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STRENGTH AND DURABILITY TESTS OF PIPELINE SUPPORTS FOR THE AREAS OF ABOVE-GROUND ROUTING UNDER THE INFLUENCE OF OPERATIONAL LOADS

The present article deals with integrated research works and tests of pipeline supports for the areas of above-ground routing of the pipeline system “Zapolyarye — Pur-pe” which is laid in the eternally frozen grounds.

In order to ensure the above-ground routing method for the oil pipeline “Zapolyarye — Pur-pe” and in view of the lack of construction experience in case of above-ground routing of oil pipelines, the leading research institute of JSC “Transneft” — LLC “NII TNN” over the period of August, 2011 — September, 2012 performed a research and development work on the subject “Development and production of pipeline supports and pile foundation test specimens for the areas of above-ground routing of the pipeline system “Zapolyarye — Pur-pe”.

In the course of the works, the test specimens of fixed support, linear-sliding and free-sliding pipeline supports DN1000 and DN800 were produced and examined.

For ensuring the stable structural reliability of the supports constructions and operational integrity of the pipelines the complex research works and tests were performed:

1. Cyclic tests of structural elements of the fixed support on the test bed of JSC “Diascan” by means of internal pressure and bending moment with the application of specially prepared equipment for defining the pipeline supports strength and durability.

2. Tests of the fixed support under the influence of limit operating loads and by means of internal pressure for confirming the support’s integrity. On the test bed there were simulated all the maximum loads on the support (vertical, longitudinal, side loadings, bending moment including subsidence of the neighboring sliding support) and, simultaneously, internal pressure of the carried medium.

3. Cyclic tests of endurance and stability of the displacements of sliding supports under the influence of limit operating loads for confirming their operation capacity.

Relocation of the pipeline on the sliding supports from temperature expansion in case of preheated oil charge into a “cold” pipeline was simulated.

4. Cyclic tests of durability of frictional couples under the influence of operational and maximum loads.

On the test bed there were examined various materials for the sliding surface of the supports, ensuring the norm friction coefficient.

Key words: pipeline supports, above-ground routing, supports test, operating loads, strength, durability.

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