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REVIEWS

Practical Experiences with Flow-Induced Vibrations; Proceedings on IAHR/IUTAM Symposium. Edited by E. NAUDASCHER and D. ROCKWELL. Springer-Verlag, 1980. 849 pp.

Wind Engineering; Proceedings of the Fifth International Conference on Wind Engineering. Edited by J. E. CERMAK. Two volumes, 1444 pp. Pergamon Press, 1980.

Although these two conferences had several common technical topics, such as wind-induced motion of tall buildings and bridges, the overall impressions given by the two are quite different. The Symposium at Karlsruhe on Flow-Induced Vibration in 1979 consistently emphasized practical experience gathered from a limited number of industrial fields. The Colorado Conference on Wind Engineering in 1979 on the other hand demonstrated the diversity of fundamental and applied topics which currently define wind engineering.

Consider first the Karlsruhe Symposium. Many papers of the proceedings include one or more 'charts', essentially one-page case histories of flow-induced vibration giving a brief outline of a problem, the mechanism involved, the cure adopted and references to related reports. Theory, design criteria and particular test results related to the problems involved are discussed in some of the papers (and these are the better ones). Of the several summary papers, those dealing with nuclear reactors and heat exchangers, hydraulic gates, ship-propeller excitations and suspended span bridges are particularly good. A series of invited papers in the form of a workshop reviews the prediction and modelling of flow-induced vibration, again from a practical point of view and finally a panel discussion addresses critical unresolved problems. The consistent emphasis on practical aspects has produced proceedings which may contain few new fundamental ideas but which form a unique collection of problems, solutions and comments unlikely to appear in print elsewhere.

The International Conference on Wind Engineering (ICWE) is the latest in a quadrennial series which, until this fifth meeting, had the title 'Conference on Wind Effects on Structures'. Originally the name implied a combination of fluid mechanics, meteorology and structural analysis applied to the design of large structures sensitive to the effects of high wind speeds. Since the original international meeting at the National Physical Laboratory in 1963, the field has expanded considerably and has been given the new name 'wind engineering' to cover the many aspects of non-aeronautical fluid mechanics linked loosely with wind effects. For example, high-Reynolds-number bluff-body aerodynamics, particularly when combined with upstream shear or turbulence, is now considered by some to be squarely if not exclusively within the purview of the new subject.

In fact the subject of wind engineering has been defined to a large extent by the papers accepted for presentation at the international meetings. These proceedings include such new topics as pollutant dispersion of both heavy and buoyant gases, flow over complex terrain (with and without density stratification), and the social and economic impact of storms. Naturally the increasing scope has been accompanied by an increase in size: from 55 papers in the fourth (1975) meeting to over

100 papers in the fifth (1979) proceedings. Fundamental and applied papers appear in most of the seven main subject areas considered at the latest conference so that the emphasis is not consistently on practical experience. Instead the outstanding impression given is that of diversity, and if topics such as wind energy or vehicle aerodynamics are added in future conferences the diversity will increase, still within the framework of wind engineering. Is a continuing growth in scope and size of the ICWE a desirable trend from the standpoint of the organizers, the participants or the research communities involved?

Another question raised in reviewing the Karlsruhe and Colorado meetings concerns the role played by conference proceedings vis-à-vis that of related journal publications. In this connection, it is interesting that the *Journal of Industrial Aerodynamics*, founded in 1975, has recently changed its name to *Journal of Wind Engineering and Industrial Aerodynamics* and formally affiliated itself with the International Wind Engineering Association, the parent organization responsible for the ICWE series (see *J. Wind Eng. Indus. Aerodyn.*, vol. 6, no. 1–2, 1980). Traditionally the standards, review procedures and objectives of a conference paper are different from those of a journal article. In general, finished work of lasting value (so-called archival material) should be recorded in recognized journals whenever possible and duplication of papers on library shelves, once in journals and again in proceedings, should be minimized. There seems to be a trend to create proceedings which become archival repositories, in competition with regular journals. Smaller libraries and research workers relying on them are put at a considerable disadvantage by such a trend.

Having said that, it must be added that some conference proceedings contain material which is not appropriate for existing journals. This is particularly true of conferences covering highly interdisciplinary work or those inviting papers from particularly practical perspectives. The Karlsruhe meeting was aimed at the second of these somewhat exceptional categories and in consequence very little of the material collected for presentation at that meeting is likely to appear elsewhere. Wind engineering, on the other hand, is no longer without its journals; indeed there are several dedicated to its various applied aspects and others which publish fundamental material related to the subject. Much of the significant research reported at the fifth ICWE could be and probably will be reported elsewhere. Session summaries and discussions, while interesting, are seldom of lasting value. Perhaps the proceedings of the next ICWE should receive only limited circulation, allowing journals, affiliated and otherwise, to record results and summaries which are thought to be of permanent use to the research or industrial community.

The combination of diagnosis and cure emphasized in the Karlsruhe meeting will make the resulting proceedings useful in many engineering libraries, the material being related by comment and example to design and design codes. The Fifth ICWE Proceedings will undoubtedly be added to the previous four in many libraries, for it contains valuable data on applied wind engineering topics and a few papers of fundamental interest whose essential information might not appear elsewhere. Both proceedings will be of interest to those whose research in fluid mechanics is stimulated by practical problems and to those wanting a current, though not always concise, review of activities in the subject areas involved.

