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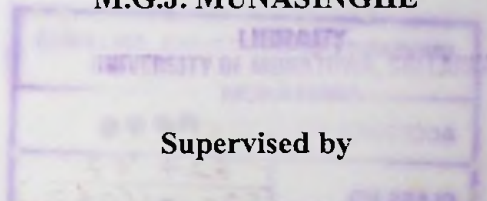
**STUDY TO RECOMMEND A STEEL TRUSS SYSTEM WITH
MINIMUM STEEL QUANTITY USEAGE FOR
MEDIUM SPAN BRIDGES**

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**THIS THESIS IS SUBMITTED TO THE DEPARTMENT OF CIVIL
ENGINEERING IN PARTIAL FULLFILMENT OF THE REQUIREMENT FOR
THE DEGREE OF MASTER OF ENGINEERING IN STRUCTURAL
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ABSTRACT

There are about 4000 bridges on National Road Network with lengths varying from 3.0 m to about 200.0 m. These bridges have varying widths about 3.0 m to 20.0 m and some of these bridges has been constructed about 50 to 100 years ago. Most of the Bridges over 30.0 m spans have been constructed using steel superstructures using *Through trusses* and are now weak and narrow for the present day traffic. Some of these steel superstructures have been developed as type drawings by then department of Public Works. Due to the cost of the pre-stressed concrete bridges are competitive with steel bridges, new steel bridges are very rear.

The concrete bridges are popular in Sri Lanka and the Pre-stressed girder superstructures are being used for spans in the range of 7.0 m to 33.0 m in general. It has gone beyond these typical spans for some places. Warakathota Bridge (Ratnapura district) has been constructed using 39.0 m (128.0 feet) Post tension beams. Pre-stressed girder concrete bridges are being used for bridges in Southern Transport Development Project for spans up to 40.0 m spans and also Manampitiya Bridge is under construction with end span of 55.0 m using continuous post tension box girders (Design by Japanese design consultants) .

There are many steel Through truss bridges could be seen in Sri Lanka highways up to about 49.0 m spans. New Muwagama Bridge in Ratnapura has been constructed as variable height *Through truss* bridge with 99.0 m long single span. (Design by Japanese design consultants).

There is high demand for alternative structural forms with improved bridge aesthetics for reconstruction of long old bridges or new bridges in long water ways using spans in the range of 30.0 m to 50.0 m (*medium spans*). Prefabricated structures are more preferable for locations with limited access and which helps to reduce the project duration.

Steel as a construction material has to be imported and not only cost of material but also fabrication, handling, Protective coating and the maintenance have high unit prices. Therefore, Steel structures with portable steel sections would reduce these all the cost components would competitive with concrete structures for medium span bridges.

This Study is concentrated on the use of *Through truss forms* in medium span bridges in the range of 30.0 m to 50.0 m spans. Three case studies were conducted for 30.0m, 40.0 m and 50.0 m for each eight number of selected Through truss forms. It was investigated for truss arrangements with minimum steel quantity usage to cater the highway bridge loadings. Conclusions and recommendations of the truss forms are laid down based on the results of the study.

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