
Swelling effects in Fagilde dam (Portugal). First approach for structural analysis and interpretation

J. Piteira Gomes*, A. L. Batista*, S. P. M. Sousa**

** LNEC – National Laboratory for Civil Engineering*

Av. do Brasil, 101, 1700-066 Lisboa, Portugal

pgomes@lnec.pt

a.l.batista@lnec.pt

*** FCT/UNL – Faculty of Sciences and Technology, New University of Lisbon*

Campus da Caparica, 2829-516 CAPARICA, Portugal

sp.sousa@campus.fct.unl.pt

ABSTRACT. The Fagilde dam is affected by concrete swelling reactions, of the ISR type, which induced serious damage in the dam's body, namely cracking. The structural modeling is supported by the monitoring results and the results of the preliminary tests for the diagnosis of the swelling reactions. A first approach for the structural analysis of dam is presented, done in order to obtain a general overview of the spatial heterogeneous expansion development, that should be considered as a necessary first step for the parameters estimation to be used in the next computations, with damage models to simulate the concrete cracking. However, a reasonable agreement between the results obtained numerically with those measured by the monitoring system was found. A great influence of the swelling effects on the dam's behavior is shown. Nowadays, serviceability and safety conditions of the dam are still acceptable.

KEYWORDS: Concrete dams, Swelling processes, Structural modeling, Structural effects, Safety control
