

УДК 691.32 (076)

МЕТОДЫ И ПРИБОРЫ КОНТРОЛЯ ПРОЧНОСТИ БЕТОНА

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There are two kinds of concrete strength control: destructive and non-destructive methods. The destructive methods are: the method of reference material and core drilling. Non-destructive methods are: plastic flow deformation, rebound hammer, shock pulse, pulling test, the method of rib chipping, ultrasonic pulse velocity (UPV) method. The ultrasonic pulse velocity method is the best one, because it allows carrying out control of the entire structure, not just the surface layer.

In order to develop a new device for concrete strength control a block diagram was made. Its operational principle is as follows: first, the generator is used for pulse shaping, this pulse is fed to the power amplifier, then it goes to the piezoelectric transducer and finally to the unit under test. The signal which goes to the receiving piezoelectric transducer is amplified in the amplifier and then goes to the detector. After that the signal goes to the analog-to-digital converter, which converts an analog signal into a digital one. Then the data go to the microprocessor 1, and when detecting a maximum signal level the visual indicator and the audio indicator are activated. Next, the measurement is made, its results are transferred via Bluetooth to the microprocessor and then to the digital indicating device.

To record the measurement results Electrically Programmable Read-Only Memory is used; it provides a record of information in the cell during the operation of the device without using special programming devices and long-term storage of data in case the power supply is disconnected. The control is carried out by means of the keyboard. The digital indicating device is intended for displaying measurement and support information in the user-friendly way.

The developed device has two transducers. The emitting transducer is connected to the device, and the receiving transducer (receiver) is wireless. The principle of operation is as follows: the wired transducer is fixed on the one side of the wall and the pulse mode in the device is set, and on the other side of the wall a wireless transducer is fixed in the point where the signal has the maximum value. Upon detection of this signal audio and visual indicators of the transducer are turned on. After that the wireless transducer is fixed on the wall, and the measurement mode is set in the device. After taking the measurement the receiver converts the analog signal into a digital one using Bluetooth and transmits the data to the device, where the data are shown on the display.