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DEVELOPMENT OF INTERFERENCE COMPESATION DEVICE OF MILL CHAMBER UNLOADIDNG SYSTEM « POLYSIUS»

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Great attention of the study during investigation of the audiometric characteristics of investigated units were given to useful component that will allow to judge the state of mill chamber which is loaded by ore. During transferring data along a communication channel it is distorted and, moreover it is imposed by additional interference.

The presence of communication channels between the chambers of the mill drums through air introduce the information overload about the state of each signal of chamber .Wherefore there were conducted studies of connection channel to improve the immunity of audiometric signals and studied communication channel between the chambers by a ball mill drum common for both chambers. The communication channel between the signals of chambers was conducted through air and it is not considered , as above, they can be easily compartmentalized by narrow directed microphones. Fig . 1-3 show the noise spectra of the first and second chambers with different ball loading of these chambers . Signal is further passed through high harmonics filter .

The distribution according to the big ball loading in all the experiments are made similarly. Frequency characteristics of the communication channel on the drum at a different ball load are obtained by calculating the spectra of the respective signals.

Variations of the amplitude-frequency characteristics of the communication channel on the drum at different ratios in the ball load in working chambers ball of mill are shown in Fig. 4. The logarithmic amplitude-frequency characteristics of the communication channel on the drum is shown in Fig. 5.

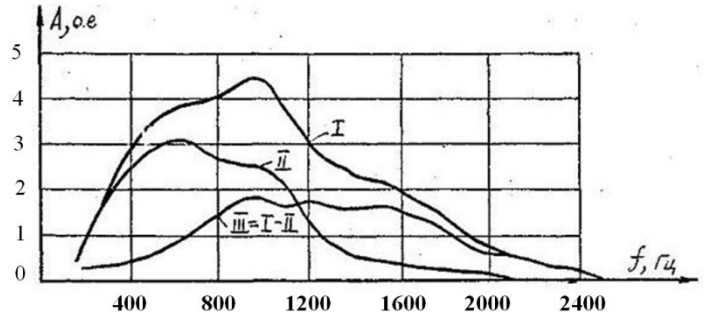

Fig.1 AFC of the first and second chamber noise at filling with ball load.

the first chamber 100 % (curve I), the second chamber 0%(curve П)

III-AFC communication channel on the drum

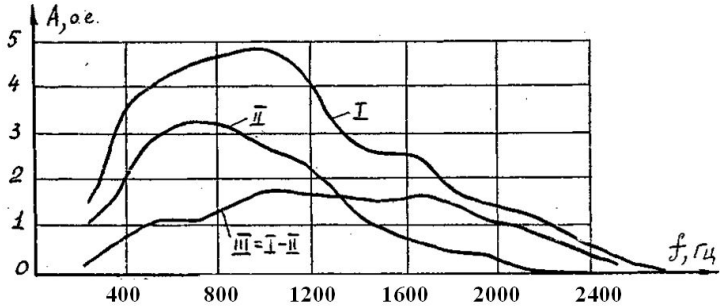

Fig.2 AFC of the first and second chamber noise at filling with ball load.

the first chamber 0% (curve П), the second chamber 100% (curve I)

III-AFC communication channel on the drum

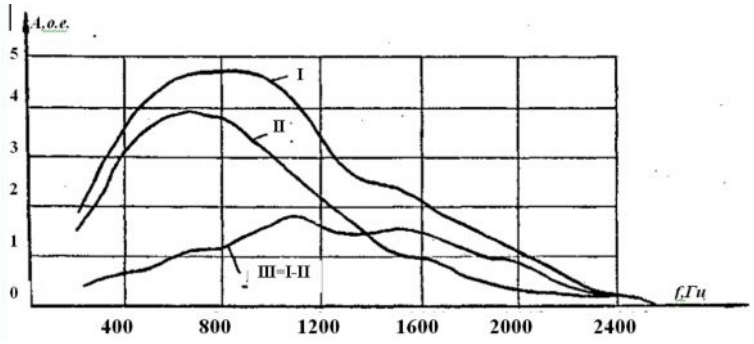

Fig. *3* AFC of the first and second noise chamber at filling with ball load.

the first chamber 100 % and ore (curve I), the second chamber 0%(curve П)

III-AFC communication channel on the drum

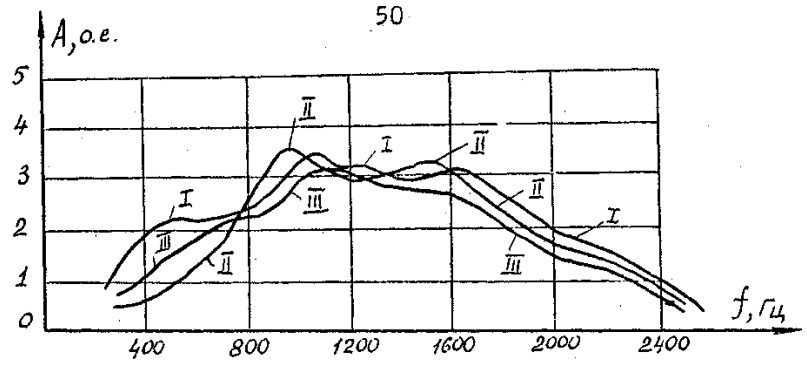

Fig. 4 AFC of connection channel on the mill drum at different ball load:

