

ROBUSTNESS AND CONSEQUENCE BASED ASSESSMENT OF AN EXISTING DAM

Valerio De Biagi¹
Bernardino Chiaia, Professor²
Alessandro Calvi³
Francesco Fornari⁴

ABSTRACT

Robustness plays a relevant role in the capacity of a structure to sustain abnormal loads or to deal with unexpected events with large effects, such as explosions and terroristic attacks. Such situations on dams may have extremely large consequences. For buildings, the design approach that best implements robustness concepts is represented by the so called “Consequence Based Design”: even if nothing is known about the cause, selective element removals and extreme load on the structure are modeled, and their effects are determined with respect to progressive collapse and damage arrest.

In the paper we try to set-up a “Consequence Based Assessment” of a typical example of a gravity dam built between the ‘30s and ‘40s of the last century in the northwestern Italian Alps. A simplified model of the structure is adopted. Removal of parts of the dam cross-section is assumed to occur: the effects of the extent of damage is discussed on the bases of the tension generated within the body of the dam.

¹ Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, C.so Duca degli Abruzzi, 24 – 10129 Torino – ITALY, valerio.debiagi@polito.it

² Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, C.so Duca degli Abruzzi, 24 – 10129 Torino – ITALY, bernardino.chiaia@polito.it

³ ENEL Production S.p.A, Dams and hydraulic infrastructures safety, C.so Regina Margherita, 267 – 10143 Torino – ITALY, alessandro.calvi@enel.com

⁴ ENEL Production S.p.A, Dams and hydraulic infrastructures safety, C.so Regina Margherita, 267 – 10143 Torino – ITALY, francesco.fornari@enel.com