

Experimental Study of Flow Structure over a 75 ° Swept Delta Wing with External Stores

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ABSTRACT

An experimental study of the leading edge vortices over a 75 ° swept delta wing with external stores is presented. A combination of flow visualization technique and fiber-optic laser doppler velocimeter measurements were used to study the leading edge vortex formation and breakdown for the delta wing with a set of external stores. The external stores had characteristic incidence angles of 20 ° ,45 ° ,90 ° ;characteristic width of 15 or 30 mm. The flow structure was examined for angles of attack from 25 ° to 40 ° at Reynolds number of 1.75×10^6 based on the root chord. Vortex breakdown was observed on all the tests of the wing with external stores. The visualization and velocity field survey data shows that the external stores made vortex breakdown occur early and the core flow transform abruptly from a jet-like flow to a wake-like flow. The result also revealed the external stores induced vortex breakdown was more steady than the natural breakdown.

Keywords : Delta wing ; external stores ; flow visualization technique ; vortex breakdown

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