



PROJECT PROFILE

Ontario County Bridges

Evaluation of Cracking in Box Beam Bridges | Ontario County, NY



CLIENT

Ontario County Public Works

BACKGROUND

The two bridges WJE evaluated for this project consist of adjacent prestressed precast concrete box beams that span approximately 90 feet. The bridges were constructed in the 1990s and were designed for a HS25-44 live loading.

Following the discovery of diagonal cracking in the fascia girders of two box beam bridges, the Ontario County Public Works sought assistance to determine the cause of cracking, to evaluate the live load capacity of the structures, and to provide recommendations for repair and restricted load posting, if necessary.



SOLUTION

WJE structural engineers completed detailed visual inspections and, using nondestructive means, located the position and size of shear reinforcement in the ends of fascia girders. They compared the as-built shear reinforcement details to those shown in the box beam shop drawings and found them to be similar. WJE used these findings to complete a structural design review per the code requirements specified in the contract documents. They found the bridges to be designed in general conformance to the codes. Where deviations existed, they were not sufficient to have caused the diagonal cracking observed. WJE engineers performed load testing to evaluate the behavior and structural response of the bridges. Trucks of known weight were positioned in various configurations, and the midspan deflection and changes in diagonal crack widths were measured. WJE structural engineers also performed detailed computer analyses using the latest research for shear in box beams. Field investigation results and structural analyses indicated that it would have been unlikely for the cracking to be caused by traffic loading. The cracking was attributed to restrained differential volume changes between the box beams and the deck. WJE engineers recommended that the cracks continue to be visually monitored through regular NBIS inspections. No major repairs were warranted; however, WJE recommended sealing the cracks to limit penetration of moisture and deicing chemicals into the concrete.

