

Abstract Submitted
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Flow Structure on Plates in Unsteady Motion T. YILMAZ, D. ROCKWELL, Lehigh University — The unsteady, three-dimensional flow structure is characterized along a flat plate (aspect ratio two) undergoing pitching motion to relatively high angle of attack and plunging motion associated with moderate effective angle of attack. Techniques of particle image velocimetry lead to sectional and volume representations of the phase-averaged velocity, vorticity and streamline topology. Emphasis is on a value of Reynolds number based on chord of 10,000. An inherent feature is pronounced spanwise flow in the vicinity of the leading-edge, either towards or away from the plane of symmetry of the plate, which is associated with formation of large-scale, three-dimensional vortical structures. Such structures can have substantial levels of vorticity oriented in the streamwise/surface-normal direction(s), and they are characterized in relation to the unsteady development of the tip vortices. Their continued evolution along the plate is associated with radical departures from a quasi-two-dimensional flow pattern. This investigation is a sequel to our recent study reported in *Experiments in Fluids*, Vol. 48, No. 3 (March), pp. 539-544.

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