for the case calculated by Summa and this longer time is also indicated in the experimental results.

References

[1]Summa, J. M., "Potential Flow About Impulsively Started Rotors," *Journal of Aircraft*, Vol. 13, April 1976, pp. 317-319.

[2]Lehman, A. F. and Besold, J., "Test Section Size Influence on Model Helicopter Rotor Performance," Oceanics, Inc., Plainview, N. Y., Rept. No. 70-76 (AD 724191), Aug. 1970.

[3]Goodman, T. R. and Lehman, A. F., "Advantage of Testing Aircraft Rotor Models with Sharply Deflected Wakes in Water," *Journal of Aircraft*, Vol. 8, July 1971, pp. 585-586.

Reply by Author to A. F. Lehman

J. M. Summa*

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I WISH to thank A. F. Lehman for his comment. It is encouraging to find that existing experimental data[1] confirm, at least qualitatively, my numerical calculations. I should emphasize, however, that the calculations in Ref. 2 represent impulsive motion of a *four-bladed* rotor in an infinite fluid medium, i.e., out-of-ground-effect. I therefore believe my discussion of the flow physics of the calculated indicial thrust behavior to be correct. That is, the indicial thrust overshoot and eventual decay to an asymptotic steady-state hover value are due to the time-dependent velocity field induced at the blades by the complicated wake system. The thrust overshoot itself occurs as the blades approach the upwash velocity field associated with the rolled-up starting vortices shed by the fore-running blades at the instant of impulsive motion. At some later time, the influence of the starting vortices wane and the largest contributors to the wake-induced velocity field at the blades are the strong rolled-up tip vortices which produce a downwash at the blade surfaces except for a small region near the tips. Consequently, the thrust eventually decays asymptotically to the steady-state value. Of course, in a closed test section the additional inflow discussed by Lehman due to a secondary circulation field would contribute to the thrust (lift) decay. However, I expect that the addition of forward velocity reduces the overshoot primarily because the starting vortices are convected away from the rotor disk at rates increased by the component of forward velocity normal to the disk. Finally, the longer time required for the development of lift overshoot in the experiment[1] is because the model was a *two-bladed* rotor (the overshoot should occur at approximately π radians of rotor movement after start-up) and because the experimental start-up required one second rather than its being mathematically impulsive.

References

[1]Lehman, A. F. and Besold, J., "Test Section Size Influence on Model Helicopter Rotor Performance," Oceanics, Inc., Plainview, N. Y., Rept. 70-76, (AD 724191), Aug. 1970.

[2]Summa, J. M., "Potential Flow About Impulsively Started Rotors," *Journal of Aircraft*, Vol. 13, April 1976, pp. 317-319.

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Index categories: Rotary Wing Aerodynamics; Nonsteady Aerodynamics.

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Errata

Early Detection of Fatigue Damage in Composite Materials

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[J. Aircraft **13**, 764-769 (1976)]

THE Fig. 10 caption is correct and the correct figure is the small figure which appears just above the caption. However, immediately above the correct figure is a large logic diagram from another paper which has no connection whatsoever with this paper. The correct figure is shown below.

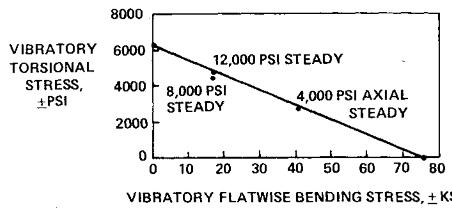

Fig. 10 Combined load fatigue diagram for graphite epoxy based on 10% torsional stiffness reduction at 10^7 cycles.

Received Dec. 6, 1976.

Index categories: Aircraft Structural Materials; Reliability, Quality Control, and Maintainability; Structural Composite Materials (including Coatings).

A Wing-Jet Interaction Theory for USB Configurations

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[J. Aircraft **13**, 718-726 (1976)]

ON page 719, column 1, first paragraph, from the middle of line 4, it should read "to have less than 2% thickness." The camber term in Eq. (13) should be $\partial z_c/\partial x$. Three lines below Eq. (33), γ_j should be $\bar{\gamma}_j$. Four lines below Eq. (33), ρ_π should be ρ_j. In Eq. (41), $\bar{c}\bar{c}$ should be $\bar{c}c$. In Eq. (45), there should be an "=" in front of $[Nww]_i$. On page 723, second column, first paragraph, line 4, ρ_j should be δ_j. The footnote in Table 1 should read $C_T = 2.095$, $\eta = 80\%$. The first vector product inside the braces of Eq. (A7) should read $\boldsymbol{b}' \cdot \boldsymbol{\ell}'$. In the denominator of the last term in Eq. (A15), y_{ik} should be y_{Ik}.

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Index category: Aircraft Aerodynamics (including Component Aerodynamics).