OPTIMIZATION OF SPILLWAY DESIGN USING FINITE ELEMENT METHODS

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ABSTRACT

Spillway is a critical component in a storage reservoir or in a diversion dam. Many failures of dams have been caused by improperly designed spillways or by spillways of insufficient capacity. There have been numerous instances, however, where the failure of a small dam with small storage capacity has resulted in the loss of life and heavy property damage. Most small dams require a reasonable conservatism in design, primarily because a failure must not present a serious hazard to human life.

Irrigation department is responsible for planning, designing, construction and maintenance of major irrigation projects in the country. There are branches in the department for each category of work. The design branch is responsible for designing of head works and improving of existing head works.

Design calculations arc done by manually and using MS Excel spread sheets. Design procedure is very much time consuming process. Therefore the main objective of this research is to propose the management of the department to enhance the design office facilities or design tools to get good quality optimized designs in limited time period.

Today the cost of materials, plants, and labor are very high and rapidly increasing. That situation is leading to more expenditure for structures and cost variations. Due to cost variations, delays of projects occur and again the cost will be more. This is a cyclic effect and it will affect for the economy of a country. If it is possible to reduce the period of the project and the quantity of resources used for a particular project, it will help to reduce the overall cost of the project. To reduce the total time period, designing period can be reduced and to reduce the quantity of resources, the structure can be optimized. For that engineers should be more innovative and should be used modern techniques. Therefore introducing the SAP 2000 software based on Finite Element Method for analyzing a\structure, above objectives can be fulfilled. Also it will enhance the design office procedure and quality of designs.

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It is my hope that the research presented in this thesis would be benefit to my organization, many engineers and would serve a useful purpose.

N.G.R. Ariyarathne.
September 2009.

DECLARATION

I, here by confirm that this Thesis is submitted in partial fulfillment of the requirements for Master of Engineering in Structural Engineering Design and it is the result of my own investigation and that has not been submitted in candidature for a degree /diploma of this University or any other University.

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