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Department

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## EFS Inspection of the Manahawkin Bay Bridge

### Situation

New Jersey Department of Transportation (NJDOT), during its inspection of the Manahawkin Bay Bridge, a steel girder bridge, used Metal Fatigue Solution's Electrochemical Fatigue Sensor (EFS) system to determine the presence and activity of fatigue cracking. The structure is the only steel girder bridge traversing the Manahawkin Bay and providing access to Long Beach Island and has previously documented cracks at fatigue sensitive details. The main purpose for employing the EFS as an inspection tool at the Manahawkin Bay Bridge was to assist NJDOT in prioritizing the repair or replacement of the cracked members by determining the growth activity of existing cracks and in some cases determining the existence of cracks not yet visually detectable.

Type of locations tested:

- Fatigue sensitive details
- Retrofitted details

During the inspections the EFS system was installed at visually identified cracks, areas adjacent to crack repair locations, and at additional locations that exhibited similar fatigue-sensitive details as those already exhibiting cracks. The EFS data analysis was used to determine whether the documented fatigue cracks were actively growing under ambient traffic flow. In some cases, the objective was to determine the effectiveness of previous remediation efforts.



### Results

Using the EFS system, it was determined that some of the existing cracks were continuing to grow while others, which had been arrested by drill stops, were not exhibiting active growth. In addition, actively growing cracks that had not previously been documented were identified with the EFS system.

Project features include:

- In-depth visual inspection
- Instrumentation installation at 17 locations and monitoring during live ambient flow load testing
- Analysis of bridge fatigue crack growth data for each EFS location
- A full report summarizing the findings

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