

# T-Beam with Curved Joint and 45° Joint Analysis

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**Abstract:** This Study Presents the Structural Analysis of a Reinforced Concrete T-Beam in Incorporating Curved and 45° Joints, Focusing on their Effect Load Distribution, Stress Concentration, and overall performance. T-beams are widely used in bridges and buildings for their efficiency in resisting bending moments, but joints often act as critical points for stress accumulation and potential failure. The analysis was carried out using finite element modeling (FEM) and validated with theoretical calculations based on standard design codes. Results indicate that curved joints help in smoother stress flow, reducing stress concentration Compared to Sharp 45° Joints, Which Exhibit higher local stresses at the intersection. However, 45° joints provide better stiffness in certain loading cases, making them suitable for specific structural applications. The study highlights the importance of joint geometry in optimizing strength, durability, and crack control in T-beam structures.