ABSTRACT

The master's thesis consists of 4 chapters, 97 pages, contains 36 illustrations, 29 tables, and 26 sources of information were selected and processed.

The object of research is the process of ultrasonic control of pipeline elements for defects of metallurgical origin in pipeline elements.

The subject of research in the work is wave processes characterizing the scattering of spatially limited beams of elastic waves in a solid isotropic medium.

The purpose of the work is to increase the efficiency of industrial measurement and control operations by improving the metrological characteristics of measurements of the propagation time of ultrasonic waves and obtaining reliable estimates of the limit values (sensitivity and detection) of contact methods of ultrasonic control in solid media when detecting long-term defects of pipeline elements.

Research tasks:

1. To conduct an analysis and substantiate ways of improving the existing methods and technical means of increasing the efficiency of operations of industrial measurements and control of pipeline elements.
2. To substantiate ways of improving the metrological characteristics of ultrasonic wave propagation time measurements.
3. To justify the choice of the method of measuring the time of passage of ultrasonic signals.
4. Perform computer simulation.
5. To develop an ultrasonic system for diagnosing pipeline elements.
6. To implement the results of research and development into the practice of use for production and educational tasks.