STRESS-STRAIN STATE OF THE UNDERGROUND SECTION OF THE PIPELINE MADE OF CURVE INSERTS AND STRAIGHT PIPE WITH COMPENSATOR

Background
At the exit of the underground section of the pipeline to the ground surface a compensating device for relieving the longitudinal stresses may be established that partly or fully removes restrictions on the movement of the pipe in the axial direction, causing additional bending of the pipeline. Comprehensively studied is the influence of compensating devices on stress-strain state (SSS) of pipelines composed of straight pipes, but the matters of their influence on the bending of a pipeline with curved inserts has not been adequately considered.

Aims and Objectives
Improvement of the methods of calculating stress-strain state of a pipeline made of curve inserts and straight pipes and having a compensator, with account for simultaneous deformation with the soil and the impact exerted on the pipe by operational loads.

Method
Finite element method, mathematical tools for solving differential equations.

Results
The analysis of the stress-strain state of the considered section of the oil pipeline with compensator is conducted for the cases where the soil is deformed in the elastic region and when the soil loses its bearing capacity. Highlighted are the features of the deformation of curved inserts. Possible causes of the failure to provide conditions that would ensure strength of the considered section of the oil pipeline are stated.

Conclusion
In the case where the middle part of the oil pipeline is in the soil which has lost bearing capacity, replacement of straight pipes by curved inserts will allow to create conditions for ensuring strength of this pipeline section.

Key words: curvilinear oil pipeline, stress-strain state, compensator, bearing capacity of soil

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