The Impact of Coffer damming and De-watering Cost on the Total Cost of Bridge Foundation

by

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A project report submitted in partial fulfillment of the requirement for the Degree of Master Enginerrig in Construction Management

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Supervised by Dr.N.D.Gunawardana

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ABSTRACT

Over the last few decades the use of bridge design and construction technologies in Sri Lanka have been limited, except in respect of the projects funded by foreign aid. At present the general practice in bridge design is to adopt a number of standard bridge designs to suit the span, depth requirements of the particular site. No cost benefit analysis is done, to select from several possible alternatives. Traditional practices are adopted to select the type of bridge and bridge foundations. They do not explore the new technologies to design and construction. This report deals with a research work undertaken to study the cost of coffer damming and de-watering and the total bridge construction cost accordingly. Also this study identifies the percentages of construction cost of key items in relation to total construction cost.

In the selection of a suitable bridge for a given location the costs during construction are not usually considered. Particularly, the selection of a suitable foundation type does not consider the cost involved in cofferdamming and dewatering.

Usually in Sri Lanka, the cost of the superstructure of a bridge does not vary with the type of foundation used provided that the spans are the same.

Therefore, the total cost of a bridge for a given location is function of the type of foundation selected. The foundation types used in Sri Lanka are;

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(a) Spread footings (b) Raft Foundations (c) Piles. (d) Well Foundations

However, experience shows that for any location all types of foundations cannot be used due to practical reasons. For example, pile foundations cannot be used for very low depths. Hence there are other factors influencing the type of foundation other than its total construction cost.

This study investigates the possibility of using the total construction cost including the cost of coffer dammming and de-watering as the criterion for selection of foundation type. It also highlights the limitations of this approach in situations where other factors are more influential than the total construction cost.

Analysis of the eleven completed bridges yield the high proportion of foundations and substructure cost in relation to overall bridge construction costs. (In the order of 64.5%) It also indicates the low proportions (18.5%) of total construction costs of a bridge yields for super structure.

This study reveals that spread foundations are more suitable for the depth upto 4 meters. Caissons are the most expensive type of foundation for any depth. Also the study indicates action should be taken to review the sub structure and super structure design techniques and the choise of foundation types to minimize the construction costs of bridges.

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