This Manual of Bridge Inspection has been prepared in accordance with the provisions of Section 5501.47 of the Revised Code of the State of Ohio which became effective September 28, 1973, and in compliance with the Code of Federal Regulations, Part 650.307. These State and Federal requirements provide for regular and systematic inspection of bridges on or over public highways and streets in the interest of public safety and protection of the public investment in such structures.

These requirements establish the areas of responsibility of various authorities regarding inventory requirements, frequency of inspection, qualifications of inspectors, and recording of inspections. Section 5501.47 of the Revised Code provides for the preparation of this manual to establish standards and procedures for inspectors representing the several authorities of the State charged with the responsibility of bridge inspection.
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Acknowledgements

The following publications were used as a guide in preparing this manual and their use as a reference by Bridge Inspectors is recommended:

"Manual for Maintenance Inspection of Bridges, 1982."


"Bridge Inventory and Appraisal Coding Guide," March 1975, Ohio Department of Transportation.
General Information

Objectives

The purpose of systematic and periodic bridge inspections, as well as supplemental inspections immediately following any natural or accidental occurrence which might lessen the integrity of a bridge is to:

1. Provide an information base for immediate action to limit use of or close to traffic any bridge which is revealed by inspection to be hazardous to public safety.

2. Determine the extent of any weakness or structural damage, critical or minor, resulting from normal deterioration, or any other cause.

3. Enable bridge maintenance, repair or replacement to be programmed more effectively through early detection of structural deficiencies by which the public investment in the highway system will be safeguarded and repair costs minimized.

Thorough inspection and careful analysis of the facts obtained by the inspection will guarantee uninterrupted traffic flow with maximum safety. The latter actually is the ultimate goal of any bridge inspection program.

Definitions

Bridge: Any structure, including supports, of 10 feet or more clear span or 10 feet or more in diameter on, above or below a highway. The span of all bridges shall be measured along the centerline of the highway.

Multiple cell culverts under a fill with a distance of 10 feet or more between extreme ends of openings, measured normal to the axis of the culvert, including multiple pipes where the clear distance between openings is less than half of the diameter of the smaller opening, shall be regarded as a bridge.

Highways: Those highway systems named in Section 5535.01 of the Ohio Revised Code, highways, streets, and roads within municipalities, and any other highway, street, and road used for public conveyance.

Inspections: The detailed physical examination of a structure, using such tools and instruments as are necessary to determine the actual condition of the various elements that make up the structure, recording the information on approved forms, and appropriately filing the data.

Maintenance: The preservation and upkeep of a bridge, including all of its appurtenances, in its original condition or as subsequently improved, insofar as practicable.

Measurement: Checking location, dimension, size and shape of all members of a bridge, including all of its appurtenances, to determine if there has been movement, distortion, deterioration, or other change in the structure.
Responsibility for Inspection

State Highways (Ohio Revised Code, Section 5501.47): “The Director of Transportation is responsible for inspection of all bridges on the state highway system inside and outside of municipalities, all bridges connecting Ohio with another state for which the Department of Transportation has inspection authority, and all other bridges or portions of bridges for which responsibility for inspection is by law or agreement assigned to the department.” The director shall inspect any bridge on a highway, with a designated representative of the owner, where he has reason to believe that the report of inspection does not reflect the condition of such bridge or that the inspection did not accord with the standards contained in the Manual of Bridge Inspection.

County Highways (Ohio Revised Code, Section 5543.20): “The County Engineer shall inspect all bridges or portions thereof on the county highway system inside and outside of municipalities, bridges on township roads, and other bridges or portions of bridges for which responsibility for inspection is by law or agreement assigned to the county. If the responsibility for inspection of a bridge is not fixed by law or agreement and the county performs the largest share of maintenance on a bridge, inspection shall be made by the County Engineer.”

Township Roads (Ohio Revised Code, Section 5543.20): The County Engineer shall inspect all bridges or portions thereof on Township roads. The Board of Township Trustees is not prohibited from inspecting bridges within a Township.

Municipal Roads and Streets (Ohio Revised Code, Section 723.54): “The legislative authority of a municipality shall designate a municipal official to have responsibility for inspection of all bridges or portions thereof within such municipality, except for bridges on the state highway system and the county highway system.” The municipality is not prohibited from inspecting any bridge within its limits.

In addition to the above requirements of the Ohio Revised Code, the Code of Federal Regulations — 23 highways — Part 650 — Subpart C — National Bridge Inspection Standards state in part that these standards shall “apply to all structures defined as bridges located on all public roads” and that “each highway department shall include a bridge inspection organization capable of performing inspections, preparing reports, and determining ratings in accordance with the provisions of the AASHTO Manual and The Standards contained herein.”

RAILROAD BRIDGES: Railroad bridges over or under highways shall also be inspected annually. Section 5501.47 (B)(1)(c) states that the definition of a bridge includes “structures” upon which railroad locomotives or cars may travel.” The inspector shall inspect the entire structure taking note of structural deficiencies. Any problems requiring immediate attention should be relayed in writing to the owner of the bridge with a copy to PUCO.
Bridge Inspector Qualifications, Skills and Equipment

**Qualifications:** The inspector shall be a registered professional engineer who has expertise in the field of bridge design, construction, and maintenance, or a technician who has general knowledge of a structural behavior, experience with bridges, attended a Bridge Inspector's Training Course and who works under the direct supervision of a professional engineer qualified to perform inspections.

The Code of Federal Regulations — 23 highways — Part 650 — Subpart C requires that:
(a) The individual in charge of the organizational unit that has been delegated the responsibilities for bridge inspection, reporting, and inventory shall possess the following minimum qualifications:

(1) Be a registered professional engineer; or
(2) Be qualified for registration as a professional engineer under the laws of the State; or
(3) Have a minimum of 10 years experience in bridge inspection assignments in a responsible capacity and have completed a comprehensive training course based on the "Bridge Inspector's Training Manual," which has been developed by a joint Federal-State task force.

(b) An individual in charge of a bridge inspection team shall possess the following minimum qualifications:

(1) Have the qualifications specified in paragraph (a) of this section; or
(2) Have a minimum of 5 years experience in bridge inspection assignments in a responsible capacity and have completed a comprehensive training course based on the "Bridge Inspector's Training Manual," which has been developed by a joint Federal-State task force.

**Skills:** The inspector should be capable of climbing structural steel without difficulty. He should have the ability to letter legibly and to read bridge plans, visualize details, draw technical sketches, and operate a camera. He should possess a mechanical aptitude and a working knowledge in the use of measuring devices such as rules, tapes, protractors, and calipers. The inspector should have an awareness of potential hazards and exhibit a serious attitude toward safety precautions to be taken while climbing and inspecting bridges. The inspector must approach each task sincerely and with the proper motivation since his judgement and thoroughness is relied upon to guarantee public safety and to protect public investment with respect to bridges.

**Equipment:** The inspector should be equipped with a pocket tape, folding rule, 50 ft. tape, calipers, chipping hammer, scraper, sounding line, binoculars, camera, safety line, small magnifying glass, small mirror, flashlight, ladder, marking tools, safety belt, hardhat, etc.

Difficulty of access to any portions of the structure should not be allowed to prevent a thorough inspection. However, the inspector should not unnecessarily jeopardize his safety and should arrange for ladders, scaffolding and assistance as he deems necessary.
Frequency of Inspection

**Periodic Inspections:** Each bridge shall be inspected at least once each calendar year at approximately 12 month intervals. The report should be reviewed and submitted to the Engineer of Maintenance within 60 days from date of inspection. Under normal circumstances, the inspection should be performed and submitted as close to the 12-month interval as possible, to avoid the possibility of filing two inspections on a bridge in any one calendar year and none in the next year.

