

Effect of Corrosion on the Shear Buckling Strength

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Abstract : The ability to resist the shear strength arises mainly from the web panel of steel girders and as such, the shear buckling strength of these girders has been extensively investigated. For example, Blaser's reported that when buckling occurs, the tension field has an effect after the buckling strength of the steel is reached. The findings of these studies have been applied by AASHTO, AISC, and to the European Code that provides guidelines for designs aimed at preventing shear buckling. Steel girders are susceptible to corrosion resulting from exposure to natural elements such as rainfall, humidity, and temperature. This corrosion leads to a reduction in the size of the web panel section, thereby resulting in a decrease in the shear strength. The decrease in the panel section has a significant effect on the maintenance section of the bridge. However, in most conventional designs, the influence of corrosion is overlooked during the calculation of the shear buckling strength and hence over-design is common. Therefore, in this study, a steel girder with an A/D of 1:1, as well as a 6-mm-, 16-mm-, and 12-mm-thick web panel, flange, and intermediate reinforcing material, respectively, were used. The total length was set to that (3200 mm) of the default model. The effect of corrosion shear buckling was investigated by determining the volume amount of corrosion, shape of the erosion patterns, and the angular change in the tensile field of the shear buckling strength. This study provides the basic data that will enable designs that incorporate values closer (than those used in most conventional designs) to the actual shear buckling strength.

Keywords : corrosion, shear buckling strength, steel girder, shear strength

Conference Title : ICBSE 2016 : International Conference on Building Science and Engineering

Conference Location : New York, United States

Conference Dates : June 06-07, 2016