U.S. Department
of Transportation
Federal Highway
Administration

Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges

Office of Engineering
Bridge Division

December 1988

Foreword

This revised Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Guide) represents several years of effort by the Federal Highway Administration with the States' cooperation and comments, both individually and through the AASHTO Bridge Subcommittee.

The new Guide will bring about more uniform and accurate ratings for bridges, should minimize any inequities in apportionments of bridge funds and will serve as a basis for developing the level of service method for evaluating bridge needs.

Initial distribution of the Guide is being made directly to each FHWA field office for distribution to the States. Additional copies are available from the Bridge Management Branch (HNG-33) of the FHWA Bridge Division.

Thomas O. Willett, Director
Office of Engineering

Under the Paper Work Reduction Act and CFR 1320 the Structure Inventory and Appraisal sheet reporting requirements are pending OMB clearance under 2125-0501.

RECORDING AND CODING GUIDE FOR THE STRUCTURE INVENTORY AND APPRAISAL OF THE NATION'S BRIDGES

Report No. FHWA-ED-89-044

OMB No. 2125-0501

U.S. Department
of Transportation
Federal Highway Administration

Prepared by

Office of Engineering
Bridge Division
Bridge Management Branch
Washington, D.C. 20590

December 1988

TABLE OF CONTENTS

		Page
Introduction		vi
Definition of Terms		viii
Data Items		
1	State Code	1
2	State Highway Department District	1
3	County (Parish) Code	1
4	Place Code	2
5	Inventory Route	2
6	Features Intersected	5
7	Facility Carried by Structure	5
8	Structure Number	6
9	Location	6
10	Inventory Route, Minimum Vertical Clearance	6
11	Milepoint	7
12	Road Section Number	7
13	Bridge Description	7
14	Defense Milepoint	7
15	Defense Section Length	7
16	Latitude	7
17	Longitude	8
18	Physical Vulnerability	8
19	Bypass, Detour Length	8
20	Toll	9
21	Maintenance Responsibility	10
22	Owner	11
23	Federal-aid Project Number	11
24	Highway System	11
25	Administrative Jurisdiction	11
26	Functional Classification of Inventory Route	11
27	Year Built	12
28	Lanes On and Under the Structure	12
29	Average Daily Traffic	13
30	Year of Average Daily Traffic	14
31	Design Load	14
32	Approach Roadway Width	14
33	Bridge Median	16
34	Skew	17
35	Structure Flared	17
36	Traffic Safety Features	17
37	Historical Significance	19
38	Navigation Control	19
39	Navigation Vertical Clearance	20
40	Navigation Horizontal Clearance	20
41	Structure Open, Posted, or Closed to Traffic	20
42	Type of Service	21
43	Structure Type, Main	22
44	Structure Type, Approach Spans	23
45	Number of Spans in Main Unit	24
46	Number of Approach Spans	24
47	Inventory Route, Total Horizontal Clearance	24

Item		Page
48	Length of Maximum Span	25
49	Structure Length	26
50	Curb or Sidewalk Widths	28
51	Bridge Roadway Width, Curb-to-Curb	30
52	Deck Width, Out-to-Out	31
53	Minimum Vertical Clearance Over Bridge Roadway	31
54	Minimum Vertical Undercl earance	31
55	Minimum Lateral Underclearance on Right	33
56	Minimum Lateral Underclearance on Left	35
57	Wearing Surface - Protective System	35
--	Condition Ratings	35
58	Deck	36
59	Superstructure	37
60	Substructure	37
61	Channel and Channel Protection	38
62	Culverts	39
63	Estimate Remaining Life	40
64	Operating Rating	40
65	Approach Roadway Alignment	42
66	Inventory Rating	42
--	Appraisal Ratings	42
67	Structural Evaluation	44
68	Deck Geometry	46
69	Underclearances, Vertical and Horizontal	50
70	Bridge Posting	53
71	Waterway Adequacy	54
72	Approach Roadway Alignment	55
73	Year Needed	56
74	Type of Service	56
75	Type of Work	56
76	Length of Structure Improvement	58
77	Proposed Design Loading of Improvement	60
78	Proposed Roadway Width	60
79	Proposed Number of Lanes	60
80	Design ADT	60
81	Year of Estimated ADT	60
82	Year of Proposed Adjacent Roadway Improvements	60
83	Type of Proposed Adjacent Roadway Improvements	60
84	Cost of Improvements	60
85	Preliminary Engineering	60
86	Demolition	60
87	Substructure	60
88	Superstructure	61
89	(Reserved)	61
90	Inspection Date	61
91	Designated Inspection Frequency	61
92	Critical Feature Inspection	62
93	Critical Feature Inspection Date	63
94	Bridge Improvement Cost	63
95	Roadway Improvement Cost	64
96	Total Project Cost	64

Item		Page
97	Year of Improvement Cost Estimate	65
98	Border Bridge	65
99	Border Bridge Structure Number	65
100	Defense Highway Designation	66
101	Parallel Structure Designation	66
102	Direction of Traffic	67
103	Temporary Structure Designation	67
104	Highway System of the Inventory Route	68
105	(Reserved)	68
106	Year Reconstructed	68
107	Deck Structure Type	69
108	Wearing Surface/Protective System	69
109	Average Daily Truck Traffic	71
110	Designated National Network	71
111	Pier or Abutment Protection (for Navigation)	71
112	NBIS Bridge Length	72
113	Scour Critical Bridges	74
114	Future Average Daily Traffic	76
115	Year of Future Average Daily Traffic	76
116	Minimum Navigation Vertical Clearance Vertical Lift Bridge	76
General		77

Appendix A	Structure Inventory and Appraisal Sheet
Appendix B	Sufficiency Rating Formula and Example
Appendix C	National Bridge Inspection Standards
Appendix D	Commentary

Introduction

The Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, hereafter referred to as the Guide, has been revised several times in the past. This latest edition revises the Guide to provide more thorough and detailed guidance in evaluating and coding specific bridge data. Several items collected previously have been deleted while new items have been added for an improved and more comprehensive data base. Some items in the Guide have 'also been expanded to provide more definitive and explicit explanations and instructions for coding. For example, the Appraisal section has specific criteria provided which shall be used by inspectors in the evaluation of all bridges. Further, basic definitions applicable to the instructions in the Guide are provided. The changes are based on comments received on the previous Guide and were developed through a joint State-Federal Task Force. This revised Guide should be thoroughly reviewed by each individual involved with the National Bridge Inspection Program.

