Readers' Forum

Brief discussions of previous investigations in the aerospace sciences and technical comments on papers published in the AIAA Journal *are presented in this special department. Entries must be restricted to a maximum of 1000 words, or the equivalent of one* Journal *page including formulas and figures. A discussion will be published as quickly as possible after receipt of the manuscript. Neither the AIAA nor its editors are responsible for the opinions expressed by the correspondents. Authors will be invited to reply promptly.*

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Addendum to "Potential Application of Piston Generated Unsteady Expansion Waves"

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SOME of the analysis in Ref. 1, most importantly the variation of stagnation conditions within an unsteady rarefaction wave, can be found in Ref. 2, for shock tube flow. Reference 2 also discusses experimental verification of flow conditions within and across the rarefaction. Agreement with theory is sometimes poor, for reasons associated with nonideal shock tube behavior. I wish to thank Professor Glass for pointing out this earlier work.

References

[1]Emanuel, G., "Potential Application of Piston Generated Unsteady Expansion Waves," *AIAA Journal*, Vol. 19, Aug. 1981, pp. 1015-1018.

[2]Glass, I. I. and Hall, J. G., *Handbook of Supersonic Aerodynamics*, Sec. 18, Shock Tubes, NAVORD, Rept. 1988, Vol. 6, Dec. 1959.

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Comment on "Spreads of Oil Slicks on a Natural Body of Water"

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IN a recent paper, Sundaram[1] has developed similarity relations for the spread of oil slicks from a continuous source of constant strength into a two-dimensional channel. It is asserted that previous analyses concerning the spread of oil on water are based on two restrictive assumptions. The first of these is that "all of the oil is spilled 'instantaneously,' so that the total volume of the slick is conserved during the spread"; the second that "it is assumed that the viscous retarding force exerted on the underside of the slick by the underlying water layers can be predicted based upon concepts of laminar boundary-layer theory."

It is the purpose of this Comment to point out that the problem of oil slicks spreading from continuous sources has been considered in the past and that the solutions obtained have proved useful in applications both to time-dependent leaks (damaged tankers, broken pipelines) and to continuous sources (blowouts). Similarity solutions of the thin layer equations governing the spread of oil slicks were published many years ago by Waldman et al.[2] The solutions include both radial flow and channel flow and are restricted only to power-law source-strength variations with time. In this early paper, the problem of spreading from a continuous source with superimposed drift was also considered and the role of ocean turbulence assessed. Further details are available in a Contractor's Report to the U.S. Coast Guard.[3] The solutions in this early paper appear to be more general as well as more complete than the recent contribution by Sundaram.[1]

References

[1]Sundaram, T. R., "Spread of Oil Slicks on a Natural Body of Water," T. N., *Journal of Hydronautics,* Vol. 14, No. 4, 1980, pp. 124-126.

[2]Waldman, G. D., Fannelop, T. K., and Johnson, R. A., "Spreading and Transport of Oil Slicks on the Open Ocean," Offshore Technology Conference, Paper No. OTC 1548, 1972.

[3]Waldman, G. D., Johnson, R. A., and Smith, P. C., "The Spreading and Transport of Oil Slicks on the Open Ocean in the Presence of Wind, Waves and Currents," Avco Systems Division, Report No. AVSD-0068-73-RR; also, U.S. Coast Guard Report No. CG-D-17-73, 1973.

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Reply by Author to G. D. Waldman and T. K. Fannelop

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DURING the last decade a number of studies on the behavior of oil pools spilled on to a body of water have been carried out, and several excellent review articles on the subject also exist in the literature. One class of theoretical studies that exists is concerned with obtaining similarity solutions for the slick spread on a quiescent body of water, and Ref. 1 represents a pioneering contribution in this class of studies. The purpose of our Note[2] was merely to point out that power-law expressions for slick spread can be obtained by making very simple order-of-magnitude estimates for the various forces involved, the virtue of the latter approach being that the consequences of various assumptions and

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