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Evaluation of Precast/Prestressed Concrete Girder Transport Vehicle Stability

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Extended Abstract

There has been an increased demand for knowledge regarding girder stability over the last few decades. As we continue to progress as society that requires bigger manufacturing, better building materials and safer results, engineers must accommodate and respond appropriately. During the 1950's, precast and prestressed concrete girders began to be utilized as critical components of bridge superstructures. Through the years since, concrete strengths have improved, requiring greater lengths of girders to accept larger spans. "With longer spans came the challenge to produce long slender girder sections that are laterally stable during production, transportation, erection, and during construction of the bridge deck" [1]. To maintain and improve public safety, more substantial protocols must be established regarding girder stability from bed to bridge. This paper deals with the stability of slender girders during transportation as a critical topic for public safety and industry credibility. The paper addresses the existing uncertainty regarding precast girder transport vehicle stability analysis parameters. The main objectives of this research are: (1) more clearly quantify transport vehicle stability analysis parameters, most importantly rotational stiffness and (2) define a protocol for specifying and verifying those parameters for contracting. This paper will present literature, research and current practices relevant to precast girder transport vehicle stability analysis parameters. The paper also includes detailed surveys with relevant transport companies and at least two design scenarios enhancing the stability of slender girders during transport [2].

Moreover, to improve the girder stability during transportation, the authors proposes using the king post stiffeners and tube stiffeners. These stiffeners are set between the flanges of the girder. This can drastically increase the elastic buckling capacity of the girders and prevent or delay lateral torsional buckling [2]. The tube stiffeners are large cylindrical tubes almost as wide as the flange elements on either side of the web. It is shown that the tube stiffeners are more effective as compared to the king post stiffeners.

References

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