This Guide, which has been endorsed by the AASHTO Subcommittee for Bridges and Structures, has been prepared for use by the States in recording and coding the data elements that will comprise the National Bridge Inventory data base. By having a complete and thorough inventory, an accurate report can be made to the Congress on the number and state of the Nation's bridges, arranged in a manner that would best suit needs for future legislation. The Guide also provides the data necessary for the Federal Highway Administration (FHWA) to produce Defense Bridge and Federal Emergency Management Agency (FEMA) reports.

The coded items in this Guide are considered to be an integral part of the data base that can be used to meet several Federal reporting requirements, as well as part of the States' needs. These requirements are set forth in the National Bridge Inspection Standards (23 CFR 650.3) which are included as Appendix C. A complete, thorough, accurate, and compatible data base is the foundation of an effective bridge management system and will require collection of additional items over those contained in this Guide. Reports submitted in connection with the Highway Bridge Replacement and Rehabilitation Program and the National Bridge Inspection Program also are related to this Guide. Obviously, it is intended that present data and future reports be developed using the National Bridge Inventory data base.

The AASHTO Manual for Maintenance Inspection of Bridges (called AASHTO Bridge Manual in this Guide) discusses the various items of information that are to be recorded as part of original bridge reports. That manual and the Bridge Inspector's Training Manual, with supplements, discuss inspection procedures and the preparation of detailed reports about the structure components. These reports will be the basis for recording values for many of the data elements shown in the Guide, particularly those having to do with the condition or the appraisal ratings.

The Structure Inventory and Appraisal (SI&A) Sheet and the sufficiency rating formula, with examples, are included as Appendices A and B, respectively. The SI&A sheet is intended to be a tabulation of the pertinent elements of information about an individual structure. Its use is optional, subject to the statements in the preceding paragraph of this Introduction. It is important to note that the SI&A Sheet is not an inspection form but merely a summary sheet of bridge data required by the FHWA to effectively monitor and manage a National bridge program.

Each State is encouraged to use the codes and instructions in this Guide. However, its direct use is optional; each State may use its own code scheme provided that the data is directly translatable into the Guide format. When data are requested-by FHWA, the format will be based on the codes and instructions in the Guide. A State choosing to use its own codes shall provide for translation or conversion of its own codes into those used in the Guide. In other words, the States are responsible for having the capability to obtain, store, and report certain information about bridges whether or not this Guide or the SI&A Sheet is used. Any requests by FHWA for submittals of these data will be based on the definitions, explanations, and codes supplied in the Guide, the AASHTO Bridge Manual, the Bridge Inspector's Training Manual plus supplements, and the Defense Bridges and Critical Highway Facilities Reports - FHPM Vol. 6, Chapter 10, Section 2.

The values provided in the tables or otherwise listed in this Guide are for rating purposes only. Current design standards must be used for structure design or rehabilitation. All possible combinations of actual site characteristics are not provided in this Guide. If a special situation not listed in the Guide is encountered, the evaluation criteria closest to the actual site situation should be used.

Items listed as no longer used are not to be submitted to FHWA. However, item numbers for deleted items have not been reused and are available for State use.

The implementation of this Guide may require some restructuring of an agency's data base and support software. If so, it is suggested that the agency consider the additional enhancements that would be necessary to eventually support a bridge management system.

Appendix D is a Commentary that compares, item by item, the 1979 Guide to this current Guide. The Commentary will provide a ready reference for item changes.

Definition of Terms

For clarity, the definitions of some terms used in the Guide are provided below.

(a) Bridge. The National Bridge Inspection Standards published in the Code of Federal Regulations (23 CFR 650.3) give the following definition:

> A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

(b) Defense Items. The items required for producing Defense Bridge and Federal Emergency Management Agency (FEMA) reports. Completion of the data contained in the Guide will provide the required data for a defense route on the bridge. The data required for underpassing records are identified in Item 5 - Inventory Route. The following items in the structure inventory have been designated for "official use only" and the information is restricted for use between government agencies within the United States.

Item Number	Description
6	Features Intersected (last digit only) designates critical facility
16	Latitude
17	Longitude
100	Defense Highway Designation

(c) Inventory Route. The route for which the applicable inventory data is to be recorded. The inventory route may be on the structure or under the structure. Generally inventories are made from west to east and south to north.

(d) National Bridge Inventory (NBI). The aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Bridge Inspection Standards that each State shall prepare and maintain an inventory of all bridges subject to the NBIS.

(e) National Bridge Inventory (NBI) Record. Data which has been coded according to the Guide for each structure carrying highway traffic or each inventory route which goes under a structure. These data are furnished and stored in a compact alphanumeric format on magnetic tapes or disks suitable for electronic data processing.

(f) National Bridge Inspection Standards (NBIS). Federal regulations establishing requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a State bridge inventory. The NBIS apply to all structures defined as bridges located on all public roads.

(g) Public Road. Any road under the jurisdiction of and maintained by a public authority and open to public travel.

(h) Structure Inventory and Appraisal (SI&A) Sheet. The graphic representation of the data recorded and stored for each NBI record in accordance with this Guide.

Data Items

Item 1 - State Code

3 digits

The first 2 digits are the Federal Information Processing Standards (FIPS) code for States, and the third digit is the FHWA region code. (New Jersey and New York will retain an FHWA region code of 2.)

