



## **Zipingpu Concrete Face Rockfill Dam Failures caused by the 8.0R Earthquake on the 12th May 2008 (Chengdu, China)**

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The 8.0R earthquake that struck Sichuan on the 12th of May 2008, in the district of Chengdu of Southern China resulted in tenths of thousands casualties, the complete destruction of many towns and extended damages to public works. The earthquake was triggered by a reverse fault of NE-SW trend, more than 100 km long, that divides morphologically the affected area in two sections, the eastern one with mild low topography and the western one with intense relief representing the boundary of Tibet Mountains.

This mountainous section is characterized by a rich drainage network that drains the greater region of the Tibet plateau. Along the trace of this high-stand for thousands of years numerous hydraulic works have been attempted in order to manage the water supply.

Especially during the past decades, 400 small and large dams have been constructed. The main dam is the Zipingpu dam. It is a Concrete Face Rockfill Dam (CFRD) that has a height of 150m, a capacity of 1.2 billion m<sup>3</sup> and includes a hydroelectric plant of 3.4 billion Kwh power.

The Zipingpu dam is located 10km east of the earthquake epicenter and after the earthquake of 8.0R, the following failures were recorded: (i) Subsidence of the crown in the central part of the dam, of the order of 50cm in relation to the side survey control points, (ii) Deformation of the lower face of the dam, an area of approximately 1000 m<sup>2</sup>, (iii) Deviations and deformations of the construction elements throughout the face of the dam, (iv) Widening of construction joints (approximately 15 cm on the upper face), (v) Extended massive landslides throughout the reservoir, and (vi) Landslides on both left and right abutments of the dam causing further damages to secondary constructions.

After the evaluation of the dam damages, the discharge of the reservoir was ordered through the emergency spillway in order to minimize the risk of a potential disaster for the nearby towns and especially Dujiangyan. Finally, the causes of the failures are investigated based on the available data.