

Theoretical Calculation of Wingtip Devices for Agricultural Aircraft

Authors : Hashim Bashir

Abstract : The Vortex generated at the edges of the wing of an Aircraft are called the Wing Tip Vortex. The Wing Tip Vortices are associated with induced drag. The induced drag is responsible for nearly 50% of aircraft total drag and can be reduced through modifications to the wing tip. Some models displace wingtips vortices outwards diminishing the induced drag. Concerning agricultural aircrafts, wing tip vortex position is really important, while spreading products over a plantation. In this work, theoretical calculations were made in order to study the influence in aerodynamic characteristics and vortex position, over Sudanese agricultural aircraft, by the following types of wing tips: delta tip, winglet and down curved. The down curved tip was better for total drag reduction, but not good referring to vortex position. The delta tip gave moderate improvement on aerodynamic characteristic and on vortex position. The winglet had a better vortex position and lift increment, but caused an undesirable result referring to the wing root bending moment. However, winglet showed better development potential for agricultural aircraft.

Keywords : wing tip device, wing tip vortice, agricultural aircraft, winglet

Conference Title : ICAMAME 2016 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

Conference Location : Sydney, Australia

Conference Dates : December 15-16, 2016