



EFS Inspection of a Bridge on I-91

Location:
Springfield, MA

MFS Project PM:
Marybeth Miceli

Client Contacts:
Massachusetts Highway
Department

Date:
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Situation

Massachusetts Highway Department (MassHighway) used Metal Fatigue Solution's (MFS) Electrochemical Fatigue Sensor (EFS) system to inspect the I-91 S-24-061 steel girder bridge. The structure has previously documented cracks at fatigue sensitive details that had been retrofitted to mitigate fatigue cracking. The overriding purpose for utilizing EFS as an analysis tool here is to help MassHighway identify the effectiveness of the retrofits and inspect similar fatigue sensitive details for potential fatigue cracking.

Type of locations tested:

- Fatigue sensitive details
- Retrofitted details

During the inspections, the EFS system was installed at areas adjacent to crack repair locations and additional locations that exhibited similar fatigue-prone details as those retrofitted.

The EFS data analysis was used to determine whether the retrofits were successful at stopping fatigue cracking. In some cases, the objective was to determine if similar fatigue sensitive details exhibited behavior to indicate future crack initiation.



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Results

Under the conditions inspected, the data indicated that the drill stops are not functioning as crack arrestors. Three of the drill stop locations had actively growing fatigue cracks and three of the locations had either plastic (permanent) deformation occurring or a small crack already initiated and propagating. The data also indicate that all of the existing cracks that were inspected are still actively growing.

Test at various locations indicated:

- A retrofitted 5/8" drill stop will crack in the future.
- A fatigue sensitive location with no previously documented crack showed active crack growth.

Metal Fatigue Solutions, Inc.
7251 West Lake Mead Boulevard
Suite 300
Las Vegas, NV 89128

Phone: (702) 800 5542

www.metal-fatigue-solutions.com