Code	State	Code	State
014	Alabama	308	Montana
020	Alaska	317	Nebraska
049	Arizona	329	Nevada
056	Arkansas	331	New Hampshire
069	California	342	New Jersey
088	Colorado	356	New Mexico
091	Connecticut	362	New York
103	Delaware	374	North Carolina
113	District of Columbia	388	North Dakota
124	Florida	395	Ohio
134	Georgia	406	Oklahoma
159	Hawaii	410	Oregon
160	Idaho	423	Pennsylvania
175	Illinois	441	Rhode Island
185	Indiana	454	South Carolina
197	Iowa	468	South Dakota
207	Kansas	474	Tennessee
214	Kentucky	486	Texas
226	Louisiana	498	Utah
231	Maine	501	Vermont
243	Maryland	513	Virginia
251	Massachusetts	530	Washington
265	Michigan	543	West Virginia
275	Minnesota	555	Wisconsin
284	Mississippi	568	Wyoming
297	Missouri	721	Puerto Rico

Item 2 - State Highway Department District

2 digits

The highway district in which the bridge is located shall be represented by a 2-digit code. Existing district numbers shall be used where districts are identified by number. Where districts are identified by name, a code number shall be assigned based on an alphabetical listing of the districts.

Item 3 - County (Parish) Code

3 digits

Counties shall be identified using the Federal Information Processing Standards (FIPS) codes given in the current version of the Census of Population and Housing - Geographic Identification Code Scheme.

Item 4 - Place Code 5 digits

Cities, towns, townships, villages, and other census-designated places shall be identified using the Federal Information Processing Standards (FIPS) codes given in the current version of the Census of Population and Housing - Geographic Identification Code Scheme. If there is no FIPS place code, then code all zeros.

Item 5 - Inventory Route 9 digits

The inventory route is a g-digit code composed of 5 segments.

Segment	Description	Length
5A	Record Type	1 digit
5B	Route Signing Prefix	1 digit
5C	Designated Level of Service	1 digit
5D	Route Number	5 digits
5E	Directional Suffix	1 digit

Item 5A - Record Type 1 digit

There are two (2) types of National Bridge Inventory records: "on" and "under." Code the first digit (leftmost) using one of the following codes:

Code	Description
1	Route carried "on" the structure
2	Single route goes "under" the structure
A through Z	Multiple routes go "under" the structure

A signifies the first of multiple routes under the structure.
B signifies the second of multiple routes under the structure.
Z signifies 26 routes under the structure.

"On" signifies that the inventory route is carried "on" the structure. Each bridge structure carrying highway traffic must have a record identified with a type code = 1 (numeric). All of the NBI data items must be coded, unless specifically excepted, with respect to the structure and the inventory route "on" it.

"Under" signifies that the inventory route goes "under" the structure. If an inventory route beneath the structure is on a Federal-aid system, is a defense route or is otherwise important, a record must be coded to identify it. The type code must be 2 or an alphabetic letter A through Z. Code 2 for a single route under and code A, B, C, D, etc. consecutively for multiple routes under the same structure. Defense routes shall be listed first. When this item is coded 2 or A through Z, only the following items must be coded: Items 1, 3-11, 16, 17, 19, 20, 26-29, 42, 43, 47-49, 100-104, and 110. All other items are to remain blank.

Item 5A - Record Type (cont'd)

It cannot be overemphasized that all route-oriented data must agree with the coding as to whether the inventory route is "on" or "under" the structure.

Tunnels shall be coded only as an "under" record; that is, they shall not be coded as a structure carrying highway traffic.

There are situations of a route "under" a structure, where the structure does not carry a highway, but may carry a railroad, pedestrian traffic, or even a building. These are coded the same as any other "under" record and no "on" record shall be coded.

Item 5B - Route Signing Prefix — 1 digit

In the second position, identify the route signing prefix for the inventory route using one of the following codes:

Code	Description
1	Interstate highway
2	U.S. numbered highway
3	State highway
4	County highway
5	City street
6	Federal lands road
7	State lands road
8	Other (include toll roads not otherwise indicated or identified above)

When 2 or more routes are concurrent, the highest class of route will be used. The hierarchy is in the order listed above.

Item 5C - Designated Level of Service — 1 digit

In the third position, identify the designated level of service for the inventory route using one of the following codes:

Code	Description
0	None of the below
1	Mainline
2	Alternate
3	Bypass
4	Spur
6	Business
7	Ramp, Wye, Connector, etc.
8	Service and/or unclassified frontage road

Item 5D - Route Number — 5 digits

Code the route number of the inventory route in the next 5 positions. This value shall be right justified in the field with leading zeros filled in. (See examples below.)

If concurrent routes are of the same hierarchy level, denoted by the route signing prefix, the lowest numbered route shall be coded. Code 00000 for bridges on roads without route numbers.

Item 5E - Directional Suffix — 1 digit

In the last position, code the directional suffix to the route number of the inventory route when it is part of the route number, using one of the following codes:

Code	Description
0	Not applicable
1	North
2	East
3	South
4	West

In some cases, letters may be used with route numbers and as part of the route numbers and not to indicate direction. In such cases, the letter should be included in the 5-position route number field.

EXAMPLES:	Record	Code
Interstate 95, on	1 1 1 00095 0	111000950
Interstate 70S, under	2 1 1 00070 3	211000703
State Highway 104, Spur, under	2 3 4 00104 0	234001040
U.S. 30E Bypass, on	1 2 3 00030 2	123000302
City street, on	1 5 0 00000 0	150000000
Ramp from I-81, under	2 1 7 00081 0	217000810
County Highway 173 on	1 4 1 00173 0	141001730
Interstate 84 under	2 1 1 00084 0	211000840
Interstate 495 on	1 1 1 00495 0	111004950
State Hwy 120 (Defense Rte) under	A 3 1 00120 0	A31001200
Alternate State Hwy 130 under	B 3 2 00130 0	B32001300
Tunnel on Interstate 70	2 1 1 00070 0	211000700

Item 6 - Features Intersected — 25 digits

This item contains a description of the features intersected by the structure and a critical facility indicator. There are 25 digits divided into 2 segments.