**Special Inspections:** Any bridge experiencing known or suspected damage as a result of collision, fire, major flood, earth shift, or other cause shall be inspected as soon after the incident as conditions permit. When it is evident that such damage is localized, only the damaged portion need be inspected; however, if a new inspection report is filed, all items must be re-coded.

Procedures for Initiating, Reporting Recording and Distributing Bridge Inspection Reports

**State Highways:** The District Deputy Director shall be responsible for inspection of all bridges presented as State responsibility that are within or contiguous to the District.

The District Bridge Engineer shall:

1. Perform, or supervise the inspector who performs the inspection of each bridge except when the inspection is being performed by a consultant.

2. Prepare, or review and approve, each Bridge Inspection Report.

3. Report immediately to the District Operations Engineer concerning any structure for which the State has inspection or maintenance responsibility, which he believes to be an immediate danger to life and property, and requires emergency action. This will enable the Operations Engineer to quickly provide the necessary protection and to notify the Central Office, Bureau of Maintenance of the situation. See Departmental Directive DH-9-OM.


5. Forward a copy of the Bridge Inspection Report to:
   a. The Structure Maintenance and Inspection Engineer, Bureau of Maintenance (original).
   b. Party or parties having responsibility for the maintenance when the State has no responsibility or shares responsibility for the maintenance.
   c. The responsible authority of each municipality in the District for each bridge in such municipality for which the State has inspection responsibility.

6. Maintain a file of the current Bridge Inspection Reports.
7. Revise the posting for reduced load limits, and the Bridge Inventory and Appraisal Code Sheet (BR-87) if any change is noted in the structure which warrants such action and send copies of revised records to the Structure Rating and Inventory Engineer, Bureau of Bridges and Structural Design.

**County Highways:** The County Engineer shall:

1. Perform, or supervise the inspector who performs, the inspection of each bridge except when the inspection is being performed by a consultant.

2. Prepare, or review and approve, each Bridge Inspection Report.

3. Report immediately to the Board of County Commissioners concerning any bridge, for which he has inspection or any maintenance responsibility, which is in a condition that he believes to be an immediate danger to life and property.

4. Report to the Board not later than 60 days after his annual inspection (*more frequently if the Board so requires*) the following:
   
   a. The condition of all bridges he is required to inspect.
   
   b. The identity of any bridge that is in a condition which he believes to be a potential danger to life or property.

5. Forward a copy of each pertinent Bridge Inspection Report to:
   
   a. The Ohio Department of Transportation, District Bridge Engineer, for each structure (*original*).
   
   b. The party or parties having responsibility for the maintenance when the County has no responsibility or shares responsibility for the maintenance.
   
   c. The Board of Township Trustees of each township for each bridge on the township road system of such township.

6. Maintain a file of the current Bridge Inspection Reports (BR-86).

7. Revise the posting for reduced load limits if warranted.

8. Revise and update the Bridge Inventory and appraisal code sheet (BR-87) if any change is noted in the structure which warrants such action and forward to the Ohio Department of Transportation, District Bridge Engineer.

**Township Roads:** Inspection of bridges on Township roads is the responsibility of the County Engineer.

**Municipal Roads and Streets:** The municipal official responsible for inspection of bridges shall:

1. Perform, or supervise the inspector who performs, the inspection of each bridge except in case of consultant assistance.

2. Prepare, or review and approve, each Bridge Inspection Report.
3. Report immediately to the authority concerning any bridge, for which the municipality has inspection or any maintenance responsibility, which is in a condition that he believes to be an immediate danger to life and property.

4. Report to the legislative authority not later than 60 days after his annual inspection (more frequently if the authority so requires) the following:
   a. The condition of all bridges he is required to inspect.
   b. The identity of any bridge that is in a condition which he believes to be a potential danger to life or property.

5. Forward a copy of each pertinent Bridge Inspection Report to:
   a. The Ohio Department of Transportation, District Bridge Engineer for each structure (original).
   b. The party or parties having responsibility for maintenance when the municipality has no responsibility or shares the responsibility for maintenance.

6. Update the Bridge Inventory. Revise and update the Bridge Inventory and appraisal code sheet (BR-87) if any change is noted in the structure which warrants such action and forward to the Ohio Department of Transportation, District Bridge Engineer.

   Reporting Forms

The Bridge Inventory and Appraisal Form (BR-87) and the Bridge Inspection Form (BR-86) are shown in the appendix. Substitute inspection forms may be used for the actual inspection, but the data submitted to the Department must be on the BR-86 Form. Forms can be acquired through the District Bridge Engineer upon request.

   Assistance and Consulting Services

The Director of Transportation will assist and cooperate with governmental units in the development of inspection procedures upon written request. Assistance with inspection of particular bridges and/or in preparation of the inspection forms can be obtained by contacting your District Bridge Engineer or the Structure Maintenance and Inspection Engineer, Bureau of Maintenance, Columbus, Ohio.

The State, counties, and municipal corporations may contract with Consulting Engineers experienced in this field for inspection services. If such Engineers are retained to make the inspection, the work need not be supervised by the governmental authority providing the inspection is made in conformance with this Bridge Inspection Manual, the findings are recorded on approved forms, and the Bridge Inspection Report is turned over to the authority for approval and processing. If the inspection is performed by Consulting Engineers, the firm's name is to appear in the "Reviewed By" blank.
Use of Nondestructive Testing

Nondestructive testing (NDT) procedures provide a means by which the extent of cracks and flaws either on the surface or subsurface can be detected. The use of NDT to examine structural members where damage is suspected, but cannot be seen, is advisable if the structure is vulnerable to complete collapse by failure of the suspect member. NDT also may be advisable for testing suspect members whose failure would render the bridge unable to carry traffic.

For steel members, radiographic techniques employed in conjunction with ultrasonic testing procedures likely will prove to be most effective. Magnetic particle inspection and dye penetrants also are useful in disclosing surface cracks and discontinuities and are, therefore, effective preliminary procedures. However, magnetic particle inspection in the field might prove to be impractical. For concrete members, the soniscope, reinforcing steel indicator, rebound hammer, and sounding bar may be utilized.

Equipment for ultrasonic testing, radiography, and for examination with the soniscope is relatively expensive, and considerable training in the techniques of testing is necessary to obtain satisfactory results. For this reason, the retention of a service company that specializes in such work probably will prove to be most economical where such NDT is deemed necessary.

Inspection Procedures

**General:** The field investigation of a bridge should be conducted in a systematic and organized procedure that will be efficient and minimize the possibility of any item being overlooked.

During the initial inspection of a structure, the Bridge Inventory Data should be checked in the field to reflect the “as built” conditions. Before making subsequent inspections the previous Bridge Inspection Report should be reviewed to ascertain the extent of previous deficiencies that may have progressed sufficiently to require immediate attention.

Deteriorated or damaged members which might affect the load carrying capacity of the bridge should be measured for loss of section and evaluated for condition. The measurements and physical evaluation should be recorded in sufficient detail to enable an Engineer to calculate the probable strength of the component being inspected.

The items listed on the inspection report should be used as a guide to assure reasonably complete inspections, but the inspector is cautioned that the list may not be complete and that the inspection should not be restricted by it. The report should not be regarded just as a check list.

