

Title: Aerodynamic Characteristics of Low-aspect-ratio Wing with Endplate and Anhedral in Ground Effect.

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#### Abstract

In order to obtain aerodynamic characteristics of endplate and anhedral in ground effect, a numerical analysis was conducted on a series of rectangular wings having aspect ratio of 1. Due to decreasing induced drag as a wing approached to ground, the wing obtained high lift-drag ratio. The influence of the induced drag on a low-aspect-ratio (LAR) wing without endplate and anhedral was, however, significant and affected low lift at the wing tip in the same low height. The endplate and anhedral reducing side wash helped to increase pressure on the lower surface while the aerodynamic characteristics, such as stability, moment coefficient, and pressure center, were changed. In this study, the numerical analysis focused on understanding the aerodynamic characteristics of LAR wing with endplate and anhedral. Comparison of aerodynamic characteristics was performed and showed that in ground effect 1) lift for all cases increased as the ground was approached, 2) endplate and anhedral enhanced the lift-drag ratio further due to the reduced side wash between lower surface and ground, and 3) flow, stability, and strength of tip vortex were changed.

Keyword: wig, 3-dimensional flow, flow analysis, low aspect ratio, endplate, anhedral, high lift-drag ratio, stability, induced drag, side wash.