Segment	Description	Length
6A	Features Intersected	24 digits
6B	Critical Facility Indicator	1 digit

The information to be recorded for this item in the first 24 digits shall be the name or names of the features intersected by the structure. When one of the features intersected is another highway, the signed number or name of the highway shall appear first (leftmost) in the field. The names of any other features shall follow, separated by a semicolon or a comma. Parentheses shall be used to provide a second identification of the same feature (see third example). Abbreviations may be used where necessary, but an effort shall be made to keep them meaningful. The data in this segment shall be left justified in the first 24 positions without trailing zeros.

A structure on a designated defense highway considered to be a critical facility, which is defined in FHPM Volume 6, Chapter 10, Section 2, shall be identified by an asterisk in the 25th position. A non-critical facility shall have the digit blank.

EXAMPLES:

I 81, US 51, MILL ROAD *
SR 772, MISSISSIPPI R
SR 42 (POND ROAD)

Item 7 - Facility Carried by Structure — 18 digits

The facility being carried by the structure shall be recorded and coded. This item shall be left justified without trailing zeros.

EXAMPLES:

COUNTY ROAD 450
us 66
MAIN STREET
C & 0 RAILROAD (appropriate for "under" record only)
PEDESTRIAN BRIDGE (appropriate for "under" record only)

Item 8 - Structure Number — 15 digits

It is required that the official structure number be recorded. It is not necessary to code this number according to an arbitrary national standard. Each agency should code the structure number according to its own internal processing procedures. When recording and coding for this item and following items, any structure or structures with a closed median should be considered as one structure, not two.

The structure number must be unique for each bridge within the State, and once established should preferably never change for the life of the bridge. If it is essential that a structure number(s) must be changed, then a complete cross reference of corresponding "old" and "new" numbers must be provided to the FHWA Bridge Division. The cross reference shall include both a computer tape and a printed listing in the FHWA required format.

The identical structure number must appear on the "on" and all "under" records associated with a particular structure. (Refer to Item 5 - Inventory Route).

One of the major problems with structure numbers has been the shifting of numbers left or right in the 15 spaces provided. Therefore, it is recommended that all 15 digits be filled and that there be no embedded blank spaces.

Item 9 - Location — 25 digits

This item contains a narrative description of the bridge location. It is recommended that the location be keyed to a distinguishable feature on an official highway department map such as road junctions and topographical features. This item shall be left justified without trailing zeros.

EXAMPLES:

6 MI. SW. OF RICHMOND
3.5 MI. S. OF JCT. SR 69

Item 10 - Inventory Route, Minimum Vertical Clearance — 4 digits
(XX feet XX inches)

Code the minimum vertical clearance over the inventory route identified in Item 5, whether the route is "on" the structure or "under" the structure. The minimum clearance for a lo-foot width of the pavement or traveled part of the roadway where the clearance is the greatest shall be recorded and coded in feet and inches. For structures having multiple openings, clearances for each opening shall be recorded, but only the greatest of the minimum clearances- for the two or more openings shall be coded regardless of the direction of travel. This would be the practical maximum clearance. When no restriction exists, code 9999.

Item 11 - Milepoint (XXX-XXX miles) 6 digits

If a milepoint location reference system is being used in the State, code a 6-digit number to represent the milepoint to thousandths of a mile (with an assumed decimal point). If mileage is coded to the hundredth, it may be used and the item zero filled. The milepoint shall reference the beginning (or other point the State uses) of the structure in the direction of increasing mileage of the inventory route identified in Item 5.

Code all zeros if a milepoint location cannot be determined or is not appropriate. If the milepoint location of the structure is at the beginning of the route mileage, code with a nominal value of 000001 rather than 000000.

Item 12 - Road Section Number

Item no longer used.

Item 13 - Bridge Description

Item no longer used. See Items 100, 101, 102, and 103.

Item 14 - Defense Milepoint

Item no longer used.

Item 15 - Defense Section Length

Item no longer used.

Item 16 - Latitude (XX degrees XX.X minutes) 5 digits

For bridges on defense highways, record and code the latitude of each in degrees, minutes and tenths of minutes (with an assumed decimal point). The point of the coordinate may be the beginning of the bridge in the direction of the inventory or any other point the State has chosen to use. If the bridge is not on a defense highway, a code of all zeros is acceptable, but it is preferable to code the latitude if available.

EXAMPLE:	Code
Latitude is 35°27.3'	35273

Item 17 - Longitude (XXX degrees XX.X minutes) 6 digits

For bridges on defense highways, record and code the longitude of each in degrees, minutes and tenths of minutes (with an assumed decimal point). A leading zero shall be coded where needed. The point of the coordinate may be the beginning of the bridge in the direction of the inventory or any other point the State has chosen to use. If the bridge is not on a defense highway, a code of all zeros is acceptable, but it is preferable to code the longitude if available.

EXAMPLE:	Code
Longitude is 81°5.8'	081058

Item 18 - Physical Vulnerability

Item no longer used.

Item 19 - Bypass, Detour Length (XX miles) 2 digits

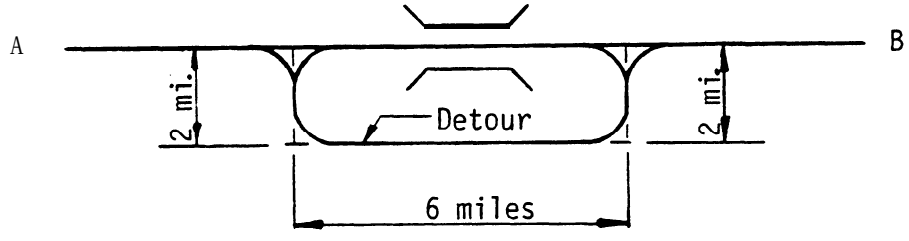
If a ground level bypass is available at the structure site for the inventory route, record and code the detour length as 00.

