

Structurally Deficient Bridges are SAFE

by Stanley W. Woods

A Structurally Deficient Bridge, as defined by bridge engineers, indicates that the bridge is in need of maintenance. A qualified bridge engineer has either determined the bridge is safe to use or it is closed for public use.

“Structurally Deficient” is the term created by bridge engineers to indicate that a bridge is in need of maintenance, rehabilitation, or sometimes replacement. As a bridge ages, parts of the bridge deteriorate to where it becomes necessary to repair or replace the deteriorated parts or, in some cases, the entire bridge. To check for these conditions, trained bridge engineers inspect bridges every 2 years or more frequently to be sure they are safe for the designated loads. If they are not, the bridges are posted for the restricted loads that they can safely carry or are closed until they can be fixed or replaced.

Unfortunately when the term “Structurally Deficient” was implemented, little thought was given to how the general public would interpret the meaning. They could have chosen some other description such as “Time to Schedule Maintenance Work.” Bridge professionals are now considering how these terms are perceived by the public and may change them.

Background

Following the collapse of a major bridge in 1967, Congress passed legislation in 1971 that required all states to inspect and maintain an inventory of all bridges on the federal-aid system. The law was expanded in 1978 to require that all bridges on public highways be added to the inventory. The law requires that all bridges be inspected at least every two years but each state must submit inspection reports to the federal government annually. The federal government

maintains a National Bridge Inventory database and uses it to identify bridges eligible for rehabilitation or replacement. These data are also used to allocate federal bridge replacement funds to each state based on needs. Bridges must be classified as either “Structurally Deficient” or “Functionally Obsolete” to be eligible for funding. Functionally obsolete means that the deck geometry, clearances, load capacity, or approach roadway alignment do not satisfy the current minimum criteria.

In order to get some consistency in reporting between the states, the federal government established rules and guidelines to aid the bridge inspectors. Five major bridge items were established for rating: deck, superstructure, substructure, structural evaluation, and waterway adequacy. Each item is rated on a scale of 0 to 9, where 0 means bridge closed and 9 means excellent condition. Each number on the scale has a definition to further aid the inspectors. The values entered for these items then determine whether a bridge is classified as structurally deficient or functionally obsolete. A bridge with a condition rating of 4 or less for the deck, superstructure, or substructure or an appraisal rating of 2 or less for structural evaluation or waterway adequacy is classified as structurally deficient.

A condition rating of 4 is defined as: Poor Condition—advanced section loss, deterioration, spalling, or scour. As you can see, there is a wide variation in the definition. There can be a large difference in advanced section loss vs.

some deterioration or spalling. Advanced section loss might imply serious loss of load capacity, whereas spalling might indicate the deck needs an overlay or be replaced with little or no loss of load capacity. This is where the inspection report can clarify the work required.

The fact that a bridge is declared as structurally deficient does not imply that it is unsafe. A structurally deficient bridge typically needs maintenance and repair and eventual rehabilitation or replacement to address deficiencies. To remain open to traffic, a structurally deficient bridge is often posted with reduced weight limits that restrict the gross weight of vehicles using the bridge. If unsafe conditions are identified during a physical inspection, the structure will be closed.

Based on the latest Inventory Report, there are 597,443 bridges on public roads of which 73,800 or 12.4 percent are classified as structurally deficient. Another 80,322 or 13.4 percent are classified as functionally obsolete. National legislation requires all states to use fully trained engineer inspectors to evaluate all these bridges and determine their safety for the traveling public. Structurally deficient is, therefore, a bridge term implying that significant work needs to be done but, as long as traffic is permitted to use the bridge, the bridge is deemed SAFE.

More information on the National Bridge Inspection Standards is available at www.fhwa.dot.gov/bridge/nbis.htm.

