

Fig. 5. Experimental results

The basic methods of measurement with ultrasound were studied and practiced. An ultrasonic well depth finder was designed. The principles of the design and installation of an experimental module were studied. Information on modern methods, improving the quality of work performance with microcontroller was obtained. The study allowed mastering the methods and sequence of work in scientific research to develop new electronic circuits and modules.

Reference

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THE INFLUENCE OF CLIMATIC TESTS ON THE PARAMETERS OF THE ELECTRIC SIGNAL GLASS FIBER REINFORCED CONCRETE

Korzenok I.N.

Tomsk Polytechnic University, Russia, Tomsk

Scientific Supervisor: Fursa T.V.. Dr.

In the operation process in natural conditions vivo structures of reinforced concrete under the influence of temperature and humidity is the

degradation failure of structures made of glass fiber reinforced concrete. To reduce the number of the degradation failure of structures made of glass fiber reinforced concrete is necessary to monitor the technical condition to ensure timely repairs and reconstruction, improve the reliability and safety of their operation. Today there are no simple methods for flaw detection in glass fiber reinforced concrete. Therefore there is a need to develop methods of control of the concrete to protect the operation of engineering structures and facilities. For solving this task can be used NDT method based on the Phenomenon of Mechanoelectric Transformations in heterogeneous non-metallic materials [1, 2].

This work is devoted to investigation of parameters of the electrical signal glass fiber reinforced concrete in the conditions of climatic tests.

The researches were performed using the laboratory complex allowing producing pulsed mechanical excitation of materials and registering the electrical signal. In more detail the methodology of the studies is given in the work [3]. For data processing used program in the programming environment LabView and the program Origin.

The measurements of electric signal to impact excitation from the samples of heavy concrete with the size 100x100x100 mm were made. Glass fiber reinforcement was placed in the center of the sample parallel to its lateral sides. Glass fiber reinforcement has a length of 120 mm and diameter of 10 mm. Researches were performed on batches of models of reinforced concrete, consisting of 15 samples. Before carrying out climatic tests, the samples were soaked in water. The samples were subjected to 8, 14 and 18 of cyclic freeze-thawing. Freezing was performed in a climatic chamber at a temperature of -40 degrees Celsius and thawing was performed in the chamber at a temperature of (20±5) degrees Celsius and humidity of 95 %. For a comparative analysis of 3 samples were not subjected to climatic tests and were stored at room conditions. Then the samples were dried and measured from the electric signal.

For the qualitative assessment of parameters of an electric signal from glass fiber reinforced concrete with different number of climatic cycles was performed qualitative evaluation of the received signals and spectra using programs LabView and Origin. . In Fig.1 and Fig.2 shows comparative graphs of electric signals and spectra depending on the number of cycles of climatic tests.

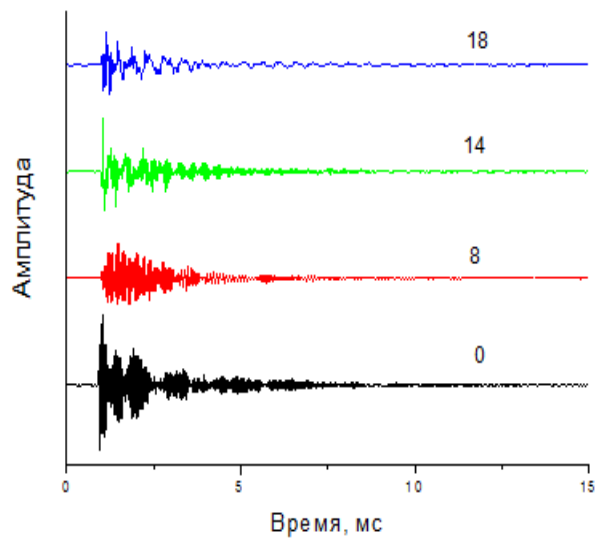


Fig.1. Electric signals from samples after different number cycles of climatic tests

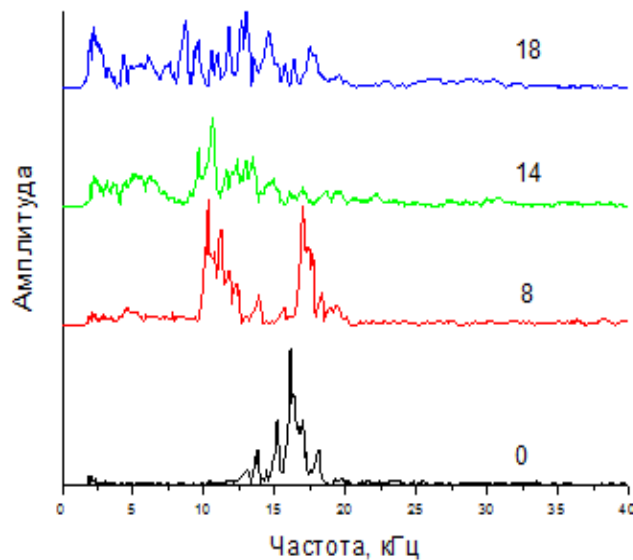


Fig.2. Spectra of electric signals from samples after different the number of cycles of climatic tests

Fig.1. shows that increasing the number of cycles of climatic tests leads to the changing character of the attenuation energy of electric signals. With increasing number of climatic cycles, the attenuation is much faster. Fig.2 shows the amplitude-frequency characteristics of electric signal of the concrete sample is shifted to low frequency region, the base spectrum thickens.

These changes in the characteristics of the electric signal indicate the formation in samples of internal defects (e.g. because there are no external defects), the appearance of which can be monitored.

Further research will be focused on the adaptation and improvement of the previously proposed algorithms and methods of NDT method based on the Phenomenon of Mechanoelectric Transformations in heterogeneous non-metallic materials for testing glass fiber reinforced concrete.

References

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EFFECT OF MECHANICAL MILLING IN THE PRODUCTION OF COMPOSITE CERAMICS

Lamonova S.A.

*National Research Tomsk Polytechnic University, Tomsk, Russia
Scientific supervisor: Surzhikov A.P., D.Sc. professor, TPU, Russia
Linguistic advisor: Mylnikova T.S., senior teacher, TPU, Russia*

Production of ceramic composite is carried out by various technologies. An important part of the production ceramic is mixing and milling of initial reagents. In this paper the role of mechanical milling in the production of ceramics is considered.

The advantages of the mechanical milling methods are:

- simplicity of installations and technologies;
- mixing of the initial powders;
- milling of various materials.

Disadvantages of the method include:

- contamination of the milling powder with abrading materials;