Bridge Condition Terminology

The term "**structurally deficient**" means that the department believes a bridge should undergo a series of repairs or replacement within the next six years. The department's policy is to repair or replace all the structurally deficient state owned bridges during that time. The department also recommends that local governments follow the same schedule for their structurally deficient bridges.

The term "**functionally obsolete**" only means that a bridge does not meet current road design standards. For example, some bridges are "functionally obsolete" because they were built at a time when lane widths were narrower than the current standard.

The "**health index**" is a tool that measures the overall condition of a bridge. The health index typically includes about 10 to 12 different elements that are evaluated by the department. A lower health index means that more work would be required to improve the bridge to an ideal condition. A health index below 85 generally indicates that some repairs are needed, although it doesn't mean the bridge is unsafe. A low health index may also indicate that it would be more economical to replace the bridge than to repair it.

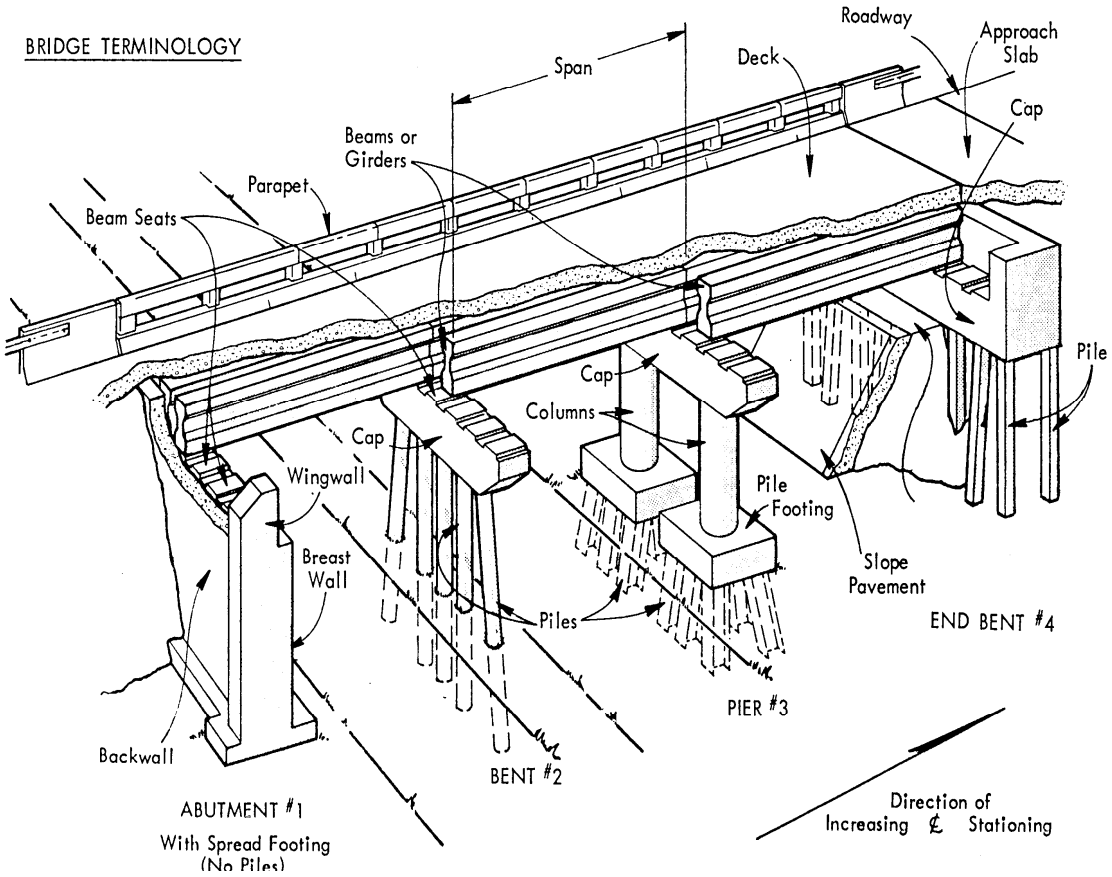
The "**sufficiency rating**" is a tool that is used to help determine whether a bridge that is structurally deficient or functionally obsolete should be repaired or just replaced. The sufficiency rating considers a number of factors, only about half of which relate to the condition of the bridge itself. The sufficiency ratings for bridges are part of a formula used by the Federal Highway Administration when it allocates federal funds to the states for bridge replacement.

