FEASIBILITY OF USING PRESENTLY USED PRE-CAST SECTIONS FOR M-BEAM TYPE BRIDGES

A thesis submitted for the partial fulfillment of the Degree of Master of Engineering in Structural Engineering Design

Submitted by
Shyama Liyanage

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Supervised by
Dr. M. T. R. Jayasinghe
Associate Professor
Department of Civil Engineering
University of Moratuwa

Abstract

For the rapid economic development of Sri Lanka, the upgrading of transportation facilities is one of the main criteria to be fulfilled. In this context, there may be an increase in the construction of bridges which will need more money. This can not be afforded by a developing country like Sri Lanka, which can not allocate too much money in construction work. So it is advantageous to carryout research, aimed at reducing the cost of them.

Most commonly used deck type for the bridges constructed in Sri Lanka is pseudo slab type bridge decks. For this type of decks, inverted T-beams are used with in-filled decks. So the cost of these types of bridge decks can be considerable. This can be reduced to some extent by adopting the M-beam type of construction with in-situ top slab. For this type of construction, it was decided to check with inverted T-beam sections, since they are readily available in Sri Lanka.

Feasible spans of the standard sections of inverted T-beams for top slab constructions were found by trial and error. Magnel diagrams were drawn to get the feasible regions of cables positions. To facilitate the checking of these sections a spreadsheet was prepared to do the design calculations. A cost comparison was done to find the most economical deck type out of two types of bridge decks. From the results got by the case study, it can be seen that the available T-beam sections can be used for the shorter spans with the top slab construction than when they are used in the in-filled construction. Even though the reduction of span is about 2.0 m to 2.5 m, the reduction of dead weight of the super structure is considerable which may cause the reduction of foundation sizes, especially in the case of shallow foundations. As per the results got from the cost study, it was found that the reduction of cost of construction of the superstructure is also reduced to some extent due to the adoption of the top slab construction.

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