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Workshop, 14th September 2001



Proceedings

Workshop

**Modern Techniques for Dams-
Financing, Construction, Operation,
Risk Assessment**

14th September 2001, Dresden

VOLUME II



Organizer
German Committee on Large Dams

In cooperation with
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Preface

Dam construction today is more than mere technique. The range of operation and influence of large dam plants has expanded during the previous years and is still experiencing further changes. High investment costs on the one hand, and long life and operation cycles on the other open up new opportunities for private financing through various models. This stimulus is mutually passed from the methods of construction through to their execution and vice versa, so that in the recent past new fascinating and innovative solutions have been proposed and realised.

Also increased requirements from outside, especially the ecological developments and extended multiple-usage have made the continuous adaptation of purpose and operation a necessity. Last but not least, as a result of public pressure, issues of security and risk minimisation for plants with high potential danger have come in the fore.

Thus, sufficient reason was given to bring these topics on to the agenda in a workshop on the occasion of ICOLD's 69th Annual Meeting in Dresden, Germany, 2001. Therefore, the workshop concentrates on the following main topics:

- construction and new technologies
- operation
- financing and risk assessment.

These proceedings contain all papers submitted for this Annual Meeting on the basis of a general invitation. We hope all participants will find these proceedings useful and inspiring to further progress on the topics covered by the workshop.

Due to this outstanding collection of papers it was a hard and thankless job for the Organizing Committee to select only a few ones for oral presentation during the workshop, although three parallel sessions have been installed. Therefore we ask for your comprehension.

The Organizing Committee wish to thank all authors who have been willing to share their knowledge and experience with other dam professionals and with their contribution made the workshop a great success.

All papers are typed by the authors according to instructions given in the call for papers. We can therefore not be held responsible for misprints or errors in the text.

Organizing Committee

August 2001



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EDER DAM, STABILISATION BY PERMANENT ROCK ANCHORS MONITORING AND LONG TERM PERFORMANCE

K. Dietz, W. Habel, I. Feddersen, Germany

In 1993/94 104 permanent grout anchors, each with a working load of 4500 kN were installed at the Eder Dam, Germany to improve the over all stability. Such high anchor loads need a detailed long term performance monitoring system. For the first time fiber optic sensors were equipped in the fixed anchor length to measure the load transfer in the rock. The report informs about this measurement system and the results of the monitoring. The measured displacements are compared with the values of anchor gauges and lift-off tests.

BARRAGES - SMALL HYDROPOWER STATIONS -

H. Erdmannsdoerfer, Germany

Although barrages retain water volumes too large for small scaled hydro there are reasonable approaches in individual cases concerning the use of small hydro stations for large dams.

Various examples of Europe, Asia and South America are referred to for demonstrating how units of small nominal outputs (< 1,000 kW) may reasonably be used for tasks like the basic supply, but above all for discharge flow regulation.

As power engine the Ossberger® Turbine is outstanding here. The simple control system, well adapted to the requirements of small-sized hydro stations, means another point of consideration.

HANDLING 45-m THICK ALLUVIUM PROBLEM IN SEYMAREH DAM PROJECT

S. A. Etesami, Iran

45m thick fine grain alluvium layer overlying the foundation bedrock of Seymareh dam required special consideration in order to maintain safety and cost effectiveness. To observe the unexpected unfavorable conditions of the alluvium , the design of diversion system including diversion tunnels , u/s and d/s cofferdams, as well as excavation of dam foundation pit had to be revised.

Various alternative designs were examined while in parallel, extensive exploratory investigations carried out. Using rather sophisticated analysis procedures, taking into account time dependent and nonlinear behavior of the soil , led to a final design which is simple and cost effective.