I– filling of the first chamber 100 %, of the second 0 %; II – filling of the first chamber 0 %, second 100% ; III – filling of the first chamber 100 %, second 0 % with ore 100 %

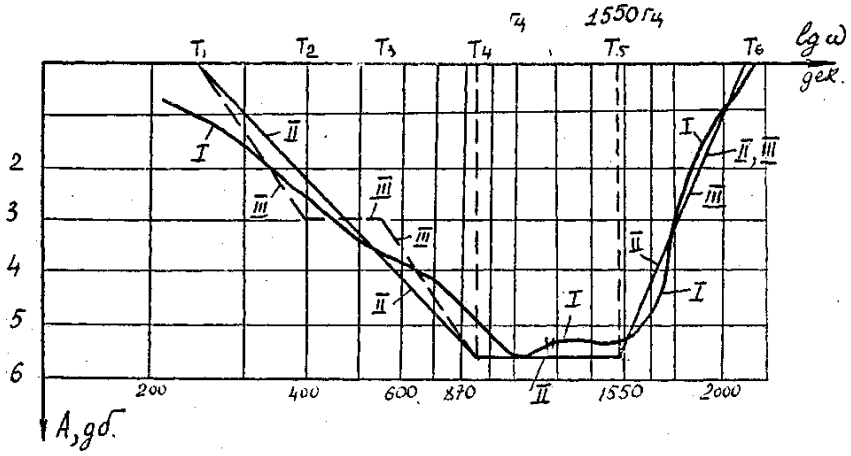

Fig. 5 LAFC of connection channel:

I- characteristic of the real channel; II- average characteristics; III- characteristics communication channel which was designed by typical incline.

According to the analysis of the characteristics of that communication channel on the drum is linear in the range of frequency of f = 870 ÷ I550 Hz and has an attenuation coefficient k = 5.5 dB, incline of fore front of frequency characteristic is i-10 dB / dec, the incline of the rear front is + 20 dB / (see Fig. 5) and can be easily modeled by linear units.

Thus, the communication channel is a linear filter, which frequency

characteristics does not depend on the mode of grinding machine, or on other factors (state of the lining material and the grinding fineness, etc.). The latter is due to the fact that the signal transmission path is a drum mill which practically does not change and therefore does not affect the state of the communication channel.

In the case of management process by grinding audiometric characteristics using a narrow range of frequencies, contributing to simplify setup and configuration of automatic control systems, the filter frequency should be adjusted in the range of f = 870 ÷ 1550 Hz, where the incline of O frequency characteristic is dB / dec.

On the other hand, the pass band should be selected in compliance with the average frequency (geometric mean of upper and lower cutoff frequencies $f_m = \sqrt{f_1 \cdot f_2}$ correspond to the preferred frequencies (in accordance with ISO Recommendation R 266 - "Preferred frequencies for acoustical measurements").

In the developed system of automatic control and regulation load mill modes the frequency of active filters is set to f_H = I250 Hz.

To identify the type of functional relationship between the load chamber with ore M and average noise level Z there were conducted experiments at wide variation of load mill with ore at the frequency range f = 870 h 1550 Hz for a long time. Microphone, with which recorded mill noise was set at point 4 below the finely ground camera. The experiment was determined by relationship between load M and the second chamber average noise level Z. Type ready Z = (M) is shown in Fig. 6.

The resulting functional relationship shows that between the average noise level generated by the mill, and the level of load there is a unique relationship. With increasing load its chamber noise is reduced, i.e., between the two values is an inverse relationship [1].

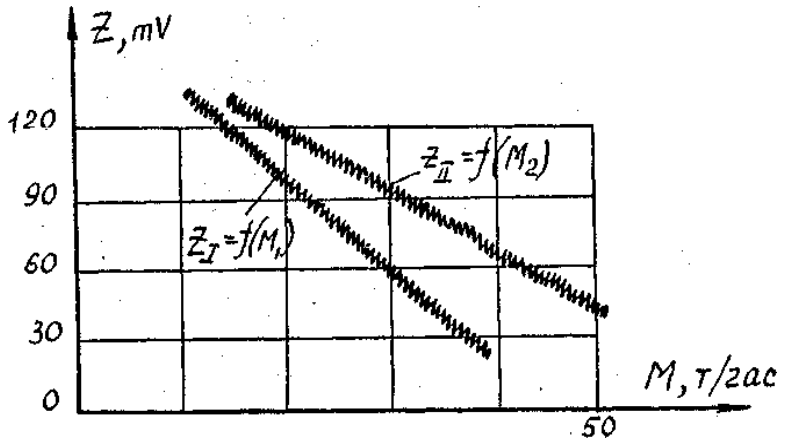

Fig.6 The dependence of the noise chambers on their load (fp = 870ch1550Gts)

REFERENCES

1 Adambaev M.D. Automatic control of pfocesses of ore dressing dry Monograph. – Almaty: Complex, 2003, 163p.