



A New Method for Calculating the Shear Stiffness of RC Beams with Web Diagonal Cracks

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Abstract

Investigation shows that long span concrete box girder bridges often suffer from cracking and deflection diseases simultaneously. A considerable number of the cracks are diagonal web cracks, which reflects the reduction of the shear stiffness of the structure. However, the current specifications only consider the adverse effects caused by flexural cracks and ignore the shear deflection. In addition, some scholars have found that the horizontal reinforcement of the web also limits the development of diagonal cracks. This paper carried out shear tests on I-shaped beams with different forms of reinforcement in the web. Then, a new calculation method is proposed to calculate the shear stiffness after diagonal cracking, which takes into account the influence of the vertical and horizontal reinforcement at the same time.

Keywords: shear stiffness; diagonal crack; truss model; horizontal reinforcement; stirrup.

1 Introduction

On one hand, experimental research on the shear load capacity of RC beams has been relatively mature while few experiments have been carried

out on the shear deformation. On the other hand, current specifications only provide calculation methods that consider structural degradation stiffness due to flexural cracks. Mainstream calculation methods include the stiffness analytical