Bridge Inspection Process

The bridge inspection process starts with the bridge inspectors reviewing the previous bridge inspection report and planning the inspection. The inspectors identify areas where defects were found in previous inspections. This allows them to determine if the defects previously identified have been repaired or have increased in size and severity. The inspectors coordinate traffic control and access equipment.

When the inspectors arrive at the bridge site they observe the bridge from a distance. Some major problems may be indicated if the profile of the bridge is not smooth, in other words the bridge will not look right to the experienced bridge inspector. The inspectors will then concentrate on discovering the cause and determining the extent of the problem. Depending on the exact nature of the problem emergency repair or immediate closure of the bridge may be required.

The inspectors use a systematic method to inspect the bridge, to ensure that the entire bridge is inspected. The exact order of the inspection will vary depending on the type of bridge being inspected.



The deck is the riding surface for traffic. The deck surface and road way barrier or parapet are looked at for potholes, cracking, excessive wear, and sounded for hollow areas. The deck joints are looked at for evidence of seepage, loose armor angles and if the deck joints are properly functioning to allow expansion and contraction as temperature changes.

The superstructure supports the deck and generally consists of beams or girders that may be constructed of timber, concrete or steel, and the bearings that connect the superstructure to the substructure. The inspectors pay close attention to areas of high stress and those prone to deterioration, but the entire superstructure is inspected. Timber members are inspected for wood rot, crushing, splitting and cracking. Concrete members are inspected for cracking, spalling and hollow areas. (Spalling is where a portion of the concrete has fallen away leaving a hole in the concrete.) Steel members are inspected for paint peeling, corrosion and cracking. The bearings serve to transmit loads from the superstructure to the substructure and allow the movement of the bridge that occur due to changes in temperature. The bearings are inspected for excessive deformation and evidence that they are functioning properly allowing the movements of the bridge due to temperature change.

The substructure supports the superstructure and transmits loads from the superstructure to the ground. The substructure generally consists of pier caps, columns and piles. The substructure may be constructed of timber, concrete or steel. Timber members are inspected for wood rot, crushing, splitting and cracking. Concrete members are inspected for cracking, spalling and hollow areas. Steel members are inspected for paint peeling, corrosion and cracking. In addition, the substructure is inspected for evidence of settlement or scour. Settlement is elements of the substructure move downward due to soil conditions. Scour is the undermining of a structure due to water flow removing soil which supports the structure.

The inspectors' actions will vary depending on their findings. The inspectors will recommend immediate closure or emergency repair of the bridge if a critical condition is found that endangers the public. The inspectors will recommend a repair be performed quickly when a situation exists that if not addressed may lead to a condition that could endanger the public. The inspectors will recommend routine repairs or maintenance to correct defects that if not repaired could increase in size and severity and shorten the service life of the bridge.

Documentation of Bridge Inspection Findings

The bridge inspectors document their findings in the bridge inspection report which contains:

- Inventory Data such as location, bridge name, roadway, facility crossed, geometric and other inventory data.
- Verbal descriptions of the inspectors' findings including size and severity of defects found.
- Pictures and sketches of portions of the bridge to clarify the verbal descriptions.
- Inspector recommendations.
- Evaluation of work performed on the bridge since the last inspection.
- Names of the inspectors, report reviewer and responsible professional engineer.
- Date and type of inspection performed.
- Numerical ratings of various bridge components.
- Values of the Sufficiency Rating and Health Index.