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SHORTER NOTICES

Fluid Mechanics. By FRANK M. WHITE. International Student Edition, McGraw-Hill Kogakusha, Tokyo, 1979. 701 pp. £5.95

This is an undergraduate text, and, to quote from the Preface, 'The coverage is broad and diverse and contains material of interest to mechanical, civil, and aerospace engineers.' It has a practical flavour, and demands minimal expertise in mathematics. This makes for a rather long-winded treatment, in which the natural compactness and economy of mathematical expression is seldom fully exploited. The author somewhat apologetically admits to using both SI and 'British Gravitational' unit systems. Inclusion of the latter (1 slug = 14·5939 kg, etc.) will hardly endear the book to British undergraduates; the 'International Student Edition' should surely commit itself unambiguously to an international system of units!

Advances in Applied Mechanics. Volume 20. Academic Press, 1980. 235 pp. $31.50.

Professor Chia-Shun Yih has once again succeeded, as editor of this well-known series, in collecting together four authoritative and readable articles: Soliton Interactions in Two Dimensions, by N. C. Freeman; Theory of Homogeneous Turbulence, by T. Tatsumi; Thermacoustics, by N. Rott; Simple Non-Newtonian Fluid Flows, by E. Becker. The high quality established in earlier volumes of the series has been admirably maintained.

Laminar-Turbulent Transition. Edited by R. EPPLER and H. FASEL. Springer, 1980. 432 pp. DM74.

This volume contains the Proceedings of the IUTAM Symposium on Laminar-Turbulent Transition held at Stuttgart in September 1979. There are 41 papers (some in the form of extended summaries) on different aspects of linear and nonlinear stability, development of turbulent spots, etc. The subject matter remains of central importance in fluid mechanics, and this collection of papers provides a valuable survey of current activity in this field. Printing is by direct photography of authors' typescripts.

MHD-flows and Turbulence. II. Edited by H. BRANOVER and A. YAKHOT. Israel University Press, 1980. 361 pp. $33.95

This volume contains the Proceedings of the Second Bat-Sheva International Seminar, held in Beersheva in March 1978 – (for a review of this meeting, see Branover *et al.*, *J. Fluid Mech.* **91**, 563, 1979). The papers include a number on 'traditional' MHD duct flow problems, and a number on metallurgical applications of MHD. The printing is of a high standard; it is a pity, though, that the publication process was so slow.

Numerical Methods in Applied Fluid Dynamics. Edited by B. HUNT. Academic Press, 1980. 651 pp. £26.80.

This volume is based on the proceedings of a conference held at the University of Reading in January 1978, under the auspices of the Institute of Mathematics and its Applications. It contains 19 papers (14 of UK origin, 3 from France, 1 from Germany and 1 from Sweden) representing a range of numerical and computational techniques, a significant proportion using finite elements.

Thermal Energy Storage and Regeneration. By FRANK W. SCHMIDT & A. JOHN WILLMOTT. Hemisphere, 1981. 352 pp. $35.50.

This book should be useful to some engineering fluid dynamicists in that it relates to thermal stores and regenerators in which fluid motion is a major consideration. There is no doubt now that the rising cost of energy makes good thermodynamic practice generally, and regenerative systems in particular, increasingly important. The time-dependent behaviour of the interlinked systems discussed in the book is remarkably complicated even though the most primitive models of the fluid mechanics have to be used. The book is very up to date and brings together important practical ideas for the first time. It is of limited interest to persons primarily concerned with fluid mechanics proper, however.

CORRIGENDUM

Axisymmetric Stokes flows due to a rotlet or stokeslet near a hole in plane wall

by A. M. J. DAVIS, M. E. O'NEILL AND H. BRENNER
J. Fluid Mech. vol. 103, 1981 pp. 183–205

Prof. H. Hasimoto, in a communication to the editor, has pointed out that one of the velocity components in a solution given in the quoted paper, hereinafter referred to as I, becomes infinite as $\rho \to 1-$ at $z = 0$. The function χ constructed in §4 of I can, according to (4.6) and (3.9), be written in cylindrical co-ordinates as

$$\chi = -\frac{2z_0}{\pi}\int_0^\infty e^{-k|z|}J_0(k\rho)\int_1^\infty \frac{s\sin ks}{z_0^2+s^2}\,ds\,dk. \tag{C 1}$$

Thus

$$(\chi)_{z=0} = -\frac{2z_0}{\pi}\int_1^\infty \frac{sH(s-\rho)}{z_0^2+s^2}\,ds$$

$$= -\frac{z_0}{(z_0^2+\rho^2)^{\frac{1}{2}}}\left\{1-\frac{2}{\pi}H(1-\rho)\tan^{-1}\left(\frac{1-\rho^2}{z_0^2+\rho^2}\right)^{\frac{1}{2}}\right\},$$

and hence, in (4.4*b*)

$$[v^{(2)}]_{z=0} = (d\chi/\partial\rho)_{z=0} \to \infty \quad \text{as} \quad \rho \to 1-.$$

Hasimoto did a similar calculation for χ in an unpublished lecture note (1979), treating only the case of a stokeslet, and observed that the error arises from using the integrated form of the boundary condition (4.6) for χ on the solid plane. He corrected the error by subtracting from χ the harmonic function

$$\chi_0 = \frac{2z_0\xi}{\pi(z_0^2+1)}(\lambda\tan^{-1}\lambda+1), \tag{C 2}$$

where ξ and λ are oblate spheroidal co-ordinates as defined in §5 of I. This function vanishes on the solid plane and gives rise to zero velocity at infinity. Across the hole $z = 0$, $\rho < 1$,

$$\chi_0 = \frac{2z_0\xi}{\pi(z_0^2+1)} = \frac{2z_0(1-\rho^2)^{\frac{1}{2}}}{\pi(z_0^2+1)}, \tag{C 3}$$