

EFFECT OF RAINFALL ON AIRFOIL PERFORMANCE

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ABSTRACT

Stimulated by a number of recent aircraft crashes, experimental investigations on model airfoils under conditions of simulated rainfall have shown that their effectiveness is significantly deteriorated, in terms of lift and drag coefficients. In an effort to provide an insight on the mechanism responsible for this kind of behavior, the flow of a gas stream past a flat plate under the influence of rainfall is investigated. An analytical solution is obtained that predicts the growth of a thin water film driven to motion along the plate due to shear from the surrounding gas. Finally, linear stability is performed that predicts the growth of interfacial waves on the gas-liquid interface that are conjectured to be responsible for the airfoil performance deterioration.