FORECAST OF THE STRESS-STRAIN STATE OF THE PIPELINE SECTIONS CROSSING THE GEODYNAMIC ZONES

Background
Due to the underground execution of the pipeline systems, they are closely exposed to the environment. Intersection of pipelines with numerous geodynamic zones (GDZ), which include the faults of different nature, the movement of the earth blocks thrusts (rock bursts), etc., are inevitably reflected in the stress-strain state (SSS) of the pipeline. The study of such effects makes it possible to forecast the technical condition of pipelines.

Aims and Objectives
The purpose of the article – to study the impact of geodynamic zones intersecting pipeline trench section 1420 mm diameter Urengoy – Petrovsk, its technical conditions and forecast of limit state.

Objectives of the Study:
- study the pipeline trench Urengoy – Petrovsk 1420 mm diameter for the presence of crossing the geodynamic zones;
- determination of the vertical movement velocity of the identified faults, crossing pipeline trench;
- measure the actual stress-strain state at the boundaries of geodynamic zones;
- calculation of SSS and the forecast of the limit state.

Methods
As a method of research there was used the geophysical survey of pipeline trench by seismic method (seismic refraction) and by electrical method (vertical electrical sounding). Moreover, there were conducted the measurement of the actual longitudinal stresses of pipe’s wall by acoustic methods, calculated and predicted values of SSS in GDZ by methods of structural mechanics.

Results
During the geophysical studies there were identified the geodynamic zones intersecting pipelines trenches and main pipeline Urengoy – Petrovsk; also the velocity of blocks on the boundaries of these zones was measured. The tension on the border zones was defined by measuring the level of actual SSS. The ultimate state of Urengoy – Petrovsk pipeline on the GDZ borders was predicted on the basis of actual stresses and the velocity of blocks movement.

Key words: geodynamic zones, fracture, seismic zones, long-distance pipelines, linear part, operation, technical condition, stress, environment

References


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