



“Gheorghe Asachi” Technical University of Iasi, Romania



STUDY OF HYDROPHOBICITY AND TEXTURE OF THE GRAVITY TRAY SURFACES TO IMPROVE THEIR TRANSFER CAPACITY

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Abstract

The article reveals a study of open trays transporting water and gravity. The study focuses on a new design patented small-size hydraulic benches, which allow investigating of the hydrophobicity degree of the materials intended for manufacture of open trays, as well as the efficiency of the tray internal surface textures to increase the transporting capacity of the streams containing solid inclusions. The wetting of protective coatings in dynamic conditions has been studied on a small hydraulic bench by creating a mini-flow and registering its characteristics with photo and video equipment. The study results on the liquid transfer in the trays of small-sized installations are given for two modes: single-phase (water) and two-phase (water with mineral inclusions). Exploratory studies have been performed to fix the vortex formation in the flow based on the chiaroscuro effect, when the filling has been made according to the tray surface corrugated texture, in a wide range of water flow velocities, as well as at calculated fillings corresponding to the actual operating conditions of trays and pipelines. The article estimates the pipeline surface structure influence on formation of the turbulence zones in different points of the obstacles. There were texture roughness characteristics given, which provide the most effective fluid flow transfer capacity by the mass of dispersed inclusions of various granulometric composition (sand-based) have been revealed. The velocity increasing ranges (below self-cleaning velocities), which provide the transfer capacity of the trays due to the textured surfaces, were established.

Keywords: chiaroscuro effect, gravity pipelines, hydrophobicity, surface texture, transfer capacity

Received: February, 2020; Revised final: June, 2020; Accepted: September, 2020; Published in final edited form: January, 2021

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