Inasmuch as the report provides space for evaluation by code of the frequently encountered principal structure members or elements only, other items to complete the inspection should be described on the back of the report. In addition to the code evaluation, a brief description of any observed defect should be written in the space to the right of the item or on the back of the report.
Materials

To ascertain the extent of deterioration, materials of construction should be examined as follows:

**Concrete:** Concrete surfaces should be examined for spalling, scaling, cracking, inadequate cover or exposure of reinforcement, loss of section or broken reinforcement, and other defects as defined below:

- **Scaling:** The gradual and continuing loss of surface mortar and aggregate.
- **Spalling:** The separation and removal of a portion of the surface concrete revealing a fracture roughly parallel, or slightly inclined to the surface.
- **Cracks:** A crack is a linear fracture in the concrete and may extend partially or completely through a member. Cracks are classified as transverse, longitudinal, diagonal, pattern or map, D-Cracking, or random. Excessive cracking at areas of maximum moment or any shear cracking should be noted.

**Steel:** Structural steel should be examined for rust, cracks, bends or kinks, and stress concentrations as defined below. Connections and connectors should be carefully examined for looseness and section loss. Inspect structural steel partially encased in concrete at the face of exposure for deterioration and movement.

- **Rust:** The decomposition of steel by oxidation from exposure to air, moisture, deicing agents and industrial fumes. Areas of severe rusting should be cleaned and measured for loss of section.
- **Cracks:** Cracks in structural steel may vary from hairline to complete fractures. Any type of crack is obviously serious and should be reported immediately. Welds and base metal in regions of stress reversal should be examined closely for evidence of fatigue cracking. Look for cracks radiating from cuts or notches.
- **Bends and Kinks:** These conditions develop because of damage arising from thermal strain, overload and collision. Note the members damaged, the type, location, extent of damage and amount of deformation.
- **Stress Concentrations:** Observe the paint film around connections for fine cracks which are indications of large strains due to stress concentrations. Be alert for sheared or deformed bolts and rivets and fractured welds.
Timber: Timber should be examined for decay, crushing, splitting, insect damage and condition of connections as defined below:

Decay: Damage from decay may not be visible at the surface as it can be confined to the interior of the member. Check around connections, splices, bolt holes and other areas where moisture can penetrate.

Crushing and Splitting: Damage caused by collision, overloads or decay.

Stone: Stones should be examined for cracks, spalls, crushing, displacement or other deterioration. Mortar joints, if any, should be checked for cracking and overall soundness.

## Bridge Inventory and Inspection Reports

**Local Bridge Inventory:** Each political subdivision responsible for the inspection of bridges shall maintain a complete office inventory (card file, microfilm, etc.) of all bridges for which it has responsibility for inspection except that municipalities shall maintain an inventory of all bridges within (or partially within) the municipality. The inventory shall contain a complete material and dimensional description of the bridge; the structure type; number of spans; overall and detailed dimensions; load carrying capacity; date of construction; and other pertinent data, including a description of any repairs or alterations made subsequent to initial construction.

The local inventory shall name the political subdivision, commission, or company responsible by law or agreement for the inspection, as well as the party responsible by law or agreement for or the parties sharing in the maintenance.

The legal authority for both inspection and maintenance responsibilities shall be listed.

All “Bridges” as defined previously shall have an Inventory and Appraisal Form (BR-87), completed and filed with the Structure Rating and Inventory Engineer, Ohio Department of Transportation.

**Bridge Inspection Report:** The inspection report for a bridge shall be prepared by the inspector during examination of the bridge at the site. The reporting Form BR-86 (see Appendix A) complete with any special notations thereon comprises the Bridge Inspection Report. Inspection Reports for exceptionally large bridges should also be accompanied with photographs. The report should be sufficiently complete so that it can be ascertained from the information contained thereon whether or not loads currently permitted on the bridge can be allowed to continue to operate over the structure safely until the time of the next scheduled inspection. If possible, the report should be complete enough to aid in the preparation of plans for maintenance work which the inspection discloses to be needed.
Coding the Bridge Inspection Report Form (BR-86)

**General Information:** All items or data information on the Bridge Inventory and Appraisal Code Sheet (BR-87) which are common also to the Bridge Inspection Report (BR-86) must be identically entered on both (i.e., Structure File Number, Bridge Number, Municipal Code, Year Built, Bridge Type, Type Service, Feature Intersected, Inspection Responsibility, Maintenance Responsibility, Some Individual Items, etc.).

**Corrections:** Any corrections to the pre-printed information in the heading of the inspection report must be made by submitting a BR-87 change. Any corrections to the “type” codes or “material” pre-printed codes can be made by entering the correct code. The computer will then pre-print the corrected code on the following year’s BR-86. Any deletions to the “type” or “material” codes can be made by entering an “X” in the proper box. **Do not use an “X” code in any condition box** on the BR-86 form, however.

**HEADING**

**Structure File Number:** This number is the key to processing all bridge data. It is the permanent identification number for the entire data file on any particular structure. The number consists of a seven (7) digit numeral which is assigned specifically for that structure by the appropriate control authority. The first two digits of the number is the numeric code for the Ohio county in which the structure is located. It is imperative that this Structure File Number be entered legibly and accurately so that data will be processed to the proper bridge file. (See Bridge Inventory and Appraisal Coding Instructions for details).

In the case of one road bridged over another road, it is important to remember that **only one Structure File Number** can exist for that bridge and there can be **only one Inspection Report** filed for that particular bridge. It is imperative that duplication by two different agencies for the same bridge be avoided.

**Bridge Number:** The bridge number is made up of three separate parts, which are: A three letter county, township, city or other standardized abbreviation code; the complete route number description; and the unit number which consists of the bridge straight line mileage and any special designation codes for ramps, parallel structures, etc. (See Bridge Inventory and Appraisal Coding Instructions for details.) In particular, note that the route number description occurs in the instructions for “Inventory Route”. In all cases, the route and unit parts must be filled in; however, each bridge on file should have a separate and unique bridge number.
On divided highways with clearly separate and parallel structures for each direction of travel, each structure will carry the same straight line mileage designation, with the addition of the letter (L) for the left structure and (R) for the right or cardinal direction structure.

On divided highways where the deck is continuous across both directions of travel and median (except for a longitudinal joint near the center of the bridge) and where the type of superstructure is different in the two directions of travel, each side is considered a separate structure and shall be numbered (L) or (R) as previously described. If the superstructures are identical in both directions and the deck is continuous across the centerline, the bridge shall be considered as one structure and numbered accordingly.

For reference and handling purposes, it is important that the Bridge Number entered on the BR-86 match exactly the Bridge Number on the BR-87 for any particular bridge.

**Year Built:** A four digit inventory item in which the first two digits indicate the year of original construction and the second two digits the latest year of any rehabilitation or major improvements (see examples below). The first two digits in this entry will never change except when the bridge is completely replaced, at which time a new BR-87 and a new Structure File Number is created. A code “00” in the first two digits is used for years 1900 and earlier. (Only the last two digits of the year are coded.)

Examples: Built 1928, No rehabilitation or major improvement
           Code: 2800
Built 1914, Rehabilitated 1960
           Code: 1460
Built 1889, Rehabilitation or major improvement 1948, 1964
           Code: 0064

**Bridge Type:** Classification will be entered as a three (3) digit numeric code denoting the material, the overall type of structure, and the special design configuration of the main supporting member(s) of the superstructure. The code shall be shown for the main span(s) of the multi-span structure.