If the bridge is one of twin bridges and is not at an interchange, code 01 where the other twin bridge can be used as a temporary bypass with a reasonable amount of crossover grading. In other cases, indicate the actual length to the nearest mile of the detour length. The detour length should represent the total additional travel for a vehicle which would result from closing of the bridge. The factor to consider when determining if a bypass is available at the site is the potential for moving vehicles, including military vehicles, around the structure. This is particularly true when the structure is in an interchange. For instance, a bypass likely would be available in the case of diamond interchanges, interchanges where there are service roads available, or other interchanges where the positioning and layout of the ramps is such that they could be used without difficulty to get around the structure. Code 99 for 99 miles or more.

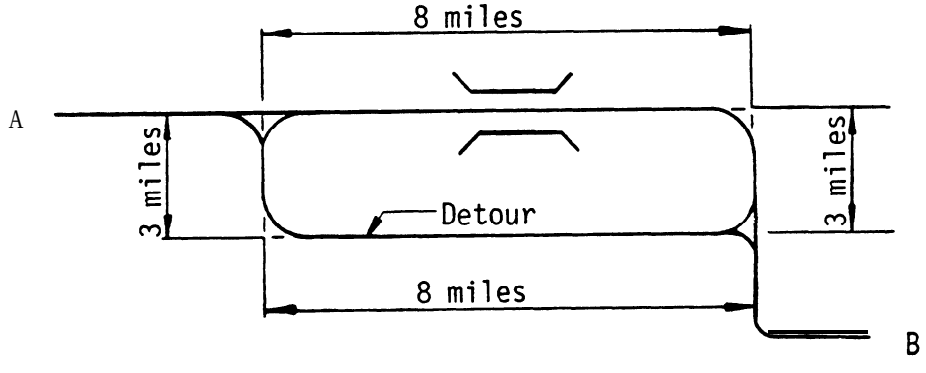
The detour route will be established following allowable criteria determined by the governing authority. (Some authorities will not allow a designated detour over a road or bridge of lesser "quality.")

Item 19 - Bypass, Detour Length (cont'd)

EXAMPLES:	Code
Diamond interchange, structure bypassable	00
Cloverleaf, not bypassable; 8-mile detour	08
Structure over river; 121-mile detour	99
Structure over highway, no interchange, bypassable at ground level	00
Structure on dead end road	99



Bypass, Detour Length A - B = 4 miles



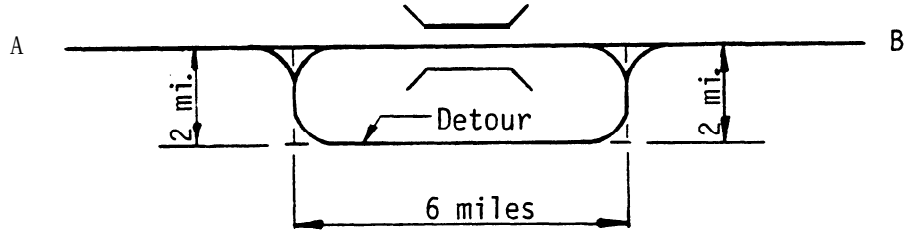
Bypass, Detour Length A - B = 0 miles

Item 20 - Toll — 1 digit

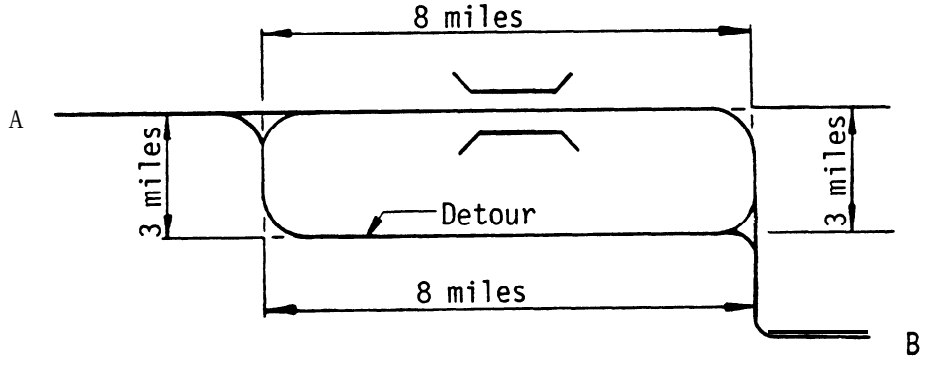
The toll status of the structure is indicated by this item. Interstate toll segments under Secretarial Agreement (Section 105 of 1978 Federal-Aid Highway Act) shall be identified separately. Use one of the following codes:

Item 19 - Bypass, Detour Length (cont'd)

EXAMPLES:	Code
Diamond interchange, structure bypassable	00
Cloverleaf, not bypassable; 8-mile detour	08
Structure over river; 121-mile detour	99
Structure over highway, no interchange, bypassable at ground level	00
Structure on dead end road	99



Bypass, Detour Length A - B = 4 miles



Bypass, Detour Length A - B = 0 miles

Item 20 - Toll — 1 digit

The toll status of the structure is indicated by this item. Interstate toll segments under Secretarial Agreement (Section 105 of 1978 Federal-Aid Highway Act) shall be identified separately. Use one of the following codes:

Item 22 - Owner — 2 digits

The actual name(s) of the owner(s) of the bridge shall be recorded on the inspection form. The codes used in Item 21 - Maintenance Responsibility shall be used to represent the type of agency that is the primary owner of the structure. If more than one agency has equal ownership, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Item 23 - Federal-aid Project Number

Item no longer used.

