

# **DAM SAFETY GUIDELINES**

## **2007**

(2013 Edition)



Canadian Dam Association  
Association Canadienne des Barrages  
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# PREFACE TO 2013 EDITION

*Dam Safety Guidelines 2007* (2013 edition) results from a review and revision to Sections 6.1, 6.2 and 6.3 of the publication issued in 2007. The only changes from the 2007 edition are contained in this Preface and Sections 6.1, 6.2 and 6.3 and are marked in the right-hand margin. Other material in *Dam Safety Guidelines 2007* remains unchanged.

CDA members have requested additional guidance on Sections 6.2 and 6.3 of the CDA *Dam Safety Guidelines 2007*. The 2007 version referred to both Risk-Informed and Traditional Standards-Based Approaches to dam safety assessments, without comment on their relative merits. In this 2013 revision, the CDA clarifies its endorsement of the use of a risk-informed approach, which includes traditional deterministic standards-based analysis as one of many considerations. CDA accepts that there are fundamental weaknesses in both approaches. Issues with the risk-informed approach include current challenges in the characterization of the hazard, the dam system performance, and the consequences. The traditional standards-based approach not only shares these difficulties but has a number of additional significant limitations. Of particular concern are:

- Focus on extreme natural hazards in isolation, which can lead to preferentially implementing expensive solutions that may not necessarily improve the safety of the dam over that which could be achieved by other more economical means
- Inability to define standards for a number of dam failure modes, which may lead to inappropriate or misleading assessment of safety

There are also other recognized difficulties in the application of the 2007 version of Sections 6.2 and 6.3. For example, selection of the level for seismic annual exceedance probability “must be justified to demonstrate conformity to societal norms of acceptable risk.” Resolution of this and other difficulties will require extensive discussions at a societal and governmental level, to answer the question of how safe new or existing dams should be. The CDA, as a non-governmental organization, does not in any way consider this question to be their responsibility; however, it recognizes that guidance is required in the interim until such larger issues are resolved.

There are many instances where the prevailing capability and resources of dam owners will preclude the use of a comprehensive risk-informed approach. Continued use of a standards-based approach is inevitable in these cases, with appropriate additional conservatism. A standards-based approach may be appropriate for certain elements of dam design and assessment. The CDA has identified the need for continued development and acceptance of the risk-informed approach. The revised Sections 6.1, 6.2 and 6.3 should be considered interim guidance, to be used until the above difficulties are addressed over time.

# PREFACE TO 2007 EDITION

Dams in Canada are owned by utilities, mining companies, pulp and paper companies, various levels of government, and private owners. Regulation of dam safety in Canada is primarily a provincial responsibility; some provinces have enacted specific dam safety regulations, while others use existing Acts or regulations to authorize the design, construction, inspection, operation, rehabilitation, alteration, or decommissioning of dams. Federal agencies have jurisdiction over some aspects of dam safety related to international boundary waters covered by treaty with the United States. The federal government also has some responsibility for security of critical infrastructure which includes many dams. In any case, legal regulations take precedence over guidelines produced by nongovernmental organizations.

In 1995, after three years of effort by working groups across the country, the Canadian Dam Safety Association published *Dam Safety Guidelines*. In 1999, the Canadian Dam Association (CDA) issued a revised version. In 2003, the CDA began soliciting input and suggestions for revisions and additions through the Internet and workshops across the country. *Dam Safety Guidelines* is a product of the CDA members, and a large number of individuals contributed to it.

*Dam Safety Guidelines* consists of

- *Section 1, principles that are applicable to all dams*—The principles should be understood by dam owners, regulators, managers, operators, and other interested parties. The brief explanatory text outlines, in general, how conformance with the principles could be demonstrated.
- *Sections 2–6, guidelines that outline processes and criteria for management of dam safety in accordance with the principles*—The guidelines are of interest to dam owners, regulators, managers, operators, and other decision-makers, as well as engineers and consultants.

The CDA also publishes a separate companion series of technical bulletins on dam safety. The technical bulletins suggest methodologies and procedures for use by qualified professionals as they carry out dam analyses and safety assessments. The technical bulletins are of particular interest to professional engineers involved in dam engineering.

The responsible dam safety engineer or decision-maker must assess and interpret the information provided in *Dam Safety Guidelines* and the technical bulletins, identify any considerations not addressed by those documents, and determine the appropriate dam safety requirements for a specific situation.

The CDA intends to review and update *Dam Safety Guidelines* and the technical bulletins as the need arises. While every reasonable effort has been made to ensure the validity and accuracy of the published information, the CDA and its membership disclaim any legal responsibility for use of *Dam Safety Guidelines*.