1st Digit - Material
1 Concrete
2 Prestressed Concrete
3 Steel
4 Timber
5 Stone
6 Aluminum
7 Cast Iron
8 Wrought Iron
0 Other
<table>
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<tr>
<th>2nd Digit - Type</th>
</tr>
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<tbody>
<tr>
<td>1 Slab</td>
</tr>
<tr>
<td>2 Beam</td>
</tr>
<tr>
<td>3 Box Beam</td>
</tr>
<tr>
<td>4 Truss</td>
</tr>
<tr>
<td>5 Arch</td>
</tr>
<tr>
<td>6 Girder</td>
</tr>
<tr>
<td>7 Frame</td>
</tr>
<tr>
<td>8 Suspension</td>
</tr>
<tr>
<td>9 Culvert</td>
</tr>
<tr>
<td>0 Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3rd Digit - Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Simple Span</td>
</tr>
<tr>
<td>2 Continuous</td>
</tr>
<tr>
<td>3 Deck</td>
</tr>
<tr>
<td>4 Thru</td>
</tr>
<tr>
<td>5 Filled</td>
</tr>
<tr>
<td>6 Orthotropic</td>
</tr>
<tr>
<td>7 Movable - Lift</td>
</tr>
<tr>
<td>8 Movable - Bascule</td>
</tr>
<tr>
<td>9 Movable - Swing</td>
</tr>
<tr>
<td>0 Other</td>
</tr>
</tbody>
</table>

**Type Service:** This entry is intended to show the type of service on the bridge and the type of service under the bridge using a three digit numeric code:

The first digit must be the numeric which indicates whether the inventory route is on or under the structure.

- 1 Route on structure
- 2 Route under structure

The second digit indicates the type of service on the structure.

- 1 Highway
- 2 Railroad
- 3 Pedestrian Exclusively
- 4 Highway - Railroad
- 5 Highway - Pedestrian
- 6 Overpass structure at an interchange or second level of a multi-level interchange
- 7 Third Level (Interchange)
- 8 Fourth Level (Interchange)
- 9 Building or Plaza
- 0 Other
The third digit indicates the type of service under the structure.

1. Highway, with or without Pedestrian
2. Railroad
3. Pedestrian Exclusively
4. Highway - Railroad
5. Waterway
6. Highway - Waterway
7. Railroad - Waterway
8. Highway - Railroad - Waterway
9. Relief
0. Other

**Feature(s) Intersected:** Enter the name or names of the feature(s) intersected by the inventory route.

## Coding of Individual Items

The inspector should use his/her best judgement in rating the condition of an item. He/she should analyze the effect of the individual item in its relationship to: the safety of the traveling public, the integrity of the structure, the other items or components of the bridge and the amount of repair necessary to restore the member to good condition. The inspector should rate the items by visualizing them in their "new" or "as-built" condition as compared to their current condition.

The condition of individual bridge items shall be rated by the inspector at the site using the following codes:

<table>
<thead>
<tr>
<th>Code</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good Condition - No repair required.</td>
</tr>
<tr>
<td>2</td>
<td>Fair Condition - Minor deficiency, item still functioning as designed.</td>
</tr>
<tr>
<td>3</td>
<td>Poor Condition - Major deficiency, item in need of repair to continue functioning as designed.</td>
</tr>
<tr>
<td>4</td>
<td>Critical Condition - Item no longer functioning as designed.</td>
</tr>
</tbody>
</table>

Type and material codes are required with some of the items. The codes to be used are listed in the individual item descriptions. These codes are to be entered only on the first inspection report and will be preprinted to the left of the coding boxes on subsequent reports. These need not be recoded unless types and materials are changed on the bridge.

### DECK

The primary function of the bridge deck is to provide a riding surface and to transmit the wheel loads to the supporting members. It also provides a support for curbs, walkways, railings, medians, expansion joints, and provides a surface to transmit drainage off the bridge.
**Item 1. Floor**

The floor is the primary load carrying member of the deck and should be inspected top and bottom for evidence of leakage, deterioration and structural inadequacy. The condition of slab type structures, the top slab of prestressed concrete box beams and the top flange of prestressed concrete tee beams, should be coded under this item. The first digit is the type code and the second is the condition.

**Type Code**
1. Reinforced concrete
2. Laminated timber strip
3. Timber plank
4. Filled steel grid
5. Open steel grid
6. Corrugated steel plate
7. Steel buckle plate
8. Steel checker plate
9. Steel jack arch
0. Other

**Item 2. Wearing Surface (Protective System)**

The primary function of a wearing surface is to provide a smooth riding surface and to protect the underlying floor. It should be examined for smoothness, cracks, drainage, debris, and signs of deterioration.

The kind of wearing surface material on the structure should be recorded. One of the codes listed below should be used to code the wearing surface material and type of protective system. *(Select only one of the codes below.)*

**Type Code**
1. Concrete - no protective system
2. Asphaltic concrete - no protective system
3. Asphalt block
4. Grating - open or closed
5. Wood planking
6. Asphaltic concrete with known membrane
7. Other
8. Asphaltic concrete with cathodic protection

**Concrete With Coated Rebar Protective System**
A. Epoxy
B. Galvanized
C. Other coating
Concrete - Special Concrete Protective System

D Low slump dense concrete
E Polymer modified concrete (Latex Modified Concrete)
F Polymer impregnated concrete
G Internally sealed concrete
H Other type of special concrete

J Any combination of the above
N Not applicable

Several of these type codes will have to be determined from office records and field investigation.

Item 3. Curbs, Sidewalks and Walkways

Curbs, sidewalks and walkways do not normally contribute to the structural strength of the bridge. They are provided mainly for motorist safety and pedestrian convenience and protection. They should be examined for deterioration, security of connections and hazards to pedestrians.

Type Code
1 Concrete
2 Steel
3 Timber
0 Other

Item 4. Median

The primary function of median is to separate oncoming traffic travelling in the opposite direction. It may be level or raised and may or may not have barrier guardrails. It may be closed or have an open expansion or construction joint. Examine for deterioration, damage and security of connection of the guardrail.

Item 5. Railing

Safety is the primary function of railings and they should be sufficient to protect both pedestrians and vehicles. Examine for deterioration, damage, security of connections and safety hazards.

Type Code
1 Reinforced Concrete Parapet
2 Reinforced Concrete and Steel
3 Reinforced Concrete and Aluminum
4 Concrete Post and Steel Panel
5 Concrete Panel and Post
6 Steel Panel and Post
7 Steel Guardrail
8 Timber
9 None
0 Other

Note: If more than one type of rail exists, code the type and condition of the most inadequate.
Item 6. Drainage

Effective drainage is essential for the proper maintenance of a bridge. Examine the drainage system for clogging, ponding, deterioration and adequacy.

Type Code
1 Over the side
2 Opening thru curbs or wheelguards
3 Scuppers with downspouts
4 Inlets with drain pipes
5 Drain trough under open joints
0 Other

Item 7. Expansion Joints

Expansion joints provide for the expansion and contraction of the bridge superstructure. Examine carefully for proper opening, anchorage, and deterioration. Also check beam to backwall clearances.

Type Code
1 Metal Finger
2 Sliding Metal Plate or Angle
3 Elastomeric Compression Seal
4 Poured
5 Open
9 None
0 Other

Note: If more than one type on same structure, code the most representative type and condition.

Item 8. Deck Summary

The Deck Summary is to be rated by the inspector or the reviewer after careful analysis of the deck section items using the following codes:

Type Code
9 New Condition
8 Good condition - no repairs needed
7 Generally good condition - potential exists for minor maintenance
6 Fair condition - potential exists for major maintenance
5 Generally fair condition - potential exists for minor rehabilitation
4 Marginal condition - potential exists for major rehabilitation
3 Poor condition - repair or rehabilitation required immediately
2 Critical condition - the need for repair or rehabilitation is urgent. Facility should be closed, or closely monitored, until the indicated repair is complete.
1 Critical condition - facility is closed. Study should determine the feasibility for repair.
0 Critical condition - facility is closed and is beyond repair.
SUPERSTRUCTURE

The entire portion of a bridge which receives the deck loads and transmits the reaction therefrom to the substructure.