Item 24 - Highway System

Item no longer used. (See Item 104)

Item 25 - Administrative Jurisdiction

Item no longer used.

Item 26 - Functional Classification of Inventory Route — 2 digits

For the inventory route, code the functional classification using one of the following codes:

Code		Description
	Rural	
01		Principal Arterial - Interstate
02		Principal Arterial - Other
06		Minor Arterial
07		Major Collector
08		Minor Collector
09		Local
	Urban	
11		Principal Arterial - Interstate
12		Principal Arterial - Other Freeways or Expressways
14		Other Principal Arterial
16		Minor Arterial
17		Collector
19		Local

Item 26 - Functional Classification of Inventory Route (cont'd)

The codes must be compatible with the codes for Item 104 - Highway System of the Inventory Route. The bridge shall be coded rural if not inside a designated urban area. The urban or rural designation shall be determined by the bridge location and not the character of the roadway.

Item 27 - Year Built — 4 digits

Record and code the year of construction of the structure. Code all 4 digits of the year in which construction of the structure was completed. If the year built is unknown, provide a best estimate. See Item 106 - Year Reconstructed.

EXAMPLES:		Code
Construction completed	1956	1956
	1892	1892

Item 28 - Lanes On and Under the Structure — 4 digits

Record and code the number of lanes being carried by the structure and being crossed over by the structure as a 4-digit number composed of 2 segments. The number of lanes should be right justified in each segment with leading zero(s) coded as required.

Segment	Description	Length
28A	Lanes on the structure	2 digits
28B	Lanes under the structure	2 digits

Include all lanes carrying highway traffic (i.e., cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane for the entire length of the structure or under the structure by the owning/maintaining authority. This shall include any full width merge lanes and ramp lanes, and shall be independent of directionality of usage (i.e., a l-lane bridge carrying. 2-directional traffic is still considered to carry only one lane on the structure).

When the inventory route is "on" the bridge (the first digit of Item 5 - Inventory Route is coded 1), the sum of the total number of lanes on all inventoried routes under the bridge shall be coded. When the inventory route is "under" the bridge (the first digit of Item 5 - Inventory Route is coded 2 or A through Z), the number of lanes shall be coded for the inventory route only.

When the inventory route is "under" the structure, the obstruction over the inventory route may be other than a highway bridge (railroad, pedestrian, pipeline, etc.). Code 00 for these cases if there are no highway lanes on the obstructing structure.

Item 28 - Lanes On and Under the Structure (cont'd)

Double deck bridges may be coded as 1 or 2 structures as noted in the examples below. Either method is acceptable, however, all related data must be compatible with the method selected.

EXAMPLES*:	Code
1 lane on, 0 lanes under	0100
3 lanes on, 1 lane under	0301
8 lanes on 2-way, 12 lanes under **	0812
5 lanes on double deck each direction, 2 lanes under	1002***
5 lanes on double deck each direction, 2 lanes under	0502****
Railroad and pedestrian on, 4 lanes under	0004

* For the inventory route on the bridge, the first digit of Item 5 - Inventory Route is coded 1.

** This example has 3 inventory routes under the bridge of 6, 4, and 2 lanes of 2-way traffic respectively. When coding an "under" record for each of these inventory routes, the first digit of Item 5 - Inventory Route is coded A, B, and C, and Item 28 is coded 0806, 0804, and 0802 respectively for the 3 required records.

*** Acceptable if coded as 1 bridge. However, other data such as ADT, curb-to-curb width, etc., must be for both decks.

****Acceptable if coded as 2 separate bridges. However, other data such as ADT, curb-to-curb width, etc., must be for a single deck.

Item 29 - Average Daily Traffic 6 digits

Code a 6-digit number that shows the average daily traffic volume for the inventory route identified in Item 5. Make certain the unit's position is coded even if estimates of ADT are determined to tens or hundreds of vehicles; that is, appropriate trailing zeros shall be coded. The ADT coded should be the most recent ADT counts available. Included in this item are the trucks referred to in Item 109 - Average Daily Truck Traffic.

The ADT must be compatible with the other items coded for the bridge. For example, parallel bridges with an open median are coded as follows: if Item 28 - Lanes On and Under the Structure and Item 51 - Bridge Roadway Width, Curb-to-Curb are coded for each bridge separately, then the ADT must be coded for each bridge separately (not the total ADT for the route).

EXAMPLES:		Code
Average Daily Traffic	540	000540
	15,600	015600
	24,000	024000

Item 30 - Year of Average Daily Traffic — 2 digits

Record the year represented by the ADT in Item 29. Code the last 2 digits of the year so recorded.

EXAMPLE:	Code
Year of ADT is 1988	88

Item 31 - Design Load — 1 digit

Use the codes below-to indicate the live load for which the structure was designed. The numerical value of the railroad loading should be recorded on the form. Classify any other loading, when feasible, using the nearest equivalent of the loadings given below.

Code	Description
1	H 10
2	H 15
3	HS 15
4	H 20
5	HS 20
6	HS 20+Mod
7	Pedestrian
8	Railroad
9	HS 25
0	Other or Unknown (describe on recording form)

Item 32 - Approach Roadway Width (XXX feet) — 3 digits

Code to the nearest foot a 3-digit number that represents the normal width of usable roadway approaching the structure. Usable roadway width will include the width of traffic lanes and the widths of shoulders where shoulders are defined as follows:

> Shoulders must be constructed and normally maintained flush with the adjacent traffic lane, and must be structurally adequate for all weather and traffic conditions consistent with the facility carried.

Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane is not to be considered a shoulder for this item.

