Two-Dimensional Modeling Approach of the Fluid/Soil Interface in the Hole Erosion Test (HET)

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Abstract

Soil erosion is a complex phenomenon which yields at its final stage insidious fluid leakages under the hydraulic infrastructures known as piping and which provokes their rupture. The Hole Erosion Test is commonly used to quantify the rate of piping erosion. In this work, The Hole Erosion Test is modelled by using Fluent package. The aim of this work is to predict the erosion of soil during the hole erosion test(HET) .This modelling makes it possible describing the effect of the clay concentration and kaounilit concentration on erosion by using the RNG - based $k-\varepsilon$ turbulence model equations, and predicts a non uniform erosion along the hole length unlike the usual one dimensional models. In particular, the concentration of the mixture (clay+kaounilit) is found to increase noticeably the erosion rate.

Key words: Piping, Erosion, Turbulence, $k-\varepsilon$ model, Concentration of Clay, Kaounilit.