

EDP's hydroelectric activity in Portugal. New projects and the hydraulic-operational safety control of the existing dams

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ABSTRACT: EDP – Energias de Portugal, S.A. is a major European operator in the energy sector, one of the largest in the Iberian Peninsula, the largest Portuguese industrial group and the third worldwide largest producer of wind energy. EDP has a significant presence not only in the electricity sector - generation, distribution and trading – but also in the gas sector in the Iberian Peninsula.

In 2007 the company initiated an ambitious hydroelectric construction program in Portugal comprising five repowering projects and four new schemes, which includes the construction of seven dams and eleven powerhouses and the installation of seventeen generation units, eleven of which are reversible.

In the first part of this communication, after a brief reference to the strategic importance of hydroelectricity in Portugal and the rationale for the growth program undertaken by EDP, a general description of the mentioned projects will be presented.

Besides the construction of new schemes, safety of the existing dams has always been a matter of special concern for EDP.

The hydroelectric power generation system of EDP, in Portugal, includes more than 50 dams in operation, which cover virtually all the structural types and a wide range of heights and reservoirs volumes, built from the end of the 1920's to the beginning of the 2000's. The design and construction of 43 of such dams were concluded before the publication of the new Portuguese Dam Safety Legislation (PDSL), in the beginning of the 1990's.

In order to meet the requirements of the PDSL in what concerns the hydraulic-operational safety assessment of each of these 43 existing dams, EDP defined and implemented, from the end of the 1990's, a wide program of studies and measures. This program comprises two phases:

- The first one includes the review of the extreme flood scenarios, a suitability analysis of discharge devices and the outline of eventual corrective structural or nonstructural measures;
- The second phase, undertaken after approval of the previous one by the Portuguese Water Authority, consists in the design and/or implementation of the envisaged corrective measures.

These studies were already developed for 31 of those dams. Regarding spillways suitability, non-structural corrective measures were proposed for 16 dams and corrective structural for other 8 dams. The most relevant of these corrective structural measures refer to the Paradela, Salomonde and Caniçada dams, in each of them it was found to be necessary to construct a new spillway to complement the existing discharge capacity.

In the second part of this communication, after a short reference to the main conclusions of the above mentioned hydraulic-operational safety control studies, special emphasis will be done to the main features of the complementary spillways designed and already constructed (Paradela and Salomonde) or under construction (Caniçada).

Keywords: Hydroelectric schemes, dams, spillways, hydraulic-operational safety assessment.