Item 9. Alignment

The superstructure should be examined for any discontinuities in the vertical or horizontal alignment due to settling, shifting, accident damage, etc.

Item 10. Beams or Girders

Longitudinal members transferring deck or floor system loads directly to substructure. Examine carefully for deterioration (particularly loss of member cross sectional area), loose connections, cracks or deformations due to overloading and damage (collision or flood). Indicate on report if beams are weathering steel or galvanized steel (not in coding boxes).

Type Code
1. Rolled steel
2. Riveted built-up steel
3. Welded built-up steel
4. Concrete tee beam
5. Concrete girder
6. Prestressed concrete box beam
7. Prestressed concrete I-beam
8. Timber
0. Other

Note: Code the type and condition of the most representative.

Item 11. Diaphragms or Crossframes

Secondary members in beam and girder bridges placed to distribute stresses and improve rigidity. Examine for condition and security of connections. Fatigue prone connections should be closely inspected and reported.

Floor System (Items 12, 13, 14)

A system of joists and floor beams which transfers the deck load to the main girders or trusses. The joists are sometimes omitted on short panel lengths in which case the floor itself spans between floor beams. Check all members for condition, alignment and security of connection.
**Item 12. Joist**

The joists span between floor beams and provide the primary support for the deck system. The deck loading is transmitted to the joists and through the joists to the floor beams and then to the truss or girder.

**Item 13. Floor Beams**

The transverse members which support the joists or floor and transmit the loads to the main longitudinal girders or trusses.

**Item 14. Floor Beam Connections**

The end connections or hangers attaching the floor beams to the trusses or main girders are particularly critical where they are exposed to moisture and de-icing chemicals. Check for loose or broken connections and loss of section.

Generally, Items 15-23 pertain only to truss type bridges and should only be coded when inspecting a truss bridge.

**Item 15. Verticals**

Vertical members extending between top and bottom chords which will resist either tension or compression stresses depending on the truss configuration. Most verticals are also main structural members and their failure would usually be critical and render the truss unsafe.

**Item 16. Diagonals**

The diagonal members extending between successive top and bottom chords and will either resist tension or compression depending on the truss configuration. Most diagonals are also main structural members and their failure would be extremely critical and render the truss unsafe.

**Item 17. End Posts**

The end compression member of a truss, either vertical or inclined, extending between chords and functioning to transmit the truss end reaction to the bearings.

**Item 18. Top Chord**

The upper longitudinal member extending the full length of the truss, *(from end post to end post)*. For a simple span, the top chord is designed to always be in compression. Failure of this chord will render the truss unsafe.
Item 19.  Lower Chord

The lower longitudinal member extending the full length of the truss. For a simple span, the lower chord is designed to always be in tension. Failure of this chord will render the truss unsafe.

Bracing

The secondary system of members which distributes loads, stabilizes the bridge against torsional and wind loadings, prevents buckling of compression chords, and integrates the separate main member systems. Check all members for condition, alignment, collision damage, and security of connection.

Item 20.  Lower Lateral Bracing

The bottom lateral braces lie in the plane of the bottom chord, or bottom girder flange, and provide lateral stability and resistance to wind stresses.

Note: In general, Items 12, 13, 20, 21, 22 and 23 can be considered secondary structural members and although their failure should receive immediate attention, an individual member failure will not render the structure unsafe.

Item 21.  Top Lateral Bracing

The top lateral braces lie in the plane of the top chord and provide lateral stability between the two trusses and resistance to wind stresses.

Item 22.  Sway Bracing

Sway braces are secondary structural members spanning between the trusses at interior panel points which provide lateral stability and shear transfer between trusses. In the case of low or pony trusses the sway bracing may take the form of knee bracing on the outside of the trusses.

Item 23.  Portals

A heavy sway frame which is found overhead at the ends of a thru truss and provides lateral stability and shear transfer between trusses.
Item 24. Bearing Devices

Bearing devices transmit the superstructure load to the substructure. They also provide for longitudinal movement due to expansion and contraction and rotational movement due to deflection. The bridge bearings are vitally important to the functioning of the structure. If they are not kept in good working order, stresses may be induced into the structure that will shorten the usable life of the bridge. Check all components of a bearing for deterioration, movement, alignment, contact, security of connection and lubrication where necessary. Generally, bridges have both fixed and expansion bearing devices. Code the type and condition of the expansion bearing devices.

Type Code
1 Rollers
2 Rockers
3 Sliding
4 Elastomeric
9 None (Condition code not required)
0 Other

Item 25. Arch

In general, any structure having throughout its length a curved shaped. The curve may be elliptical, circular, papabolic or combination shape. The most common types are the Filled Spandrel Arch, Open Spandrel Arch, Open Spandrel Ribbed Arch and Thru Arch. These are generally constructed of concrete or stone. Check all members for deterioration, alignment and signs of failure.

Item 26. Arch Columns or hangers

The vertical members which bear on or hang from the arch and support the superstructure.

Item 27. Spandrel Walls

A wall built upon an arch to function as a retaining wall for the roadway in a spandrel filled structure; but, when the spandrel is not filled, to support the floor system and its loads.

Item 28. Suspension System

(Note: Items 28-32 pertain only to suspension bridges.) The main cables or chains from which the floor system is suspended. Check all members carefully for deterioration, alignment, security of connections, movement or signs of distress.
Item 29. **Suspenders**

The generally vertical wire cables, metal rods or bars designed to engage a cable band or other device connecting them to the main suspension cable at one end and to the suspended superstructure at the other end, thus permitting them to assist in supporting the bridge floor system and its superimposed loads by transferring loads to the main suspension members of the structure.

A member serving to support another member in a horizontal or an inclined position against sagging, twisting, or other deformation due to its own weight.

Item 30. **Towers**

A large pier or a frame extending well above the roadway and serving to support the cables or chains of a suspension type bridge at the end of a span.

Item 31. **Bent Posts**

The shorter towers at the ends of the bridge which support the main cable or chain. Generally, the cable or chain is nearly horizontal at this point and then abruptly changes direction and goes immediately down to the anchorages.

Item 32. **Anchorage**

The complete assemblage of members and parts whether composed of metal, masonry, wood or other material designated to hold in correct position the anchor span of a cantilever bridge, the end of a suspension span cable or a suspension span backstay, the end of a restrained beam, girder or truss span, a retaining wall, bulkhead, or other portion of a structure.

Item 33. **Bridge Machinery**

The mechanism of a movable bridge which causes the bridge to lift or swing; also includes the locking mechanisms which secure the bridge in position for traffic service.
Item 34.  Paint

Painting is the primary means by which steel is protected from the elements and it is imperative that the condition of the paint film be thoroughly inspected. Code the last two digits of the year of the last painting and the current condition of the paint film according to the following:

Condition Code
1  Good - Preventative maintenance only
2  Fair - Mottled appearance or signs of rust stains. Third priority for painting program.
3  Poor - Scaling, rust, flaking or a beginning of loss of steel section. Second priority for painting program.
4  Critical - Numerous areas bare, rusted areas in areas of paint failure or overhead leakage, first priority for painting program.

For all paint conditions, the percent of rust should be indicated on the back of the Inspection Form.

Item 35.  Live Load Response

Observe the bridge from beneath while heavy vehicles (trucks) are crossing so as to ascertain excessive deflection, vibration, unusual noises and other indications of structure defects.

