



## **Optimization of Single-Track PSC I-Girder for Metro Viaduct**

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### **Abstract**

Metro is becoming a popular mode of urban transportation in the rapidly developing modern world (India). There are two major components in a metro viaduct, substructure and superstructure. Various types of girders used in superstructure are U-Girder, Box Girder, I-Girder, etc. I-Girder is the focus of research in this paper. Design engineers involved in metro projects have used either codal provisions or previously laid down thumb rules for the design of I-Girder. Designs as per these standards give satisfactory results but optimizing the design to obtain an economical section needs further investigation. Optimization of I-Girder is a challenging task due to complexity and correlation among the variables. A large number of variables play an important role in the design of I-Girder such as span, depth of I-Girder, cross-section, grade of concrete, number of I-Girders, Pre/Post tensioning, number of strands, etc. This paper focuses on the computation of optimum cost for different spans and span to depth ratio for I-Girder under the influence of dynamic loading. FEM software Midas Civil is used for the analysis. Computation of results and graphical presentation is performed using MS Excel. Results presented in this study may provide a cost-effective guideline for the design solution of an I-Girder metro viaduct superstructure.

**Keywords:** Cost optimization, Pre-stressed I-girder, Dynamic analysis