

A Study on Application of Elastic Theory for Computing Flexural Stresses in Preflex Beam

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Abstract : This paper presents the step-by-step procedure for using Elastic Theory to calculate the internal stresses in composite bridge girders prestressed by the Preflexing Technology, called Prebeam in Japan and Preflex beam worldwide. Elastic Theory approaches preflex beams the same way as it does the conventional composite girders. Since preflex beam undergoes different stages of construction, calculations are made using different sectional and material properties. Stresses are calculated in every stage using the properties of the specific section. Stress accumulation gives the available stress in a section of interest. Concrete presence in the section implies prestress loss due to creep and shrinkage, however; more work is required to be done in this field. In addition to the graphical presentation of this application, this paper further discusses important notes of graphical comparison between the results of an experimental-only research carried out on a preflex beam, with the results of simulation based on the elastic theory approach, for an identical beam using Finite Element Modeling (FEM) by the author.

Keywords : composite girder, Elastic Theory, preflex beam, prestressing

Conference Title : ICSECM 2017 : International Conference on Structural Engineering, Construction and Management

Conference Location : Osaka, Japan

Conference Dates : October 09-10, 2017