



Project Summary

Proceedings: Seminar/Workshop on Aeration System Design, Testing, Operation, and Control

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An air aeration system seminar/workshop was held at the University of Wisconsin-Madison on August 2-4, 1982. Consulting engineers, planners, and other professionals were able to exchange information on current design, testing, operation, and control activities in the United States, Canada, and Europe. The 2-1/2-day seminar/workshop consisted of short, formal discussions on the first day and the morning of the second day, workshop sessions on the afternoon of the second day, and a wrap-up interchange on new directions on the morning of the third day. The conference, cosponsored by the U.S. Environmental Protection Agency and Environment Canada, was held primarily to define areas of agreement and disagreement concerning this rapidly-changing technology and to identify associated research needs.

The proceedings includes the 25 papers presented at the seminar/workshop, summaries of four workshop sessions, and a list of seminar/workshop participants; it provides comprehensive, current, state-of-the-art information that should be of interest to all practitioners in the field of oxygen transfer.

This Project Summary was developed by EPA's Water Engineering Research Laboratory, Cincinnati, OH, to announce the contents of the proceedings that are available in their entirety in a separate report of the same title (see Project Report ordering information at back).

Basis for Seminar/Workshop

In the last few years, substantial effort has been devoted in the environmental engineering field to the search for more energy efficient wastewater treatment systems. Since the aeration of wastewater represents one of the more energy intensive operations in wastewater treatment, research and development efforts have been aimed toward improvements in design, manufacture, testing, operation, and control of these systems. The following research and development activities and concerns (currently completed or underway) are addressed in the proceedings:

- Clean water oxygen transfer test analyses and verification
- In-process oxygen transfer test development and analyses
- Alpha factor test procedure development
- Oxygen sensor evaluations
- Fine bubble diffuser operation and maintenance evaluations
- Dissolved oxygen control strategy analyses
- Cost-benefit studies on aeration systems and aeration control
- Field-scale studies to optimize fine bubble design and operation

The major goals behind these broad-based research and development activities are to reduce aeration system energy needs and to improve criteria for sizing oxygen transfer equipment. In

extracting maximum performance from both traditional and emerging aeration approaches, four principal technical areas must be addressed: system design including specifications for compliance testing, shop and field testing, operation and related maintenance, and air supply control.

Seminar/Workshop Program

In addressing the principal areas described above, the seminar/workshop was divided into six technical sessions, presented in the following order:

1. Characteristics of aeration systems
2. Aeration system design
3. Aeration system control
4. Operation and maintenance of aeration systems
5. Testing of aeration systems
6. New directions

Session 1 included discussions of diffused, mechanical, and oxidation ditch aeration systems. In Session 2, papers were presented on translation of clean water oxygen transfer rates to dirty water performance; aeration system scale-up; aeration system design protocols in North America, the United Kingdom, West Germany, and the Netherlands; and blower design considerations. Automatic dissolved oxygen (DO) control, a suggested DO field test protocol, and calibration and evaluation of DO sensors comprised the topical discussions in Session 3. Operation and maintenance activities relative to fine bubble ceramic diffusers, aeration devices used in treating paper industry wastewaters, troubleshooting, and the operator's perspective were addressed in Session 4. Session 5 was devoted to presentations on aerator testing in clean water and under process conditions as practiced in both the United States and

Canada. Session 6 was opened up for discussion of emerging methodologies for aerator testing and design. Finally, workshop summaries on aeration system design, operation and maintenance, aerator testing, and oxygen transfer streams are included in the proceedings following the technical papers.

The full report was submitted in fulfillment of Cooperative Agreement I CR809975 by the University of Wisconsin-Madison under the partial sponsorship of the U.S. Environmental Protection Agency.

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The complete report, entitled "Proceedings: Seminar/Workshop on Aeration System Design, Testing, Operation, and Control," (Order No. PB 85-173 896/AS; Cost: \$34.00, subject to change) will be available only from:

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