

Natthawuth Inmala 2010: Seepage Model Analysis for Risk Index Method from Visual Inspection of Roller Compacted Concrete During Initial Impounding Case Study: Khun Dan Prakarn Chon Dam. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Suttisak Soralum, Ph.D. 343 pages.

Since there is no system for inspection and safety evaluation practice of Roller Compacted Concrete (RCC) dam, this study proposes a guideline for visual inspection and risk evaluation of RCC dam by risk index method. The Khun Dan Prakan Chon Dam was used as a case study, which includes 2 two dams namely, RCC-B and RCC-S. Firstly about 41 components of the dam were considered as the component concerning the risk of dam. Secondly the components grading were defined into 4 levels from 1 as normal condition to 4 as need to be repaired. Weighting factor of each component was scored by expert. Summation of product of rating and weighting factor of each block is calculated as Risk Index (RI) of the block. However, increasing the accuracy of weighting method by expert is necessary. Therefore this study review a safety of the RCC dam with analyses of seepage through dam and foundation. The seepage analyses were performed under steady state flow and the drainage system within the dam and foundation were defined as clog in many cases. The resulted seepage quantity through gallery from model were compared with the real seepage from measure by flowmeter to verify appropriate parameters of materials. The uplift pressure was then used in the stability analysis. To adjust the weighting score of the dam components to increase the potential for safety evaluation by RI method.

From weighting factor of dam components, it is found that Crest, Joint Drain Pipe, Wall, Roof, Floor and Downstream Slope are the important components. The condition of Khun Dan Prakan Chon Dam is considered to be good in overall, most of the blocks have RI less than 2 (normal). The RI resulting of RCC-S higher than the RCC-B at 2.17 and 1.75, respectively. Stability analysis from seepage model in every case of clogged drainage system in the dam and foundation found the factor of safety resulting value conform with basis acceptable design criteria.. Once considered the weight of the adjustment components it was found that the Joint Drain Pipe, Wall and Roof is not important a risk of the dam because they are the items that help reducing the pressure inside the dam-body. The Dam Drain Pipe and Foundation Drain Pipe has very little effect on stability. The RI resulting after seepage and stability analysis of RCC - S and RCC - B is decreased overall, but higher in some block due to the weighting score of some high rating scores components that have gain weight. The RI resulting were 2.29 and 1.97, respectively.

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Thesis Advisor's signature