“The Stress Monitoring System for the Main Pipeline, Based on Magnetic Elastic Method”

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Head Sergey Fomichov, Doctor of Science, Professor

Results.

The monitoring system includes equipment, methods, and software. It was designed for the following purposes: Measurement of mechanical stress within the main pipeline, located in potentially dangerous areas. Transmission of measurement data into operator’s server. Graphical representation of the current stress distribution in a horizontal axis of a pipeline. Graphical representation of stress changes in the points of measurement over time.

The monitoring system is focused on the prevention of accidents on the main pipeline used for the transportation of petroleum and gas, which can contaminate then environment. This is achieved by finding the proper time to stop the pipeline operations and conduct repair when operational stress exceeds the established limits. The principle of main pipeline destruction was defined. The distribution of stress along the horizontal and vertical axis of a pipeline was researched. The influence of plastic deformations on magnetic characteristics of ferromagnetic steels was researched. The influence of the quality of contacts and the positions of first layer transmissions of researched material on the parameters of signals of the four pole transmitter was researched. The basics principals of designing a system to monitor mechanical stresses of the main pipeline was developed. A model of a modular system of the analog block of universal measure of mechanical stress, the digital module of the base block of universal measure, the commutation module of the base block of universal measure, and the block to connect the transmitter to the main pipeline were developed. Software to gather data from base blocks has been built. The method to define mechanical stress of the main pipeline was defined.