

# FHWA NONDESTRUCTIVE EVALUATION (NDE) VALIDATION CENTER

The effective condition assessment of roadways and bridges is key to maintaining a safe and efficient highway system.

Nondestructive Evaluation (NDE) technologies that determine the condition of the infrastructure can improve our ability to make important maintenance and safety decisions, and will play a critical role in the future success of the highway system. The FHWA NDE Validation Center (NDEVC) is designed to evaluate the effectiveness of NDE technologies and promote the use of NDE to improve our ability to determine the health and safety of the Nation's highways.

## OBJECTIVE

The objective of the NDEVC is to improve the state of the practice for highway bridge inspection. The Center is designed as a resource for the development and testing of NDE technologies, and to provide State highway agencies with independent evaluation and validation of those technologies. The reliability of NDE methods is evaluated through performance studies that examine the human, environmental and procedural factors associated with highway bridge inspection. New NDE technologies are developed at the center to solve specific problems and improve the tools available for the inspection and evaluation of bridges.



## PROJECT SCOPE

The NDEVC is comprised of three elements:

### NDE LABORATORY

Located at the Turner-Fairbank Highway Research Center in McLean, VA, the new NDE laboratory acts as the nucleus of the Center. The laboratory is used for benchtop testing and preliminary evaluation of NDE technologies. This state-of-the-art laboratory space includes a structural loading floor for producing fatigue-damaged components and constructing mock-ups of field conditions. The laboratory is equipped with storage areas, test set-up areas, traditional laboratory furnishing, and NDE-related equipment. A radiological laboratory is used for creating x-ray records of defects in the component specimens and test bridges, as well as providing the ability to evaluate other nuclear NDE methods. An x-ray computed tomography facility has been installed in the laboratory for creating three-dimensional images of internal defects in asphalt and concrete pavements and small structural components.

### TEST BRIDGES

Five decommissioned highway bridges that contain flaws at critical locations are used to evaluate NDE methods under realistic environmental conditions. These test bridges are critical to evaluating the influence of restricted access, structure geometry, surface conditions, platform stability, and human factors on the application of NDE methods during normal bridge inspections. These test bridges provide the Center with a unique ability to evaluate NDE technologies under the same conditions that normal bridge inspections are typically conducted, providing a powerful and unique new tool.

Two steel bridges that are open to traffic are also part of the Center. These bridges have been fully instrumented to monitor traffic loading, and detailed finite element models of the bridges have been developed. The bridges will be utilized in the evaluation of sensors and NDE methods that measure the impact of traffic loading on bridge performance.

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## COMPONENT SPECIMENS

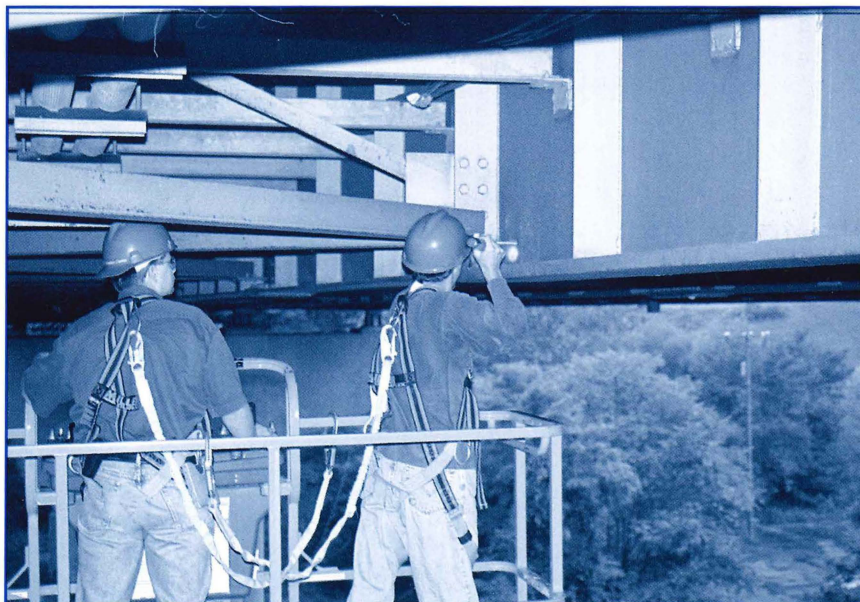
Sections of bridges containing defects, known as **component specimens**, are used to perform capability trials in the laboratory as well as research related to the development of new NDE methods. The component specimens play a critical role in the validation process, allowing for quantitative evaluation of NDE methods under controlled conditions.

The NDEVC is currently in the process of gathering component specimens from bridges being removed from service. The component specimens contain well-characterized defects that can be used to evaluate the performance of commonly used NDE methods and to develop new methods and technologies.

Among the component specimens planned for the laboratory is a library of welded details containing defects. These specimens will be used to determine the capability of NDE methods to detect and quantify cracks and other defects in welds. Other component specimens maintained at the Center include a library of bridge pins containing cracks, full-sized prestressed beams, and bridge deck sections with delaminated concrete. The component specimens maintained at the Center are available to State departments of transportation and researchers wishing to evaluate potential inspection technologies.

The NDEVC is designed to provide a national resource for the development and application of NDE methods for the inspection of transportation facilities. The Center will provide consistent and reliable validation of NDE methods, and will accelerate the implementation of NDE in the inspection process.

Researchers, industry, and users are encouraged to participate in the development and operation of the Nondestructive Evaluation Validation Center.



### For more information, please contact:

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