عنوان مقاله:

The effect of the geometry on the trajectory equation of jets in a cross flow

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خلاصه مقاله:

Some of the important parameters affecting the jet trajectory of a jet in the cross flow has been investigated in this study. We have developed an expression for the trajectory of a jet with square cross section in the cross flow. In any jet in cross flow there is a short distance, h, along which the jet travels in an almost straight path, before it bends under the influence of the cross flow. In this study, scaling analysis has been applied to establish an expression for h in a square jet in cross flow. This equation has been modified further for the special case of a kerosene jet fuel in the air cross flow. The so obtained equation may be considered as the first attempt in the literature to model the distance h of a jet in cross flow with two different fluids. A jet trajectory equation contains one or more constants which are to be determined according to the main parameters of jet in cross flow such as the velocity ratios. In the present study a generic form of jet trajectory has been introduced so that the aforementioned constants are almost fixed. This has been done for the jet in cross flow with the same fluids as well as different fluids such as the case of a kerosene jet fuel in the air cross flow. Next, the flow of a quadruplet jets (a jet with 4 exits) in the cross flow has been investigated. The comparison of the results show that the new correlations which are introduced in this study for jet trajectory have good agreement with the results reported in the literature. Finally the volume of the main stream affected by the jet has been compared for different jet in cross flow geometries. This could have an important practical impact on the design of the exhaust streams of the plants which open to the rivers and affect the life of the sea creatures.

کلمات کلیدی:

JICF, Multiple Jets in Cross Flow, JT, Jet Cross Section, JICF with different Fluids