

**Thesis title:**

Investigate an Economical Truss Type Steel Pedestrian Bridge for Sri Lanka

**Abstract:**

Applicability of concrete filled steel tubes (CFST) for compression members in truss type steel pedestrian bridges is studied in this research as an economical solution for lack of small-scale bridges in Sri Lanka. There is a lot of regions in Sri Lanka where people have to travel lot of distance to cross the river or access the nearby city for their day to day needs. CFST is a composite material which is getting more popular in the civil engineering industry. So, it is important to examine the properties of CFST as a composite material. The use of CFST in truss bridges has several advantages such as deflection reduction of the bridge, improved seismic performance, improved load carrying capacity, and dynamic performance, and cost reduction. To achieve an economical structure performance, CFST section has to be designed properly. Optimum positions to be used in CFST have to be identified depending on the structure. Replacing larger steel I section with CFST will reduce the cost since the same amount of force can be carried out with less steel amount in CFST. Also, the tendency to local buckling is reduced when thinner sections are filled with concrete. Therefore, to achieve a higher span with a lesser cost (steel tonnage) usage of CFST sections for compression members have been accessed in this study. Also, the tendency to local buckling was examined with experimental and numerical simulations. Hence first, a desk study was carried out focusing Gin Ganga area to identify the problems in an area due to lack of bridges. Two experimental models were tested in this study as one with only hollow aluminium tubes and other with cement grout filled in selected top chord members. Using a real scale numerical simulation of a CFST bridge model practical applicability and cost figures were compared with a conventional steel truss bridge.