

SEVEN YEARS OF CONTINUOUS DYNAMIC MONITORING OF BAIXO SABOR DAM

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Abstract

The Baixo Sabor dam is a 123 meters high concrete arch dam located in the north of Portugal. After the performance of a forced vibration test, a quite unique experimental programme was initiated in the dam during the first filling of the reservoir, with the installation of a continuous dynamic monitoring system in December 2015. The implementation of such a system aimed to study the evolution of the dam's dynamic behaviour during the first filling, as well as to monitor its condition in the long-term through the development of vibration-based damage detection supported by robust operational modal analysis.

After a description of the dam and the monitoring system, this paper presents an overview of the tools developed to perform the automated tracking of the dam's modal parameters. Finally, using the database collected during the last seven years, the long-term evolution of the dam dynamic parameters is analysed, and their seasonal fluctuations interpreted. The eventual occurrence of structural anomalies is evaluated after the minimization of the most influential operational and environmental effects on the dam, such as temperature and the reservoir water level.

Keywords: operational modal analysis; continuous dynamic monitoring; dam monitoring; minimization of operational conditions; structural health monitoring.
