## 2nd International Conference DAM SAFETY EVALUATION

November 26-30, Trivandrum, India

## SELECT PAPERS

**Editors** 

C.V.J. VARMA A.R.G. RAO

Central Board of Irrigation and Power

New Delhi

ommittee for International Commission on Large Dams (India)



A.A. BALKEMA/ROTTERDAM/1997

## CONTENTS

규칙하스러	word Committees	iii Viii
	KEYNOTE ADDRESS AND THEME PAPERS	1
1.	Experience of World Bank in Implementation of Dam Safety P.N. Gupta	3
2.	Design of Review of Dams, Spillways and Strengthening Measures  N. Visvanathan and C.R. Venkatesha	9
3.	Automation of Flood Forecasting and Flood Warning System G.L. Java	27
4.	Instrumentation of Existing Dams E. Sundaraiya	39
5.	Seismic Aspects of Dam Safety  E. Sundaraiya and R. Devasahayam	51
6.	Research Needs in Dam Safety E. Sundaraiya and R. Devasahayam	77
	THEME I: DESIGN REVIEW OF DAMS, SPILLWAYS AND STRENGTHENING MEASURES	87
1.	Dispersibility Tests for Dolomite Used as Core Material Abdul Rehman Kh. Salem	89
2.	Assessment of Concrete Dams Reliability E.S. Kalustian	95
3.	Dam Surveillance and Safety in Sri Lanka H.B. Jayasekara and N.T.K. Munasinghe	103
4.	Uncertainty in the Safety Evaluation of Dams: The Floating Factor of Safety Harald Kreuzer	109
5.	National Performance on Dams Program  Martin W. McCann, Jr.	117
6.	Management of Dam Safety in Yugoslavia Omilj Markovic, Zivota Nikolic and Ninkovic	129
7.	Safety Improvement and Cost Savings in Flood Control Francois Lemperiere	141
8.	Upgrading Spillways for Extreme Floods with Fusegates System—the Shongweni Dam—A Case Study  Julien Rayssiguier	151

9.	Optimizing Flood Release at Cheruthoni Spillway Christian Guillaud, Michel Tremblay and B. Raveendran	161
10.	Hydrological Safety of Dams W.L.H.M.T. Bandara and K.A.U.S. Imbulana	171
11.	Dam Safety Measures in Flood Periods: Review of Standing Orders of Gal Oya Scheme, Sri Lanka H.A. Wijedasa	183
12.	Dam Safety A.D.M. Penman	193
	THEME II : REHABILITATION OF DAMS IN DISTRESS INCLUDING SEEPAGE CONTROL	205
1.	Rehabilitation of Warsak Hydroelectric Project, Pakistan Izhar ul Haq and Manzoor Ahmad	207
2.	Rehabilitation of Akungtien Reservoir in Taiwan Chun-Chung Chen and Wen-Sheng Liang	217
3.	THE ICOLD Committee on Rehabilitation of Dams G.P. Sims	225
4.	Dobeckot Epoxy System — A Solution to Rehabilitation of Dams and Other Hydraulic Structures  R.S. Salunke and V.C. Bhuskute	233
5.	Arresting Seepage in Reservoirs S.H.C. de Silva	239
6.	Synthetic Flexible Membranes as Remedial Measure against Seepage: Development of a Technology A.M. Scuero and G.L. Vaschetti	251
	THEME III: AUTOMATION OF FLOOD WARNING SYSTEM	477
1.	Flood Forecasting as a Tool in Dams Safety Assurance — A Case Study R. Jeyaseelan, M.R. Verma and Ashok Kumar	265
2.	Flood Warning System in Nilwala Ganga in Sri Lanka  B.K. Jayasundera	273
	THEME IV : MONITORING ASPECTS OF DAM SAFETY— INSTRUMENTATION AND SEISMICITY	281
1.	Instrumentation of 1000 Years Old Fariman Dam H. Abbas, M.E. Omran and A. Mohammadzadeh	283
2.	Kariba Instrumentation — An Update  D.Z. Mazvidza, K. Gurukumba and H. Mukupe	291
3.	Stability Analysis of Dams and Embankments During Earthquakes	301

4.	An Investigation into the Base Sliding Response of Concrete Gravity  Dams to Dynamic Loading  R.A. Mir and C.A. Taylor	307
5.	Mathematical Models for the Safety and Performance Evaluation of Arch Dams under Seismic Actions  J.O. Pedro, R.C. Camara and S.B. Oliveira	319
6.	Dynamic Stability Evaluation of Existing Embankment Dams Ashok K. Chugh	329
7.	Earthquake Analysis of Concrete Gravity Dams on Jointed Rock Foundations J.V. Lemos, P.A. Cundall and B. Dasgupta	339
8.	Methodology for Seismic Reliability Assessment of Outlet Operations at Dams  Martin W. McCann, Jr.	351
	THEME V: CASE STUDIES	363
1.	Shishmanov Val Dam — An Example for Getting Information About the State of the Dam and for Assessing the Necessity of Strengthening Measures D. Milevski	365
	Practice for Long Term Safety of Idukki Arch Dam N. Feknous, R. Simard, T. Turner and V.M. Valsalan	371
3.	Statistical Analysis in Real Time of Monitoring Data for Idukki Arch Dam Luc E. Chouinard, B.A. Nedushan, N. Feknous and B. Sesha	381
4.	Mahabad Earth-Rockfill Dam, Problems, Safety and Anticipated Remedial Measures M. Seid-Karbasi	387
5.	The Significant Role of Microgeodesy (Precise Geodetic Survey) in the Monitoring and Evaluation of Karun-I Dam Safety after the Crash of Its Spillway in 1993  A.A. Jalalzadeh, C. Fouladi and M. Mirzaiee	399
6.	Hydro-Electric Development Schemes on the Zambezi River, the Batoka Case  M.J. Tumbare and C.M. Tsokodayi	413
7.	Activities On and Around the Lake Kariba: Their Impact on the Lake and Environment S. Mukono and B.C. Mulendema	425
	THEME VI: DAM SAFETY - RESEARCH NEEDS AND LEGISLATION	435
1.	Problems in Safety Evaluation of Concrete Dams: Need for Research M.E. Omran and H. Abbas	437
2.	Safe Charge of Blasting in Close Proximity to Old Dams R.B. Singh, M.M. Singh and B.B. Dhar	445
	INDEX OF CONTRIBUTORS	457