

STRUCTURAL BEHAVIOR OF DEEP REINFORCED CONCRETE BEAMS UNDER INDIRECT LOADING CONDITION

YOUSIF JABBAR LAFTA¹ & KUN YE²

^{1,2}School of Civil Engineering, and Mechanics, Huazhong University of Science and Technology, Wuhan, China

¹Department of Civil Engineering, University of Basra, Ministry of Higher Education, Iraq

ABSTRACT

This study investigates the structural behavior of indirectly loaded deep reinforced concrete (RC) T-beams. A total of 21 deep RC T-beams were divided into three groups according to the ratio of shear span to effective depth. Beams without web reinforcement were tested under indirect point loading applied via central intersecting members until shear failure. Experimental results indicate that indirectly loaded deep beams can carry additional load after diagonal cracking is initiated. The performance of these beams is associated with 3D non-linear finite element analysis that involves discrete reinforcement modeling. This modeling process is performed using ANSYS 12.1. Appropriate numerical modeling approaches are recommended, experimental load-deflection responses are compared in relation with FEA. The behavior of beams was observed under loading. Ultimate loads, deflection responses, and crack patterns are recorded as well. The numerical modeling results agreed with the test results for the beams.

KEYWORDS: Deep T-Beams, Indirect loading, Shear Span-To-Effective Depth Ratio