DESIGN AND ANALYSIS OF WING TIP TWIST ON A FORWARD SWEPT WING USING PRANDTL-D WING CONCEPT

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Abstract

Our project is all about the implementation of a wing tip twist for Prandtl-D wing to a Forward swept wing. The innovative idea is that the Prandtl-D wing is used only for a glider till date whereas, we implied this concept for a commercial aircraft. The phenomena of twisting the tip of the wing leads to the change in geometry which results in drag reduction and increase in lift to drag ratio. With the help of a reference project, a wing geometry is chosen and the model is scaled down according to our test section. By using CATIA V5 R20, our model is drawn and analyzed with the help of ANSYS Fluent 16.0. The geometry with the best result is 3-D printed and tested in the low speed subsonic wind tunnel. Both the analytical and experimental results are validated. In general, the forward swept wing aircraft possess good aerodynamic performance in subsonic range. We look into that whether our project increases the efficiency or not.

Keywords: Prandtl-D Wing, Swept Wing, Forward Swept Wing, Wing Tip Twist, Angle Twist