

## COMPARATIVE STUDY OF STEEL I - GIRDER AND PRESTRESSED

### STEEL I – GIRDER AS PER IRC24:2010

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#### ABSTRACT

Prestressing of structural elements especially steel girders improve their load bearing capacity and rigidity along with reduction in material consumption and overall cost for the same loading. The present study aims at preparing expedient interface for design of Steel I-Girder and Prestressed Steel I-Girder as per IRC24: 2010, encompassed through parametric study of two lane road bridges for varying span to depth ratios, considering 15m, 20m, 25m and 30m of spans. The analysis is done considering dead load, superimposed load and moving load as per class A-2 lane / class 70R loading. Design of prestressed steel I-girder is done by varying the diameter and number of strands. 9.5 mm, 11.1 mm, 12.7 mm and 15.2 mm diameter class B 7-ply strands are considered in 4, 8, 12, 16 and 20 numbers of groups. The cost comparison is done as per prevailing market rates. A definite increase in the bending capacity of steel I-girder is found when prestressed with strands, without any enhancement in shear capacity. Prestressed steel I-girder provides shallower depth of the girder for same L/D ratio. With increase in the strand area and number of strands, bending capacity increases for same L/D ratio. Prestressed steel I- girder shows cost saving up to 50% for 15m span, 37% for 20m span, 28% for 25m span and 20% for 30m span. Cost of girder per meter length decreases when applying the prestressing force with increase in L/D ratio.

**KEYWORDS:** Prestressed Steel I-Girder, Cost Comparison, IRC24:2010, L/D Ratio