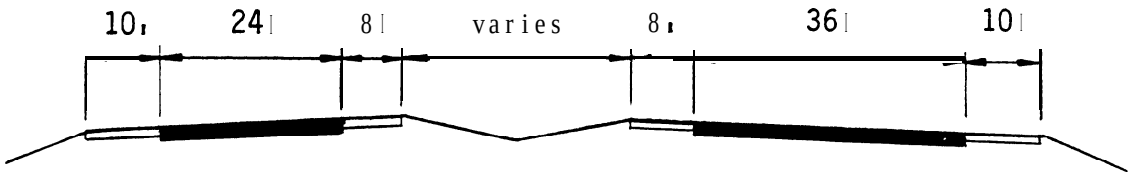
For structures with medians of any type and double-decked structures, this item should be coded as the sum of the usable roadway widths for the approach roadways (i.e., all median widths which do not qualify as shoulders should not be included in this dimension). When there is a variation between the approaches at either end of the structure, record and code the most restrictive of the approach conditions.

Item 32 - Approach Roadway Width (cont'd)

EXAMPLES:

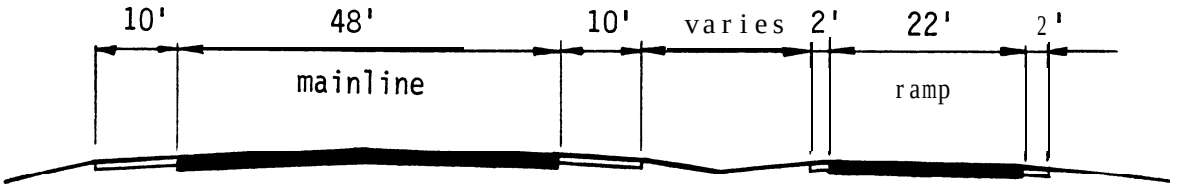
Left Shoulder	Left Roadway	Median Shoulders	Right Roadway	Right Shoulder	Code
4.0		-	16	6.0	026
6.0	-	-	36	12.0	054
12.0	48	30	48	12.0	150
10.0	24	16	36	10.0	096

The last example above represents the coding method for a structure in which the most restrictive approach has the cross-section shown below:



Regardless of whether the median is open or closed, the data coded must be compatible with the other related route and bridge data (i.e., if Item 51 - Bridge Roadway Width, Curb-to-Curb is for traffic in one direction only, then Items 28, 29, 32, etc. must be for traffic in one direction only).

If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width. The total approach roadway width for the example below is 94 feet (a code of 094).

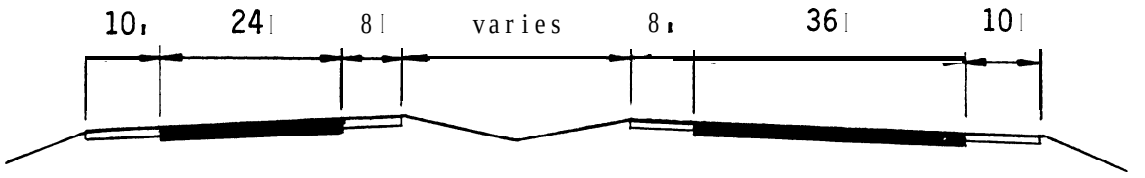


Item 32 - Approach Roadway Width (cont'd)

EXAMPLES:

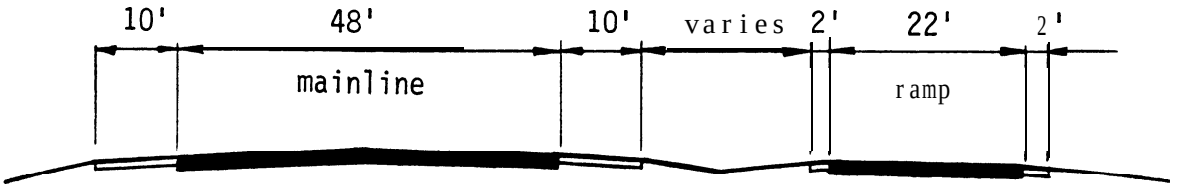
Left Shoulder	Left Roadway	Median Shoulders	Right Roadway	Right Shoulder	Code
4.0		-	16	6.0	026
6.0	-	-	36	12.0	054
12.0	48	30	48	12.0	150
10.0	24	16	36	10.0	096

The last example above represents the coding method for a structure in which the most restrictive approach has the cross-section shown below:



Regardless of whether the median is open or closed, the data coded must be compatible with the other related route and bridge data (i.e., if Item 51 - Bridge Roadway Width, Curb-to-Curb is for traffic in one direction only, then Items 28, 29, 32, etc. must be for traffic in one direction only).

If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width. The total approach roadway width for the example below is 94 feet (a code of 094).



Item 34 - Skew (XX degrees) 2 digits

The skew angle is the angle between the centerline of a pier and a line normal to the roadway centerline. When plans are available, the skew angle can be taken directly from the plans. If no plans are available, the angle is to be field measured if possible. Record the skew angle to the nearest degree. If the skew angle is 0°, it should be so coded. When the structure is on a curve or if the skew varies for some other reason, the average skew should be recorded, if reasonable. Otherwise, record 99 to indicate a major variation in skews of substructure units. A 2-digit number should be coded.

EXAMPLES:		Code
Skew angle	0°	00
	10°	10
	8°	08
	29°	29

Item 35 - Structure Flared 1 digit

Code this item to indicate if the structure is flared (i.e., the width of the structure varies). Generally, such variance will result from ramps converging with or diverging from the through lanes on the structure, but there may be other causes. Minor flares at ends of structures should be ignored.

Code	Description
1	Yes, flared
0	No flare

Item 36 - Traffic Safety Features 4 digits

Bridge inspection shall include the recording of information on the following traffic safety features so that the evaluation of their adequacy can be made.

(A) 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.

(B) Transitions: The transition from approach guardrail to bridge railing requires that the approach guardrail be firmly attached to the bridge railing. It also requires that the approach guardrail 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.

