AN EXPERIMENTAL STUDY ABOUT FRONT SIDE CONTOUR SEGMENT CURVATURE TO FLUID FLOW CHARACTERISTIC OVER ASSYMETRICAL AIRFOIL THREE-DIMENSIONAL (3-D) NEAR A WALL (ANGLE OF ATTACK = 0°, 10°, 12°, 16°, 18°)

Name Student : SILVIA APRITA
NRP : 2107. 100. 066
Department : Mechanical Engineering FTI – ITS
Supervisor : Dr. Ir. Heru Mirmanto, MT

ABSTRACT

Secondary flow is a form of flow that contain element stream flow in direction of orthogonal to the direction of the main flow. This flow occurs because the boundary layer formed on each surface will interact with each other, thus forming a new skewed boundary layer are complicated. The secondary flow formation phenomenon can be found in assymmetrical airfoil near the side which were given the influence of the curvature of the contour of the front segment and the provision of angle of attack of the aerodynamic force.

In this study experimental tests to be conducted in a wind tunnel with a Reynolds number, Re= 98 000 and the angle of attack of 0°, 10°, 12°, 16°, and 18°. Test models in the form of two asymmetrical airfoils are not near the side which has a chord length = 120mm and span =700mm with 5° variations of the curvature of the front at 30% c. Trace of the flow visualization be presented by usin Titanium Powder.

Final results are expected from this research is to change the curvature of the contour of the front segment of a given angle of attack relatively is large to the airfoils
unsymmetrical near the wall will affect the three-dimensional flow characteristics and the resulting aerodynamic performance. So it known characteristics of the shear stress on the end wall in through the change of curvature contour segments that show the influence of the front of the horseshoe vortex intensity against the intensity of the flow near the trailing edge curl and wake at the upper side corner which will be presented in the form of traces of oil flow visualization on the blade and endwall.

Keywords: Angle Of Attack, Secondary Flow, Curvature Of The Contour Of The Front Segment, Asymmetrical Airfoil, Trace Of Oil Flow