Condition Code
E  Excessive
S  Satisfactory (normal)

Item 36.  Superstructure Summary

Item 36 is a summary item to be rated by the inspector or the reviewer after careful analysis of the superstructure section. In most all cases, the superstructure rating should not be influenced by the deck rating. An exception to this would be a concrete slab bridge.

Condition Codes
9  New
8  Good Condition - No repairs needed
7  Generally good condition - potential exists for minor maintenance
6  Fair condition - potential exists for major maintenance
5  Generally fair condition - potential exists for minor rehabilitation
4  Marginal condition - potential exists for major rehabilitation
3  Poor condition - repair or rehabilitation required immediately
2  Critical condition - the need for repair or rehabilitation is urgent. Facility should be closed, or closely monitored, until the indicated repair is complete.
1  Critical condition - facility is closed. Study should determine the feasibility for repair.
0  Critical condition - facility is closed and is beyond repair
**SUBSTRUCTURE**

The substructure of a bridge is that portion that transmits the loads and stresses from the structural deck, superstructure, or load supporting system to the ground. Underwater investigation should be done as needed to assure that scour and undermining is not threatening the bridge.

**Material Codes (For Items 37 and 39)**

1. Stone
2. Concrete
3. Concrete and Stone
4. Timber
5. Steel
6. Steel and Timber
7. Steel and Concrete
8. Other

**Item 37. Abutments**

A substructure supporting the ends of a single span or the extreme ends of a multispans superstructure and, in general, retaining or supporting the approach embankment. Examine abutments for condition, movement, bulging, cracking, settlement, joint integrity, leakage, and scour.

**Type Code**

1. Gravity
2. Cantilever
3. Solid wall
4. Cellular or “U”
5. Stub - gravity
6. Stub - capped pile
7. Integral
8. Pedestal
9. Capped pile bent
10. Other

**Item 38. Abutment Seats**

Check bearing areas for cracking, spalling and other signs of failure. The edges are particularly critical under beams or bearing devices.

**Item 39. Piers**

A substructure supporting the ends of the spans of a multispans superstructure at intermediate locations between the abutments. Examine for condition, movement or settlement, and scour.
Type Code
1 Gravity
2 Cantilever (Tee) - Open panel
3 Cantilever (Tee) - Solid panel
4 Pedestal
5 Capped pedestal
6 Open bent
7 Capped Open bent
8 Capped pile
9 Tower
0 Other

**Item 40. Pier Seats**

The upper most part of a pier upon which the superstructure rests. Check bearing areas for cracking, spalling and other signs of failure. The edges are particularly critical under beams and bearing devices.

**Item 41. Backwalls**

The topmost portion of an abutment extending above the bridge seat which functions primarily as a retaining wall for the approach embankment. It may also serve as a support for an approach slab. Check backwalls for condition and amount of clearance between beam ends and face of backwall which may indicate abutment movement or pavement pressures.

**Item 42. Wingwalls**

Extensions of abutments to retain approach embankment. Check for condition and evidence of movement.

**Item 43. Fenders and Dolphins**

Fenders and dolphins around piers or abutments protect the substructure against collision by vessels. They are designed to absorb the energy of physical contact with the vessel. Check for condition, damage and security of connection.

**Item 44. Substructure Summary**

The substructure condition shall be summarized by the inspector or the reviewer after careful analysis of the substructure items using the following codes:

Condition Codes
  9 New Condition
  8 Good Condition - no repairs needed
Condition Codes (Con't.)
7 Generally good condition - potential exists for minor maintenance
6 Fair condition - potential exists for major maintenance
5 Generally fair condition - potential exists for minor rehabilitation
4 Marginal condition - potential exists for major rehabilitation
3 Poor condition - repair or rehabilitation required immediately
2 Critical condition - the need for repair or rehabilitation is urgent. Facility should be closed, or closely monitored, until the indicated repair is complete.
1 Critical condition - facility is closed. Study should determine the feasibility for repair.
0 Critical condition - facility is closed, and beyond repair.

CULVERTS

Culvert type bridges are structures which convey water or form a passageway through an embankment and are designed to support super-imposed loads of earth or other fill material plus a live load. Generally, prefabricated or corrugated metal structures 10' span or greater are considered to be culvert type bridges. Masonry arches with integral spandrel walls, sidewalks and railings shall not be coded in this section. **Note:** Items 45, 46, 47 and 48 shall not be coded unless the structure is inventoried as a “Culvert Type Structure.” The second digit of the Bridge Type should be coded “9” (to indicate a culvert) in the heading of the BR-86 Form.

**Item 45. General**

Check all culvert type bridges for deterioration, settlement, open joints, plugging, cracks or signs of movement.

<table>
<thead>
<tr>
<th>Type Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slab Top</td>
</tr>
<tr>
<td>2</td>
<td>Box (Concrete, Aluminum, Steel)</td>
</tr>
<tr>
<td>3</td>
<td>Pipe - Circular</td>
</tr>
<tr>
<td>4</td>
<td>Pipe - Arch</td>
</tr>
<tr>
<td>5</td>
<td>Pipe - Elliptical</td>
</tr>
<tr>
<td>6</td>
<td>Arch</td>
</tr>
<tr>
<td>0</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Item 46. Alignment**

Check the alignment of the culvert barrel being especially critical of discontinuities between any adjacent culvert segments.

**Item 47. Headwalls or End Walls**

Headwalls or endwalls are designed to retain the embankment and prevent the water from undermining the culvert ends. Check all headwalls or endwalls for deterioration, settlement, undercutting and signs of failure such as cracking.
Type Code
1  Concrete
2  Stone
3  Metal
4  Wood
0  Other

Item 48. Culvert Summary

The culvert condition shall be summarized by the inspector or the reviewer after careful analysis of the culvert items using the following codes:

Condition Code
9  New Condition
8  Good Condition - no repairs needed
7  Generally good condition - potential exists for minor maintenance
6  Fair condition - potential exists for major maintenance
5  Generally fair condition - potential exists for minor rehabilitation
4  Marginal condition - potential exists for major rehabilitation
3  Poor condition - repair or rehabilitation required immediately
2  Critical condition - the need for repair or rehabilitation is urgent. Facility should be closed, or closely monitored, until the indicated repair is complete.
1  Critical condition - facility is closed. Study should determine the feasibility for repair.
0  Critical condition - facility is closed and is beyond repair.

Note: This item cannot be coded unless the second digit of the bridge type shown in heading is a "9" (which indicates a culvert).

CHANNEL

Channels should be examined to determine whether any condition exists that could in any way cause damage to the bridge, embankment or other areas surrounding the bridge. Note the alignment, protection and adequacy of all waterways.

Item 49. Alignment

The channel should align with and cause the stream to flow under the center of the structure. The channel banks should be parallel with the substructure, such as piers and abutments.

Item 50. Protection

The method, if any, used to protect the bridge and the upstream channel banks from scour and other degradation caused by the stream action. Note and rate the type and condition of all channel protection and spur dikes.
Type Code
1 Concrete
2 Stone
3 Sheet Piling
4 Piling
5 Rip Rap
0 Other

Item 51. Waterway Adequacy

Scour and stream bed degradation are actually the result of inadequate waterway areas. The geometry of the channel, the amount of debris carried during high water periods, and the adequacy of freeboard should be considered in determining waterway adequacy. Where large quantities of debris and ice are expected, sufficient freeboard is of the greatest importance. Check for scour of stream beds and banks, sandbars or debris which could change the direction of flow, or other obstructions which could influence the adequacy of the waterway.

