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ABSTRACT

Wind Tunnel measurements are conducted using scaled down models of aerospace as well as automotive systems. These models are attached to supporting struts. The forces on the support system are taken into account to obtain the corrected aerodynamic data. Most of the struts used in testing are cylindrical in shape with a pitch rod for the alpha mechanism. These model attachments introduce additional forces and moments due to their size and frontal area. A diamond shaped strut is one of the proposed solutions with other benefits of reduced contribution towards the lift due to its tapered profile. This paper describes the effect of support interference due to the two different strut types. First, the entire cylindrical strut was shrouded by a streamlined metal fairing and its influence on the actual force and moments were measured through a series of blow downs in the IIUM low speed wind tunnel at different velocities and side slip angles. Later, the tests were conducted for the diamond shaped strut with a pitch rod mounted on the turntable at a certain distance from the central diamond shaped strut. Lastly the cylindrical strut was installed without the fairing. In comparison with the cylindrical strut (with or without fairing), the diamond shaped strut was found to have smaller lift. The developed databank for different struts will be beneficial for the future design of experiments in wind tunnels of similar dimensions. Such support systems not only contribute towards drag but also to the lift as well as side force.

Keywords: *Subsonic Wind Tunnel, Cylindrical Strut, Diamond Shaped Strut, Fairing, Pitch Rod, Low Speed*

1. NOMENCLATURE

b	wing Span, m
C_L	the coefficient of lift
C_D	the coefficient of drag
C_M	the coefficient of pitching moment
C_n	the coefficient of yawing moment
C_r	the coefficient of rolling moment
C_y	the coefficient of side force
LSWT	low speed wind tunnel

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