



## Strength and Serviceability of Reinforced Concrete Inverted T Beams

### Description

#### Meta Fields

**Project Completion Year :** 2013

**Project Starting Year :** 2009

**Other Documents 0 Other Documents File :** 2334

**Primary Sponsor Contact Info :** Texas Department of Transportation (TxDOT) Research and Technology Implementation Office P.O. Box 5080 Austin, TX 78763-5080 USA

**Project Length :** 60 months

**Specific Abc Aspect :** Results from this project would also apply to precast inverted-tee bent caps.

**Key Words :** Inverted-T Bent Caps, Strut-and-Tie Modeling, Crack Widths, Diagonal Cracking, Serviceability, Full-scale

#### Abstract :

Significant diagonal cracking in reinforced concrete inverted-T straddle bent caps has been reported throughout the State of Texas. Many of the distressed structures were recently constructed and have generally been in service for less than two decades. The unique nature of the problem prompted a closer look into the design and behavior of such structural components. An experimental study was conducted in which 33 reinforced concrete inverted-T beam specimens were tested. The effects of the following variables were evaluated: ledge depth and length, quantity of web reinforcement, number of point loads, member depth, and a/d ratio. A strut-and-tie design method proposed by TxDOT Project 0-5253, initially calibrated for compression-chord loaded deep beams, was investigated. It was concluded that the strut-and-tie method was a simpler and accurate design method and was recommended for use in inverted-T beam design. A recommendation was also made on the amount of minimum web reinforcement needed for strength and serviceability considerations. A simple service-load check was proposed for the purpose of limiting diagonal cracking under service loads. Lastly, a chart was created to aid in the distress evaluation of a diagonally-cracked inverted-T bent cap in the field.

**Subject :** Inverted-Tee Beams

**Group :** Substructure

**Category :** Completed Projects