Item 52. Channel Summary

The channel condition shall be summarized by the inspector or the reviewer after careful analysis of channel items using the following codes:

Condition Codes
9 New Condition
8 Good Condition - no repairs needed
7 Generally good condition - potential exists for minor maintenance
6 Fair condition - potential exists for major maintenance
5 Generally fair condition - potential exists for minor rehabilitation
4 Marginal condition - potential exists for major rehabilitation
3 Poor condition - repair or rehabilitation required immediately
2 Critical condition - the need for repair or rehabilitation is urgent. Facility should be closed, or closely monitored, until the indicated repair is complete.
1 Critical condition - facility is closed. Study should determine the feasibility for repair.
0 Critical condition - facility is closed and is beyond repair

APPROACHES

A smooth transition between the roadway pavement and the bridge deck is important for the reduction of impact forces acting upon the bridge and for driving safety. A difference in elevation between the bridge deck and the approach pavement increases impact and vibration as the vehicle reaches the bridge. Rough approaches will also cause vibration in the vehicle, which in turn, transmits added vibration to the bridge.
**Item 53. Pavement**

Note and rate the condition of the approach pavement.

**Type Code**

1  Concrete  
2  Bituminous  
0  Other  

**Item 54. Approach Alignment**

Note and rate the effect of the alignment of the approach pavement on the impact to the bridge and safety to the vehicle. (In this item the inspector is not rating the condition of the approach alignment, but rather the acceptability of the alignment by today's standards.)

**Item 55. Grade**

Note and rate the effect of the grade of the approach pavement on the impact to the bridge and safety to the vehicle.

**Item 56. Approach Slabs**

Note and rate the condition, settlement or other signs of failure of the approach slab.

**Item 57. Guardrail**

Note the type and condition of the approach guardrail.

**Type Code**

1  Steel Beam  
2  Flexible Steel Plate  
3  Steel Cable  
4  Steel Tape  
5  Timber Rail  
6  Timber and Steel Cable  
7  Concrete Deflective Parapet  
9  None  
0  Other
Item 58. Relief Joints

Relief joints are transverse openings in concrete pavements which are filled with asphalt concrete or other compressible material. These joints are placed in the vicinity of bridges to help alleviate the pressure on backwalls caused by pavement expansion in the summer months. Determine the presence of and rate the condition of these joints.

Item 59. Embankment

Note the general condition of the approach embankment for indications of settlement, bulging, stream scour and saturation from entrapped water.

Item 60. Approaches Summary

The condition of the approaches shall be summarized by the inspector or the reviewer using the following codes:

Condition Codes
- 9 New condition
- 8 Good condition - no repairs needed.
- 7 Generally good condition - potential exists for minor maintenance
- 6 Fair condition - potential exists for major maintenance
- 5 Generally fair condition - potential exists for minor rehabilitation
- 4 Marginal condition - potential exists for major rehabilitation
- 3 Poor condition - repair or rehabilitation required immediately
- 2 Critical condition - the need for repair or rehabilitation is urgent. Facilities should be closed, or closely monitored, until the indicated repair is complete.
- 1 Critical condition - facility is closed. Study should determine the feasibility for repair.
- 0 Critical condition - facility is closed and is beyond repair.

GENERAL

Items in this section are of a general nature and do not relate to specific bridge elements.

Item 61. Navigation Lights

Determine whether all required navigation lights are operating and properly located. Examine the lighting fixtures for condition, visibility, electrical connections and security of attachment to insure uninterrupted service.
**Item 62. Warning Signs**

All signs which advise the traveling public of restricted load limits, restricted width, restricted vertical clearance and reduced speed limits are to be inspected for legibility and condition, including any advance warning signs. Notations should be made on back side of BR-86 as to required signs which are missing or are in need of replacement due to damage or weathering.

**Item 63. Inspection Responsibility**

The inspection responsibility belongs to the agency *legally responsible* for inspection (as *established in the Ohio Revised Code*) or by written agreement transferring this responsibility to another agency.

*This Item is not to be coded* on this report, but will be preprinted based on data contained on the Bridge Inventory and Appraisal Code Sheet (BR-87). For the inspector’s information only, the codes which will appear in this box are:

1. State Transportation Department
2. Other State Agency
3. County Agency
4. City or Other Local Agency
5. Federal Agency
6. Railroad
7. Other Private
8. Combination

**Item 64. Maintenance Responsibility**

The maintenance responsibility belongs to the agency legally responsible for the maintenance of the bridge.

*This Item is not to be coded* on this report, but will be preprinted based on data contained on the Bridge Inventory and Appraisal Code Sheet (BR-87). For the inspector’s information only, the codes which will appear in this box are the same as for Item 63.

**Item 65. Vertical Clearance**

Indicate if a vertical clearance restriction exists for vehicular traffic which passes either on or below the bridge using the following codes:

1. A restriction exists above or below the bridge. (*25’ or less*)
2. The restriction has changed since the last inspection. (*Due to changed conditions such as resurfacing.*)

N  Does not apply to this bridge.

(Note: *Code only the last box. Do not use first three boxes.*)

The check should also be made to determine if the necessary signing is in place for structures with 13’-6" vertical clearance or less.
Item 66. General Appraisal and Operational Status

This is a two part item. The first box is for coding the general, overall condition of the bridge. The second box is for coding the operational status of the bridge. The operational status of the bridge should be coded by the inspector using the following codes:

“C” Bridge is closed to all traffic.

“P” Bridge is open to traffic, but is load restricted (i.e., physically signed for a load reduction or load limit.)

“A” Bridge is open to traffic with no load restrictions.

Rate the overall structural condition, taking into account the major structural deficiencies. The Appraisal Rating is to be based partially on the Deck, Superstructure, Substructure Condition ratings and the load carrying capacity.

The condition of the deck should have a relatively small influence on this appraisal rating and rarely should the appraisal rating for the structural condition be less than “4” due to a bridge deck problem. Exceptions to this would be concrete slab, T-beam and box girders. The minimum numerical rating of “4” is realistic if only the bridge deck needs replacement and the rest of the supporting superstructure is to remain in place. A lower rating could be justified if a significant amount of additional reconstruction or replacement is required on the rest of the superstructure to restore the load carrying capacity of the bridge.

The bridge is appraised not only on physical condition, but also on load carrying capacity of the superstructure and substructure. Therefore, a well-maintained bridge may still be appraised at a “4” or “5” because the original design load or the inventory rating was less than today’s standard.

Of first importance are those items whose malfunction or loss would adversely affect the integrity of the structure. For example, a loose expansion device, a pier cap that needs concrete work, or a damaged truss portal, should not classify a bridge as a “basically intolerable condition.”

The general appraisal of the bridge shall be coded by the reviewer after a careful analysis of aspects of the bridge condition using the following codes:

Condition Code
9 New Condition
8 Good condition - no repairs needed
7 Generally good condition - potential exists for minor maintenance
6 Fair condition - potential exists for major maintenance
5 Generally fair condition - potential exists for minor rehabilitation
4 Marginal condition - potential exists for major rehabilitation
Condition Code (Con't.)

3  Poor condition - repair or rehabilitation required immediately
2  Critical condition - the need for repair or rehabilitation is urgent. Facility should be closed, or closely monitored, until the indicated repair is complete.
1  Critical condition - facility is closed. Study should determine the feasibility for repair.
0  Critical condition - facility is closed and is beyond repair.

**Note:** If a code of “1” or “0” is entered in the condition box, a “C” must be entered in the status box. In this case a “1” or “0” must also appear in at least one other summary box to indicate which area of the bridge is in critical condition to cause the closure.

