PROCEEDINGS

INTERNATIONAL DAM BREACH PROCESSES WORKSHOP

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

USDA

ars Agricultural Research Service

STILLWATER, OKLAHOMA
MARCH 10-11, 1998

Proceedings, International Dam Breach Processes Workshop, 10-11 March 1998, Stillwater, Oklahoma

Co-hosted by the U.S. Department of Interior, Bureau of Reclamation, and the U.S. Department of Agriculture, Agricultural Research Service

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SUMMARY

The International Dam Breach Processes Workshop was held in Stillwater, Oklahoma, at the USDA, Agricultural Research Service Plant Science and Water Conservation Research Laboratory on March 10 and 11, 1998. The purposes of the workshop were:

1. Exchange technical information related to dam breach processes and ongoing research in the area,
2. Gather input from users as to what they perceive as research needs, and
3. Coordinate research efforts and investigate the possibilities for cooperation in the performance of needed research.

Attendees represented interested parties from both the public and private sector within the United States, Europe, and Canada.

The primary focus of the workshop was the breach of earth embankment dams. However, related topics of flood routing procedures, emergency action planning, social implications of dam failure, and the failure processes associated with concrete structures were also discussed.

Although the group did not arrive at any explicit plan of action, there appeared to be a general consensus among the participants on several issues. These included:

1. The need for an improved understanding of the dam breach processes crosses national boundaries, and efforts should be made to keep the paths of communication open so that all benefit from ongoing research efforts.

2. There is a need to better understand and quantify the times associated with breach initiation and breach formation for earth embankment dams. Definitions for these times discussed during the workshop were:

   Breach initiation time - *the duration of time, beginning with the first observable flow over or through a dam that might initiate warning, evacuation, or heightened awareness, and ending with the start of the breach formation phase.*

   Breach formation time - *the duration of time between the first breaching of the upstream face of the dam until the breach is fully formed. For overtopping failures the beginning of breach formation is after the downstream face of the dam has eroded away and the resulting crevasse has progressed back across the width of the dam crest to reach the upstream face.*

3. Much valuable information is available from embankment failures that continue to occur each year, but it is often lost because local authorities have other pressing needs during a crisis, and are not aware of the type of data that would be of most use to dam breach researchers. The formation of a standing forensic team that could promptly investigate incidents of dam failure and dam survival of extreme events (e.g., overtopped but not failed) would be extremely valuable.

4. In order to better predict earth embankment dam breach behavior, the various modes of breach such as piping and erosion due to overtopping need to be studied and evaluated separately.

5. The primary benefits of improved prediction of breach initiation and formation times will accrue to those within a few kilometers of the structure, but this is also the region which historically has the greatest risk for loss of life.

6. Improvements in breach modeling technology may significantly aid in risk assessment studies, where thresholds of failure and probabilities of failure are of interest, as well as consequences of dam failure.

7. The potential for interagency cooperation exists and should be evaluated further. The potential for international cooperation may exist at some point in the future.

The technical information exchanged during the workshop stimulated numerous ideas for potential research approaches.

WORKSHOP SCHEDULE

	TOPIC	SPEAKERS
March 10, 1998 - State of the Art in Dam Breach Mechanics		
8:00-8:15 am	Welcome & Introductions	*Jim Webster and Darrel Temple, USDA-ARS; Phil Burgi, USBR*
8:15-8:30 am	Introduction/Scope/Objectives	*Darrel Temple, USDA-ARS*
8:30-9:00 am	NWS-BREACH model	*Danny Fread, NWS*
9:00-9:30 am	Breach parameter prediction methods; need for and potential benefits of improved breach models	*Tony Wahl, USBR*
	— BREAK —	
10:00-10:30 am	Historical work on headcut erosion modeling	*Greg Hanson and Kerry Robinson, USDA-ARS*
10:30-11:00 am	Overtopping protection and large riprap testing	*Kathy Frizell, USBR, and Jim Ruff, CSU*
11:00-11:30 am	Discussion	
	— L U N C H —-	
1:00-1:30 pm	Piping and seismic liquefaction breaches	*Dave Gillette, USBR*
1:30-2:00 pm	USDA-ARS ongoing research on headcut erosion and embankment breach	*Temple and Hanson, USDA-ARS*
2:00-2:30 pm	Open discussion of importance and priority of focusing research on various breaching modes	*Moderator: Temple, USDA-ARS*
	— BREAK —	
3:00-3:30 pm	NATO Project - Dam-Break Flood Risk Management in Portugal	*Prof. António Betamio de Almeida, Laboratorio National de Engenharia Civil, Portugal*
3:30-4:00 pm	The EC Concerted Action on Dam-Break Modelling (CADAM)	*Mark Morris, HR Wallingford*
4:00-4:30 pm	Open discussion of ongoing research	

March 11, 1998 - Needs from a User/Owner/Regulator Perspective

8:00-8:30 am	NRCS needs	*Bill Irwin, NRCS*
8:30-9:00 am	FERC perspective	*Ken Fearon and Wayne King, FERC*
9:00-9:15 am	EDF needs in the field of dam breach processes	*Jean-Charles Galland, Electricité de France*
9:15-9:30 am	Discussion: Needs from regulator/owner perspective	
	— BREAK —	
10:00-10:30 am	Integration with risk assessment process	*Wayne Graham, USBR*
10:30-11:00 am	Breach modeling needs from a consulting engineer's viewpoint	*Dave Froehlich, Parsons-Brinkerhoff*
11:00-11:30 am	Discussion: Research needs and opportunities for future collaboration	
	— L U N C H —-	
1:00-4:30 pm	USDA-ARS lab facilities tour and review of ongoing embankment breach research at the Stillwater lab	

PRESENTATION SUMMARIES

Presentation summaries were provided by the authors following the workshop. These summaries were edited as required for compilation in the pdf format using available software. Questions regarding these presentation summaries should be addressed directly to the authors. A list of participants, including address information, is provided following the presentation summaries.

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