NUMERICAL ANALYSIS OF PORE WATER PRESSURE CHANGES OF AN EARTH DAM AND MONITORING OF VERTICAL DEFORMATIONS. CASE STUDY - PLOPI DAM, IASI COUNTY

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Abstract

Numerical analysis of pore water pressure changes and the evolution of vertical deformations are the main aspects of the behaviour monitoring of an earth dam. This study analyzed the main aspects of the behaviour monitoring of the Plopi Dam, built on the Gurguiata River, in the northwest of Iași County, Romania. The main data taken into consideration are the dam body's type and material, the foundation's soils, and the dam's monitoring equipment. For tracking the evolution of the pore water pressure, 12 piezometers are used. The Plopi Dam is equipped with 19 piezometers, of which 9 piezometers (marked with B) show the route of the infiltration curve through the dam body and 10 piezometers (marked with F) have the bottom level in the base of the foundation and record the variation of groundwater levels in the aquifer. The paper presents the pore-pressure ratios in embankment material throughout its existence, mainly in the last 12 years, and the influence of external stresses on the hydrostatic levels. Data obtained for a period of 45 years (1978-2023) from 11 landmarks, placed on the dam canopy, were used in the settlement analysis of the embankment The filling in the dam body is still being consolidated, the settlements are significant, the pore pressures are high, so the monitoring of the dam's behaviour is done continuously so that the dam is safely exploited.

Key words: dam, pore pressure, hydrostatic level, settlements, consolidation