When a bridge is closed due to condition, the percent legal loads on the BR-87 must be changed to 000% immediately, but not before the BR-86 is submitted. On a closed bridge that is to be reopened to traffic, a BR-87 change must be submitted raising the percent legal load to something greater than 000%, before a revised BR-86 can be submitted.

**Item 67. Inspected By**

The inspector is to sign the inspection report and code the date of the inspection along with his first and last initials in the appropriate boxes. The inspector shall also type or print his name directly under his signature.

**Item 68. Reviewed By**

The reviewer of the report is to sign the report and code the date along with his first and last initials in the appropriate boxes. A reviewer's signature is not required if the inspector is a registered professional engineer. The reviewer must be a professional engineer registered in the State of Ohio if the inspector is not. The signature should be followed by a "P.E." to indicate that the reviewer (or inspector) is a registered professional engineer. In cases where the inspection is performed by a consultant, the report should contain a signature along with the firm's name. The reviewed date must always be subsequent to the inspected date.
Item 69. Survey

These eight boxes are currently being used to gather data which relates to the operational safety status of the bridge. All eight boxes must be filled in for this survey to be valid.

The codes to be used are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Inspected feature does not meet currently acceptable standards.* Code “0” for a condition where guardrail is required and none is provided.</td>
</tr>
<tr>
<td>1</td>
<td>Inspected feature meets currently acceptable standards.* Code “1” for a condition where guardrail is not required.</td>
</tr>
<tr>
<td>N</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

*Currently acceptable standards should take into account traffic volume and speed, types of vehicles in the traffic stream, height of bridge, and underbridge conditions and activities. Thus, currently acceptable standards for a “farm to market” bridge railing and approach rail should usually differ from that for an expressway.

<table>
<thead>
<tr>
<th>Box No.</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Bridge railings: Some factors that affect the proper functioning of bridge railing are height, material, strength, and geometric features. Railings must be capable of smoothly redirecting an impacting vehicle. Bridge railings should be evaluated using the AASHTO “Standard Specifications for Highway Bridges” as a guide for establishing a currently acceptable standard.</td>
</tr>
<tr>
<td>(2)</td>
<td>Transitions: The transition from approach rail to bridge railing requires that the approach rail be firmly attached to the bridge railing. It also requires that the approach railing be gradually stiffened as it comes closer to the bridge railing. The ends of curbs and safety walks need to be gradually tapered out or shielded.</td>
</tr>
<tr>
<td>(3)</td>
<td>Approach guardrail: The structural adequacy and compatibility of approach guardrail with transition designs should be determined. Rarely does the need for a barrier stop at the end of a bridge. Thus an approach guardrail with adequate length and structural qualities to shield motorists from the hazards at a bridge site needs to be installed. In addition to being capable of safely redirecting an impacting vehicle, the approach rail must also facilitate a transition to the bridge railing that will not cause snagging or pocketing of an impacted vehicle. Acceptable guardrail design suggestions are contained in the AASHTO Guide for Selecting, Locating, and Designing Traffic Barriers.</td>
</tr>
<tr>
<td>Box No.</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>(4)</td>
<td>Approach rail ends: As with guardrail ends in general, the ends of approach rails to bridges should be flared, buried, made breakaway, or shielded. Design treatment of guardrail ends is given in the AASHTO Guide for Selecting, Locating, and Designing Traffic Barriers.</td>
</tr>
<tr>
<td>(5)</td>
<td>Pavement Marking: At or on the structure - centerline or lane lines, edge lines for structure with berm.</td>
</tr>
<tr>
<td>(6)</td>
<td>Restriction Signing: Regulatory signing such as load limit or spacing.</td>
</tr>
<tr>
<td>(7)</td>
<td>Warning Signing: Narrow bridge, One lane, Vertical Clearance.</td>
</tr>
<tr>
<td>(8)</td>
<td>Bridge End Markers: Delineation at ends of structure for narrow structures.</td>
</tr>
</tbody>
</table>
Miscellaneous Additional Information for Coding the BR-86 Form

Do not enter more than one character in any coding box. If the item to be coded consists of more than one material or type, use the code which indicates the “most representative” or the “least adequate” material or type. Likewise, the condition code should be selected which indicates the “most representative” or “least adequate” condition. See individual item descriptions for specific instructions. The “X” code is not allowed in any condition box. The “X” code is only to be used in the type and material boxes to instruct the keypunch operators to eliminate the previous coding altogether in that particular item. To change a type code, just code in new character. Send in original reports only. The carbons and copies should be kept in the District file or the County office. Always use the preprinted forms, not hand written ones, to assure accuracy of the bridge information year after year. The only exceptions for using blank BR-86’s are:

1) Newly inventoried bridges (inspections which are submitted at the same time as the corresponding BR-87 or bridges which were filed after the time of printing of the pre-printed BR-86 Forms).

2) Critical condition bridges which need to be inspected more than once a year.

If the pre-printed information on the BR-86 does not reflect the latest file information (because the BR-87 change sheet was submitted after the BR-86 was printed) simply cross out the incorrect information and enter correct information above it. It is simpler to submit a hand corrected preprinted BR-86 than to fill out a complete new one. Note: This can only be done if the BR-87 changes have already been submitted.

If a pre-printed BR-86 is received for a bridge that has been replaced, destroy the pre-printed BR-86 and fill out a blank BR-86. In this instance, the old bridge must have already been retired and a new BR-87 submitted for the new bridge, as described in the Bridge Inventory and Appraisal Coding Guide.

An inventory sheet (BR-87) must always be on file for a particular bridge before the corresponding inspection report BR-86 can be accepted.

For non-culvert type bridges, all applicable Summary Items must be filled in (except Item 48) in order to generate a sufficiency rating for the bridge.

For culvert type bridges, only Summary Items 48, 52 and 60 (whichever are applicable) must be filled in to obtain a sufficiency rating.
# Bridge Inspection Report

**STATE OF OHIO: DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**BRIDGE INSPECTION REPORT**

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>BRIDGE TYPE</th>
<th>TYPE SERVICE</th>
<th>YEAR BUILT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DECK**  
1. TREADS  2. WEARING SURFACE  3. CURBS & WALKWAYS  4. MEDIAN  5. RAILING  6. DRAINAGE  7. EXPANSION JOISTS  8. SUMMARY

**SUPERSTRUCTURE**  

**SUBSTRUCTURE**  
36. ANCHOR PLATE  37. ANCHOR SEATS  38. ANCHOR SEATS

**FEET**  
39. SUPPORTS  40. PIER SEATS  41. SUPPORTS  42. WINGWALLS  43. SUMMARY

**TENDERS & DOCKING**  
44. SUMMARY

**COFFERS**  
45. ALIGNMENT  46. GADLENS

**HEADWALLS & ENDWALLS**  
48. SUMMARY  49. ALIGNMENT

**CHANNEL**  
50. PIPE  51. PIPE  52. SUMMARY

**WATERWAY DEFENCE**  
53. APPROACHES  54. ALIGNMENT

**GENERAL**  
55. GENERAL

**INSPECTION RESPONSIBILITY**  
56. INSPECTION RESPONSIBILITY  57. MAINTENANCE RESPONSIBILITY

**VERTICAL CLEARANCE**  
58. SUMMARY  59. GENERAL

---

**APPENDIX A**

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**CHECKED**  
**ASSISTANT INSPECTOR**  
**INSPECTOR**  
**REVIEWED BY**

---

**DATE**  
**REVIEW**  
**REVIEWED**  
**REVIEWED**

---

USE REVERSE SIDE FOR ADDITIONAL DETAILS