

## Effect of Installation of Long Cylindrical External Store on Performance, Stability, Control and Handling Qualities of Light Transport Aircraft

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**Abstract :** This paper presents the effect of installation of cylindrical external store on the performance, stability, control and handling qualities of light transport category aircraft. A pair of long cylindrical store was installed symmetrically on either side of the fuselage (port and starboard) ahead of the wing and below the fuselage bottom surface running below pilot and co-pilot window. The cylindrical store was installed as hanging from aircraft surface through specially designed brackets. The adjoining structure was sufficiently reinforced for bearing aerodynamic loads. The length to diameter ratio of long cylindrical store was ~20. Based on academic studies and flow simulation analysis, a considerable detrimental effect on single engine second segment climb performance was found which was later validated through extensive flight testing exercise. The methodology of progressive flight envelope opening was adopted. The certification was sought from Regional airworthiness authorities and for according approval.

**Keywords :** second segment climb, maximum operating speed, cruise performance (single engine and twin engine), minimum control speed, and additional trim required

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