

Abstract

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On RANS Modeling of Unconfined Swirl Flow

This article presents numerical simulations of unconfined swirl flow. The Sydney swirl flow database was used as references for the boundary conditions and experimental validation. A number of RANS turbulence models were investigated in order to explore their potential in predicting axial and swirl velocity profiles of the swirl flow field. The numerical investigations showed that among the tested RANS models, the k-w showed an acceptable performance in predicting the swirling flow features in both cases (low and high swirl level). The results also demonstrated that the k-w model was able to provide a reasonably accurate prediction data that is in consistent with experimental measurements at most locations.