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Comment on "Moving-Wall Effect on Unsteady Boundary Layer"

Lars E. Ericsson*

Mountain View, California 94040

and

Martin E. Beyers†

Institute for Aerospace Research,
Ottawa, Ontario K1A 0R6, Canada

IN Ref. 1 an elegant analysis is presented which demonstrates theoretically that the moving-wall effect influences the separation of the boundary layer on a stalling airfoil in the manner described in the discussion of Fig. 14 in Ref. 2. That is, the moving-wall effect will amplify the accelerated-flow effect on a pitching airfoil but counteract it on an airfoil describing a plunging motion.³ It would be of significant interest if the authors were to extend their theoretical analysis to the one-degree-of-freedom three-dimensional flow on a coning body of revolution illustrated by Fig. 6 in Ref. 4. As has been demonstrated analytically,⁵ the self-induced coning of a body of revolution⁶ is generated by a flow mechanism fundamentally the same as that giving rise to dynamic lift overshoot on an oscillating airfoil. This is important in view of the fundamental role that this flow phenomenon plays on a combat aircraft maneuvering at high angles of attack.^{7,8}

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Reply by S. Tavoularis to M. E. Beyers and L. E. Ericsson

S. Tavoularis*

University of Ottawa, Ottawa, Ontario K1N 6N5, Canada

I BECAME aware of Ref. 1² of the comment, only after publication of my Note.³ I also cited it in a subsequent publication.¹ Unfortunately, I was unaware of it while I was rederiving independently the geometrical expressions in my Note and neither were the wind-tunnel professionals that I consulted with nor the *Journal of Aircraft* editor and reviewers. I apologize to the *Journal of Aircraft* readers for the redundancy.

The expressions in Refs. 2 and 3 are purely geometrical and exact and, of course, cannot be expected to apply under conditions of significant interference. Even so, they seem to apply fairly well to steady-flow model tests in a high-speed wind-tunnel facility, as clearly demonstrated in Ref. 1. Moreover, such expressions were never meant to be used in unsteady flows, and I am rather surprised that the authors of the comment feel the need to publish such a statement. In unsteady wind-tunnel testing, like in any unsteady flow configuration, it is not only the facility effects that must be accounted for but the history of flow development as well.

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*Engineering Consultant. Fellow AIAA.

†Principal Research Officer, Applied Aerodynamics Laboratory. Senior Member AIAA.

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*Professor, Department of Mechanical Engineering.