



# **DESIGN A SMALL WIND TUNNEL STUDIES FOR BOUNDARY LAYER EXPERIMENT**

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## ABSTRACT

Boundary layer theory is an essential knowledge in aerodynamics study. In order to study boundary layer, the appropriate equipments are required. The most popular equipment which often used is a wind tunnel. Because miniature, portable wind tunnels are not commercially available, I am designed a small portable wind tunnel for the Mechanical Engineering Department of Universiti Teknologi Mara. The wind tunnel was designed to deliver air at flow rates ranging from 0 to 25.6 cubic meter per minute by using 1/5 hp tube axial fan. The total pressure drop throughout the miniature, portable wind tunnel is 1.0786 inH<sub>2</sub>O. Air speeds through the 0.0142m<sup>2</sup> test section are variable from 0m/s to 30m/s. The wind tunnel can incorporate two possible test configurations within the test section. The first utilizes smooth flat plate model, which attach to wall of test section. The second configuration incorporates a flat plate with rough surface. Pressure drop through the 600mm long test section is obtained mechanically with the use of pitot tube and a manometer. Velocity measurements are also obtained with a pitot tube and outputted to the inclined manometer. This study was made possible with the support of Department of Mechanical Engineering, Universiti Teknologi Mara (UiTM) under the supervision of En. Aman Mohd Ihsan.