

## The Use of Micros in Fluid Engineering

These are the proceedings of an international conference held in June 1983 in London. It was truly international in character with about half of the 25 papers originating from the UK and the remainder from abroad.

There were two sessions entitled Turbulent Flow and two entitled Data Acquisition and Logging, with one each on Solids Transport, Two Phase Flow, Control, and Hydrology and Hydraulics. The proceedings have been laid out in this fashion, but it would be wrong to assume that they are only of interest to those directly involved with the above subject areas. A number of papers have obviously had to be fitted into the most appropriate session where there has not been too close a link with the title, eg the presentation of a software package for orifice plate sizing appears under Hydrology, and a micro-computer controlled traversing system for use in a gas turbine engine is classed as Solids Transport. Taken together, however, the papers give a good overview of the type of fluid mechanics situations to which microprocessors are being applied.

In some cases the use of microprocessors was fundamental to the measuring methods described. These included two papers on the development of cross-correlation methods for application to pneumatically conveyed solids, controlling the performance of a hydrocyclone by monitoring the oil and water content of the fluid entering it, and the use of microprocessors to compensate for changes with flowrate of the calibration coefficient of flowmeters. Others involved the measurement of velocity profile and drag forces by controlling automatically the movement of a laser Doppler anemometer and a surface roughness measuring stylus, and the control of a water turbine by microprocessor-controlled water jets on the discharge side.

The majority of papers, however, described the use of microprocessors to reduce testing time or permit measurements which would otherwise have been impracticable. In some cases the application was so specific that it is unlikely that there would be many situations in which the technique used could be copied directly, eg monitoring the thermal movement of a rotating annulus of fluid, and the control of a particular facility to investigate dynamic stall on a helicopter rotor aerofoil. In others the application of microprocessor techniques to such topics as the rapid analysis of fluctuating pressure signals, the analysis and processing of the output from strain gauges on models of off-shore structures, and the acquisition of data from multiple channels in controlled time sequences, could be used as a guide for many other circumstances.

Three of the papers effectively presented computer programs for particular applications, covering the analysis of spiked crude oils, the prediction of water flow distribution in a network of pipes and the control of stormwater in areas of potential flooding. This was balanced by three which either gave details of how particular commercial hardware components could be interfaced to instrumentation or built into a complete analysis system.

The papers provide an insight into how microprocessors can be used in a range of fluid mechanics investigations or applications; the value of the proceedings is more to readers who wish to obtain this general picture than to those who seek a solution to a particular problem.

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Published price 25.00, by BHRA, Cranfield, Bedford MK43 0AJ, UK

### Books received

Heat pipes—Datamethod Manual. £50.00, pp. 130, ESDU International

*Manual comprises four ESDU Data Items (published in 1979 and 1980) covering: general background on use, design and operation; performance of common small pore wicks; and thermophysical properties of heat pipe working fluids in the operating range -60 °C to 300 °C*

Transient Two-Phase Flow, ed. M. S. Plesset, \$75.00, pp. 800, Hemisphere Publishing Corporation

Numerical Methods in Thermal Problems, Vol III, ed. R. W. Lewis, J. A. Johnson and R. Smith, pp 1300, Pineridge Press Limited

Numerical Properties and Methodologies in Heat Transfer: Proceedings of the Second National Sym-

posium, *Tien-Mo Shih*, \$69.50, pp 554, Hemisphere Publishing Corporation

Photon Correlation Techniques in Fluid Mechanics, ed. E. O. Schulz-DuBois, DM 80 (\$34.50), pp. 399, Springer-Verlag

Handbook of Fluids in Motion, N. P. Cheremisinoff, £75.00, Butterworth Group

Numerical Methods in Heat Transfer, Vol. II, ed. R. W. Lewis, K. Morgan and B. A. Schrefler, £29.75 (\$69.95), pp. 550, John Wiley & Sons Ltd

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