

Table of Contents

Preface – ALAIN SELLIER, ÉTIENNE GRIMAL, STÉPHANE MULTON, ÉRIC BOURDAROT	ix
Chapter 1. International Context	1
A Review of the Effectiveness of Strategies to Manage Expansive Chemical Reactions in Dams and Hydro Projects – ROBIN CHARLWOOD, IAN SIMS	3
Swelling Dams in Switzerland – FRANCESCO AMBERG, ROGER BREMEN, PATRICE DROZ, RAPHAËL LEROY, JOHANNES MAIER, BASTIAN OTTO	40
Chapter 2. Physico-Chemical Mechanisms. Experimental Test	53
Behavior of Concrete Deteriorated by ASR under Triaxial Load ADRIEN HILAIRE, ALAIN B. GIORLA, CYRIL DUNANT, LIONEL SOFIA, KAREN SCRIVENER.	55
Importance of Alkali-Wrapping for CPT – KAZUO YAMADA, YUICHIRO KAWABATA, SHOICHI OGAWA, KENGO HAGA, YASUTAKA SAGAWA, T. OCHIAI	68
Structures Damaged by ASR and DEF: Improving the Prognosis of Structures Damaged by Expansive Concrete with Physico-Chemical Modelling STÉPHANE MULTON, ALAIN SELLIER, ÉTIENNE GRIMAL, ÉRIC BOURDAROT	80
Can Certain Alkali Minerals Explain the Slow Reactivity of Granitic Aggregates in Dams? – ANTONIO SANTOS SILVA, ISABEL FERNANDES, ANA RITA FERRAZ, DORA SOARES.	93
Experimental Study on Effects of Aggregates Mineralogical Composition and Preservation Conditions on DEF in Concrete – MARIE MALBOIS, LOIC DIVET, STÉPHANE LAVAUD, JEAN-MICHEL TORRENTI	106

The Identification, Extent and Prognosis of Alkali-Aggregate Reaction Related to Existing Dams in Switzerland – RUSSEL MICHAEL GUNN, KAREN SCRIVENER, ANDREAS LEEMANN	117
Experimental Evidence for the Link Between Aggregate Degradation and Expansion and the Formulation of the Microstructural Model CYRIL DUNANT, KAREN SCRIVENER	144
A Robust Testing Protocol for the Assessment of ASR Reactivity of Concrete LIONEL SOFIA, THEODORE CHAPPEX, CYRIL DUNANT, KAREN SCRIVENER	153
Chapter 3. Structural Modeling	161
Modeling of Environmental Conditions and their Impact on the Expansion of Concrete Affected by the Alkali–Silica Reaction – YUICHIRO KAWABATA, KAZUO YAMADA, SHOICHI OGAWA	163
Nonlinear Finite Elements for the Assessment of Hydraulic Concrete Structures Affected by Alkali-Aggregate Reaction: A Study Case MAHDI BEN FTIMA, PIERRE LÉGER, FATEH BOUSSAHA	176
Macro-Modelling of AAR-Affected Hydraulic Structures: Assessment of Parameters Influencing the In-Situ Concrete Growth VLADIMIR GOCEVSKI, EMRE YILDIZ	188
AAR and DEF Structural Effects Modelling – ÉTIENNE GRIMAL, PIERRE MORENON, ALAIN SELLIER, STÉPHANE MULTON, ÉRIC BOURDAROT	203
Swelling Effects in Fagilde Dam (Portugal): First Approach to Structural Analysis and Interpretation – JOSÉ PITEIRA GOMES, ANTONIO LOPEZ BATISTA, S.P.M. SOUSA	218
Expansions in a Concrete Dam with Bridge over Spillway in South America: Case Study with Expansions of Different Origin – ANA BLANCO, SERGIO H.P. CAVALARO, IGNACIO SEGURA, LUIS SEGURA-CASTILLO, ANTONIO AGUADO	235
Modeling Concrete Expansions via Coupled C-M Mesoscale Analysis with Zero-Thickness Interface Elements, and Lab Experiments IGNACIO CAROL, JOAQUIN LIAUDAT, CARLOS M. LÓPEZ	248
Chapter 4. Dams and Hydraulic Structures Applications.	
Remedial Works	261
Numerical Analysis of AAR Affected Structures with Slot-Cuts: Finite Element Analysis Using Explicit Scheme – VLADIMIR GOCEVSKI, EMRE YILDIZ	263
Swelling Arch Dams with Thrust Blocks – GRÉGORY COUBARD, JÉRÔME SAUSSE	277

Bimont Dam Case: Studies and Investigations Inside the Dam Body CHRISTINE NORET, KATIA LALICHE	289
Chambon Dam: A Struggle against AAR – OLIVIER CHULLIAT, ÉTIENNE GRIMAL, ÉRIC BOURDAROT	305
Chapter 5. Long-Term Behavior. Risk Reduction	319
The Diagnosis and Prognosis of ASR and ISR in Miranda Dam, Portugal JOÃO CUSTÓDIO, JOSÉ ILÍDIO FERREIRA, ANTONIO SANTOS SILVA, ANTÓNIO BETTENCOURT RIBEIRO, ANTÓNIO LOPES BATISTA	321
Long-Term Behaviour of EDF Dams Regarding Concrete Swelling Structures: Synthesis of Monitoring Data Over Time – THIERRY GUILLOTEAU, FRANÇOIS MARTINOT, JÉRÔME SAUSSE	338
Important Lessons Learnt from the Proper Surveillance of Swelling Concrete LOUIS CHRISTIAN HATTINGH, CHRIS OOSTHUIZEN, ILIDIO TEMBE, C.N. MAHLABELA	352
Index of Authors	367