**GIRDER BRIDGE DESIGN**

**ABSTRACT**

Girder bridges are widely used bridge system for short to medium span (20m to 50m) highway bridges due to its moderate self weight, structural efficiency, ease of fabrication, low maintenance etc. In order to compete with steel bridge systems, the design of I-girder Bridge system must lead to the most economical use of materials. The objective is to minimize the total cost in the design process of the bridge system considering the cost of materials, fabrication and installation.

For a particular girder span and bridge width, the design variables considered for the cost minimization of the bridge system, are girder spacing, various cross sectional dimensions of the girder, number of strands per tendon, number of tendons, tendons configuration, slab thickness and ordinary reinforcement for deck slab and girder. Design constraints for the optimization are considered according to AASHTO Standard Specifications. The optimization problem is characterized by having a combination of continuous, discrete and integer sets of design variables and multiple local minima. An optimization algorithm called Evolutionary Operation (EVOP) is used, that is capable of locating directly with high probability the global minimum. The proposed cost optimization approach is compared with an existing project which leads to a considerable cost saving while resulting in feasible design.