AN EXPERIMENTAL STUDY ABOUT FRONT SIDE COUNTOUR SEGMENT CURVATURE TO FLOW CHARACTERISTIC OVER ASYMETRICAL AIRFOIL

(Angle of attack = 0°, 2°, 4°, 6°, 8°)

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Abstract

Massive separation is a flow separated phenomenon from contour surface. These occurred by the existence of adverse pressure gradient in airfoil downstream region. Massive separation in airfoil can decrease its performance. Airfoil stall is one of the massive separation indicators. This airfoil stall can decrease the lift force and increase the drag force. A lot of researches about the influence of body geometry are intended to reduce or delay massive separation over airfoil.

The goal of this research is to learn about flow characteristics over asymmetrical airfoil with two types of front side contour segment curvatures. The experiment is taken inside a wind tunnel with Reynolds number 98000 and angles of attack 0°, 2°, 4°, 6°, 8°. Parameters which are used to obtain flow characteristics are static pressure distribution over airfoil contour and flow visualization using oil flow visualization method.

The result of this experiment indicates that the change of front side contour segment curvature influences the flow deflection either in upper side and lower side. The airfoil which has more curvature would deflect flow with strong acceleration which is indicated by early bubble separation in angle of attack 0°- 4°. However in higher angle of attack, airfoil with has more curvature would have massive separation earlier. Sharp deflection with strong acceleration which is occurred earlier can
make adverse pressure gradient moving forward, in which the flow deflection can not prevent the handicap as adverse pressure gradient getting bigger.

**Key words:** Front side contour segment curvature, Angle of attack, Flow deflection, Flow separation.