LABORATORY EXPERIMENT 1

LIFT AND DRAG EVALUATION ON A SHORT AEROFOIL

By: Engr. Arvin N. Gastardo

OBJECTIVES

After completing the experiment, the student will be able to:

1. Understand the traits/characteristics of the airflow around the test subject (Short Aerofoil).
2. Collect and save all the data of the test subject.

OVERVIEW

The aim of wind tunnel tests is the simulation of the flow around bodies or their scaled models. In aeronautical applications, the measurement of aerodynamic loads in a wind tunnel, forces and momentums, is a very difficult task due to the required accuracy. The wind tunnel balances, comprised by several hardware and software components, provides directly the pursued measurements, with high accuracy and reliability. For these reasons, among others, wind tunnel balances have become a common tool in testing facilities. During the test, the model is placed in the test section of the tunnel and air is made to flow past the model. Flow visualization techniques are used to provide diagnostic information about the flow around the model. We will be using the smoke technique for our experiment.

EQUIPMENT

SUBSONIC WIND TUNNEL

COMPONENTS

Fan Speed Controller

Balance Indicator

2/3 Component Balance

Smoke Generator Control Unit

PROCEDURES

1. Calibrate the component balance and install the test subject (MP 330-019).
2. Open the wind tunnel program to input all required data for the experiment.
3. Key in your full name.
4. Key in the room temperature.
5. Select model for the experiment according to the experiment setup.
6. Adjust the wind velocity (20 m/s) control for the experiment.
7. Set the model's angle of attack to zero degree
8. Collect the data result
9. Rotate the model at 10 degrees increment and repeat step 8.
10. Click the save to file button and choose the desktop as file location. Assign your name as the file name. Provide data sheet on the next page under table A-1.

SUPPLEMENTARY QUESTIONS FOR EXPERIMENT

1. How would you describe the characteristic/trait of the airflow around the test subject?

2. What are the changes on the data as the angle increases?

Table A-1