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Deformation law and stability state of cofferdam during pumping process in PC combined method pile cofferdam

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ABSTRACT

Cofferdam is a key component of the containment system during the construction period. In order to ensure the quality and safety of underground open cut structure projects in China, and to strongly promote the development and progress of similar underground engineering cofferdam technology such as open cut lake tunnels, this paper takes the Jinji Lake tunnel cofferdam project as the basis, and conducts a study on the deformation law and stability state of PC combined method pile cofferdam support structure during the whole process of weir pumping construction combined with field monitoring analysis. The results show that: (1) with the continuous pumping and slope excavation, the overall structural deformation of the cofferdam tends to move more and more towards the inner side of the cofferdam; (2) during the construction process, the horizontal displacement values of the pile tops on the waterward and backward sides of the cofferdam do not differ much; and the maximum horizontal displacement value of the pile body on the waterward side does not differ much from the horizontal displacement value of the pile top, but on the backward side differs significantly. (3) During the pumping process in the weir, the maximum horizontal displacement of the piles on both sides of the weir basically appears near the bottom of the lake. The study reveals the asymmetric deformation law of the piles on both sides of the weir, which provides reference for similar projects of PC combined method pile cofferdam.

Keywords: PC combined method pile cofferdam; Deformation law; Stability; Finite element simulation; Field monitoring

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