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Analysis of Pressure Wave Velocity in a Steel Pipeline with Inserted Fiber Optic Cable

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ABSTRACT

The paper presents the analysis of the water hammer phenomenon in a steel pipeline with inserted fiber optic cable. Particularly, pressure wave velocity of the phenomenon is considered. A derivation of formula which is presented, allows to calculate pressure wave velocity in the case where a cable with a different Young's modulus compared to the elasticity of the pipeline is inserted into it. The derivation was carried out using the mass balance. The results of experimental tests conducted using three different fiber optic cables are presented. Experimental studies show that inserting cable into a pipeline has an attenuating effect on water hammer phenomenon.