MONITORING OF ELEVATED PIPELINES USING GLOBAL NAVIGATION SATELLITE SYSTEMS

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The prospects of using global navigation satellite systems for monitoring of elevated pipelines in remote Arctic regions are considered. An analysis of existing techniques for regime geodetic observations on oil pipeline of the Vostochno-Messoyakhskoye field with a length of 100 km located in the southern part of the Gydan Peninsula is carried out. A comparison of geometric leveling and alternative subsidence monitoring techniques for linear infrastructure projects is made. A method for elevation measuring using global navigation satellite systems to determine the deformations of piles of an elevated pipeline has been developed and tested. Measurement consists of the 2 stages: 1) create the local precise geodetic network of benchmarks along pipeline from the reference station; 2) height determinate of the control marks on the pipeline piles using RTK technique. The possibility of using satellite leveling to monitor the development of dangerous exogenous geological processes and the restoration of disturbed areas on the real examples is shown.

Key words: global navigation satellite systems (GNSS), RTK technique, radar interferometry, terrestrial laser scanner, geometrical leveling, geotechnical monitoring, elevated oil pipeline, permafrost.

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