31.5	63	125	250	500	1000	2000	4000	8000
$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$	89	93	90	90	87	84	86	80	75	69
$\sigma - \sqrt{\frac{1}{n}\sum_{i=1}^{n}(\bar{x} - x_i)}$	± 3	± 4	± 4	± 4	± 3	± 4	± 3	± 2	± 3	± 4

The resulting calculation of the likely noise is noise performance of conventional tractor HTZ-17 121, which describes the products at the named parameters. Based on the foregoing, the guaranteed degree of reliability can be concluded that compliance or non-compliance HTZ-17 121, manufactured by regulatory requirements on the level of noise in the workplace.

Conclusion. For an objective assessment of the noise characteristics of agricultural tractors need to test the party machines, which is defined adopted offset. The noise levels in the workplace of one brand of tractors reasonable to evaluate using the expectation and standard deviation.

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In this article Results rassmotrenы yspытanyya selskohozyaystvennыe transportnыh funds on Protection of labor.
Funds, Work, test.

In paper the results of testing the agricultural vehicle safety.
Tool, Work, testing.