

Experimental and Computational Investigations of Baffle Position Effects on the Performance of Oil and Water Separator Tanks

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Abstract : Gravity separator tanks are used to separate oil from water in treatment units. Achieving the best flow uniformity in a separator tank will improve the maximum removal efficiency of oil globules from water. In this study, the effect on hydraulic performance of different baffle structure positions inside a tank was investigated. Experimental data and 2D computation fluid dynamics were used for analysis. In the numerical model, two-phase flow (drift flux model) was used to validate one-phase flow. For laboratory measurements, the velocity fields were measured using an acoustic Doppler velocimeter. The measurements were compared with the result of the computational model. The results of the experimental and computational simulations indicate that the best location of a baffle structure is achieved when the standard deviation of the velocity profile and the volume of the circulation zone inside the tank are minimized.

Keywords : gravity separator tanks, CFD, baffle position, two phase flow, ADV, oil droplet

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