

CONFERENCE REPORT

9–10 June 1983, Gaithersburg, Maryland, USA

Fundamental Research Issues in Orifice Metering

One million dollars per day is the cost, estimated by the US gas industry, of 'unaccounted for natural gas' and was the motivation for the Gas Research Institute Workshop held at the National Bureau of Standards (NBS). The objective of the Workshop was to discuss the practical problems in flow measurement confronting orifice meter users and to suggest ways to achieve solutions.

In response to the spreading concern about the contribution to that million dollar figure from the uncertainty levels in the orifice-based custody transfer measurements of natural gas, this international Workshop was convened by the sponsors GRI, NBS[†] and the UK National Engineering Laboratory (NEL). The Workshop brought together a broad spectrum of fluid measurement personalities. These ranged from orifice and other instrument manufacturers and the many users of this equipment to test specialists, and from mathematicians and computer analysts to academicians whose research areas could have significant impact in obtaining better accuracies in practical orifice measurements.

Nearly 100 attended from 10 countries. After hearing general overviews from R. W. Miller of the Foxboro Company, Dr G. E. Mattingly of NBS and Professor K. N. Ghia of the University of Cincinnati, the invited attendees were split into Task Groups. These Task Groups were selected to provide a mixture of talents to discuss the flow measurement problems in using orifice metering from four different viewpoints. Half the time of the Workshop was spent in this way, the Task Groups being charged to identify how desired improvements could best be achieved. As a result they each recommended limited numbers of key projects into which available and newly-funded effort could be funnelled. These were discussed in a full assembly later on the second day when

presentations were also made to describe the various test programmes currently being carried out in the USA and Western Europe.

The combined set of priority projects, which was defined as the end-product of the Workshop, included:

- To improve the accuracy and reliability of the equipment in use to measure the differential pressure created by the presence of the orifice plate in the pipeline.
- To confirm the absolute accuracies of the laboratory calibration facilities used to validate the predicted discharge coefficients.
- To resolve the differences in the present national and international standard specifications.
- To combine experimental and numerical computer modelling to achieve better explanations of flow phenomena in the upstream pipeline and through the orifice meter.

These and other specific projects were spelled out in detail. It is felt that some could provide benefits quite quickly while others will mature in the years ahead to advance the science and practice of orifice metering.

The first target, undoubtedly, will be to halve the contribution from the measurement errors and uncertainties to the amount of 'unaccounted-for-gas'. It is anticipated that similar benefits can be gained in the UK and other industrialized nations using natural gas. Thus the resulting effects would be felt both directly, by translation into reduced gas costs to the consumer and, indirectly, by the consequent reduction in production costs.

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CALENDAR

Two-Phase Flow Metering (Course)

4–6 October 1983
Cranfield, UK

Design and Operational Problems of Turbomachinery

18–19 October 1983
Dresden, GDR

Tokyo International Gas Turbine Congress

24–28 October 1983
Tokyo, Japan

5th International Seminar on Boundary Elements

8–11 November 1983
Hiroshima, Japan

Miss A. L. Roff, Short Course Officer, Cranfield Institute of Technology, Cranfield, Bedford MK43 0AL, UK

Professor G. Schramm, Technical University Dresden, Section of Energy Transformation, 8027 Dresden, GDR

1983 Tokyo International Gas Turbine Exhibit Secretariat, Japan Convention Services Inc, Nippon Press Center Building, 2-1 Uchisaiwai-cho 2-chome, Chiyoda-ku, Tokyo-100, Japan.

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