

عنوان مقاله:

Drag coefficient and strouhal number analysis of a rectangular probe in a two-phase cross flow

محل انتشار:

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خلاصه مقاله:

In some case of laboratory and industrial applications, various kind of measurement instruments must be placed in a conduit, in which multiphase fluid flows. Vortex shedding for any immersed body in flow field is created with a frequency, which according to flow conditions such as flow rates, geometry of body, etc. may be constant or variable. Failure may happen, if this frequency is close to one of the natural frequencies of the instruments. These flows can play a significant role in long-term reliability and safety of industrial and laboratory systems. In this study, an Eulerian–Eulerian approach is employed to simulate Air-Water two-phase flow around a rectangular probe with different volume fractions (0.01-0.5) and Reynolds numbers (1000-3000). Two-phase flow characteristics around the probe have been analyzed numerically. The results show vortex shedding in all cases with distinct Strouhal number. In addition, results illustrate that shedding is intensified by increasing Reynolds number. In order to validate the results, fraction of inlet volume was set to zero, and drag coefficient and its relation with low Reynolds number (1000-3000) in single phase flow were compared to experimental and numerical results in published article. The results show a complete agreement between the simulation and available data.

کلمات کلیدی:

Two-Phase Cross Flow, Strouhal Number, Rectangular Probe, Drag coefficient

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