Bridge inspection

Definitions

What are "general condition ratings?" According to the National Bridge Inspection Standards (NBIS), condition ratings are used to describe an existing bridge or culvert compared with its condition if it were new. The ratings are based on the materials, physical condition of the deck (riding surface), the superstructure (supports immediately beneath the driving surface) and the substructures (foundation and supporting posts and piers). General condition ratings range from 0 (failed condition) to 9 (excellent). For detailed definitions, click here.

Which bridges are included in the NBI system? NBI structures are bridges or culverts that carry vehicular traffic and have an opening longer than 20 feet measured along the center of the roadway.

What bridges are not considered part of the NBI system? Non-NBI structures include bridges or culverts that carry vehicular traffic and are *equal to or less than* 20 feet measured along the center of the roadway.

VDOT exceeds the NBI standards by inspecting and documenting in our inventory *all* bridges regardless of their length and all culverts having an opening greater than 36 square feet.

What is a "structurally deficient" bridge? Bridges are considered structurally deficient if they have been restricted to light vehicles, closed to traffic or require rehabilitation. Structurally deficient means there are elements of the bridge that need to be monitored and/or repaired. The fact that a bridge is "structurally deficient" *does not* imply that it is likely to collapse or that it is unsafe. It means the bridge must be monitored, inspected and maintained.

How is "structural deficiency" determined? The condition of different parts of a bridge is rated on a scale of 0 to 9 (with 9 being "excellent" and zero being "failed"). A structurally deficient bridge is one for which the deck (riding surface), the superstructure (supports immediately beneath the driving surface) *or* the substructure (foundation and supporting posts and piers) are rated in condition 4 or less.

What makes a bridge structurally deficient, and are structural deficient bridges unsafe? The fact that a bridge is "structurally deficient" *does not* imply that it is likely to collapse or that it is unsafe. A "deficient" bridge is one with some maintenance concerns that do not pose a safety risk. A "deficient" bridge typically requires maintenance and repair and eventual rehabilitation or replacement to address deficiencies. To remain open to traffic, structurally deficient bridges are often posted with reduced weight limits that restrict the gross weight of vehicles using the bridges. If unsafe conditions are identified during a physical inspection, the structure must be closed.

What is a "functionally obsolete" bridge? A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand, or those that may be occasionally flooded.

A functionally obsolete bridge is similar to an older house. A house built in 1950 might be perfectly acceptable to live in, but it does not meet all of today's building codes. Yet, when it comes time to consider upgrading that house or making improvements, the owner must look at ways to bring the structure up to current standards.

What is a "fracture-critical" bridge? A fracture-critical bridge is one that does not contain redundant supporting elements. This means that if those key supports fail, the bridge would be in danger of collapse. This *does not* mean the bridge is inherently unsafe, only that there is a lack of redundancy in its design.

What is a bridge's "sufficiency rating?" Sufficiency ratings were developed by the Federal Highway Administration to serve as a prioritization tool to allocate funds. The rating varies from 0 percent (poor) to 100 percent (very good). The formula considers structural adequacy, whether the bridge is functionally obsolete and level of service provided to the public.

History of Federal Bridge Inspection Program The federal bridge inspection program regulations were developed as a result of the Federal-Aid Highway Act of 1968 following the collapse of the Silver Bridge in Point Pleasant, West Virginia. The United States Secretary of Transportation established the National Bridge Inspection Standards (NBIS) to locate and evaluate existing bridge deficiencies to ensure the safety of the traveling public.

The 1968 Federal-Aid Highway Act directed the states to maintain an inventory of federal-aid highway system bridges. This was amended over time to establish criteria for NBIS bridges including:

- Defining the NBIS to bridges to those on the federal-aid highway system
- Requiring inspections of bridges longer than 20 feet on all public roads
- Expanding bridge inspection programs to include special inspection procedures for fracture-critical members and underwater inspection