Montri Jinagoolwipat 2010: The Behaviors of Concrete Face Rockfill Dam During Construction-Filling and Earthquake Condition: A Case Study of Vajiralongkorn Dam. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering.
Thesis Advisor: Assistant Professor Suttisak Soralump, Ph.D. 258 pages.

Concrete Face Rockfill Dam (CFRD) is becoming popular extensively because of economics and safety reason. However this type of dam has a weak point which is the problem of slab cracking that lead to leakage. Therefore, we need to understand the stress-strain behavior of this dam in order to properly design this type of dam in the future. This study concentrate on modeling the behavior of Vajiralongkorn Dam which is the first CFRD dam in Thailand. The study found that the appropriate way to model the stage construction is to assign the linear elastic as a material model during construction stage and later on redistributed stress using elastic-plastic model to obtain the deformation after the end of construction. The result of model agreed with the settlement redorded from instruments.

Futhermore, this study has evaluated seismic dam safety behavior from earthquake which has PGA from 0.054g to 1.264g. The result found that most of movement would appear at the downstream part of the dam which could calculate the minimum factor of safety during shaking and the end of shaking of 1.50 and 1.70 respectively. At the upstream part if the water level remain normal water level, the movement would not effect to face slab. But if the water level is reduce, it would effect to concrete slab cracking. The vertical dynamic settlement along the dam crest has a maximum value of 4 meters which is less than the 7 meters freeboard.

Lastly, it clearly shown in this research that the shape and geologic type of foundation are main contributors to the slab cracking both in static and dynamic loading situation.

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