Book review

ICOLD Bulletin 148: Selecting Seismic Parameters for Large Dams – Guidelines (Revision of Bulletin 72)

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International Commission on Large Dams (ICOLD) Bulletin 72 (*Selecting Seismic Parameters for Large Dams*) was published in 1989 under the chairmanship, first of Professor Roy Severn and then of Professor Bozovic. This document served well for more than 20 years but, in a rapidly advancing field, was superseded in 2010 by Bulletin 148.

The old Bulletin 72 defined terms such as maximum design earthquake (MDE), operating basis earthquake, reservoir-triggered earthquakes, construction earthquake and design earthquakes for appurtenant structures.

For the MDE Bulletin 72 said

For dams where failure would present a great social hazard the MDE will normally be characterised by a level of motion equal to that expected at the dam site from the occurrence of a deterministically evaluated MCE or of the earthquake determined using probabilistic procedures such as specifying 50% or higher probability of not being exceeded in a large number of years.

The committee responsible for the drafting of the new bulletin was happy with the term 'a great social hazard', implying the presence of towns or cities downstream, but were concerned that the phrase 'a large number of

Figure 1. The Zipingpu dam after the Wenchuan earthquake.

Figure 2. Power station damaged by falling boulders

years' was too vague. The new bulletin introduced the safety evaluation earthquake to replace the MDE and specified that this should be equivalent to the maximum credible earthquake (MCE) or to 'the probabilistically evaluated earthquake ground motion with a very long return period, for example, 10 000 years'.

The above changes may appear subtle but are designed to reduce the, already low, risk of seismic failure of a large dam with thousands of people downstream.

The table on Page 39 in Bulletin 72 for categorising dams was reproduced as Table 2 in the 1991 UK Seismic Guide. The new bulletin provides more guidelines on the definition of the design earthquake and the like, with the definitions of consequence class unchanged, and retained as given on page 39 of Bulletin 72. The bulletin contains material on reservoir-triggered seismicity but this subject is more fully treated in Bulletin 137 (reservoirs and seismicity)

While drafting the new bulletin several members of the committee travelled to China in 2009 to inspect damage sustained in the Magnitude 8 Wenchuan earthquake of 12 May 2008. Figures 1 and 2 show some of the damage sustained. Many small earth dams were damaged together with four dams with a height exceeding 100 m. Although no dam failed, the Wenchuan earthquake has clearly shown that dams in seismic areas must be designed to withstand strong earthquakes. It also showed the damage that can be caused to power plants by boulders falling from the hillsides.

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