Item 36 - Traffic Safety Features (cont'd)

(C) 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 the bridge site needs to be installed. In addition to being capable of safely redirecting an impacting vehicle, the approach guardrail must also facilitate a transition to the bridge railing that will not cause snagging or pocketing of an impacting vehicle. Acceptable guardrail design suggestions are contained in the AASHTO Guide for Selecting, Locating, and Designing Traffic Barriers.

(D) Approach guardrail ends: As with guardrail ends in general, the ends of approach guardrails 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.

The data collected shall apply only to the route on the bridge. Collision damage or deterioration of the elements are not considered when coding this item. Traffic safety features is a 4-digit code composed of 4 segments.

Segment	Description	Length
36A	Bridge railings	1 digit
36B	Transitions	1 digit
36C	Approach guardrail	1 digit
36D	Approach guardrail ends	1 digit

The reporting of these features shall be as follows:

Code	Description
0	Inspected feature does not meet currently acceptable standards or a safety feature is required and none is provided.*
1	Inspected feature meets currently acceptable standards.*
N	Not applicable or a safety feature is not required.*

* Until a national set of standards is approved, it shall be the responsibility of the inspecting authority to determine what are acceptable standards and what are not.

EXAMPLE:	Code
All features meet currently acceptable standards except transition	1011

Item 37 - Historical Significance — 1 digit

The historical significance of a bridge involves a variety of characteristics: the bridge may be a particularly unique example of the history of engineering; the crossing itself might be significant; the bridge might be associated with a historical property or area; or historical significance could be derived from the fact the bridge was associated with significant events or circumstances. Use one of the following codes:

Code	Description
1	Bridge is on the National Register of Historic Places.
2	Bridge is eligible for the National Register of Historic Places.
3	Bridge is possibly eligible for the National Register of Historic Places (requires further investigation before determination can be made) or bridge is on a State or local historic register.
4	Historical significance is not determinable at this time.
5	Bridge is not eligible for the National Register of Historic Places.

Item 38 - Navigation Control — 1 digit

Indicate for this item whether or not navigation control (a bridge permit) is required. Use one of the following codes:

Code	Description
N	Not applicable, no waterway
0	No navigation control on waterway (bridge permit not required)
1	Navigation control on waterway (bridge permit required)

Item 39 - Navigation Vertical Clearance (XXX feet) 3 digits

If Item 38 - Navigation Control has been coded 1, record in feet the minimum vertical clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. The measurement shall be coded as a 3-digit number rounded down to the nearest foot. This measurement will show the clearance that is allowable for navigational purposes. In the case of a swing or bascule bridge, the vertical clearance shall be measured with the bridge in the closed position (i.e., open to vehiculartraffic). The vertical clearance of a vertical lift bridge shall be measured with the bridge in the raised or open position. Also, Item 116 - Minimum Navigation Vertical Clearance Vertical Lift Bridge shall be coded to provide clearance-in a closed position. If Item 38 - Navigation Control has been coded 0 or N, code 000 to indicate not applicable.

EXAMPLES:		Code
Measured Vertical Clearance	150.0	150
	20.6	020
	24.2	024

Item 40 - Navigation Horizontal Clearance (XXXX feet) 4 digits

If Item 38 - Navigation Control has been coded 1, record for this item the minimum horizontal clearance in feet. This measurement should be that shown on the navigation permit and may be less than the structure allows. If a navigation permit is required but not available, use the minimum horizontal clearance between fenders, if any, or the clear distance between piers or bents. Code the clearance as a 4-digit number. Code 0000 if Item 38 - Navigation Control is coded 0 or N.

EXAMPLES:		Code
Horizontal Clearance	95 feet	0095
	538 feet	0538
	1,200 feet	1200

Item 41 - Structure Open, Posted, or Closed to Traffic 1 digit

This item provides information about the actual operational status of a structure. The field review could show that a structure is posted, but Item 70 - Bridge Posting may indicate that posting is not required. This is possible and *acceptable coding since Item 70 is based on the operating stress level and the governing agency's posting procedures may specify posting at some stress level less than the operating rating. One of the following codes shall be used:

Item 41 - Structure Open, Posted, or Closed to Traffic (cont'd)

Code	Description
A	Open, no restriction
B	Open, posting recommended but not legally implemented (all signs not in place)
D	Open, would be posted or closed except for temporary shoring, etc. to allow for unrestricted traffic
E	Open, temporary structure in place to carry legal loads while original structure is closed and awaiting replacement or rehabilitation
G	New structure not yet open to traffic
K	Bridge closed to all traffic
P	Posted for load (may include other restrictions)
R	Posted for other load-capacity restriction (speed, number of vehicles on bridge, etc.)

Item 42 - Type of Service — 2 digits

The type of service on the bridge and under the bridge is indicated by a 2-digit code composed of 2 segments.

Segment	Description	Length
42A	Type of service on bridge	1 digit
42B	Type of service under bridge	1 digit

The first digit indicates the type of service "on" the bridge and shall be coded using one of the following codes:

Code	Description
1	Highway
2	Railroad
3	Pedestrian exclusively
4	Highway-railroad
5	Highway-pedestrian
6	Overpass structure at an interchange or second level of a multilevel interchange
7	Third level (Interchange)
8	Fourth level (Interchange)
9	Building or plaza
0	Other

Item 42 - Type of Service (cont'd)

The second digit indicates the type of service "under" the bridge and shall be coded using one of the following codes:

Code	Description
1	Highway, with or without pedestrian
2	Railroad
3	Pedestrian exclusively
4	Highway-railroad
5	Waterway
6	Highway-waterway
7	Railroad-waterway
8	Highway-waterway-railroad
9	Relief for waterway
0	Other

Item 43 - Structure Type, Main — 3 digits

Record the description on the inspection form and indicate the type of structure for the main span(s) with a 3-digit code composed of 2 segments.

Segment	Description	Length
43A	Kind of material and/or design	1 digit
43B	Type of design and/or construction	2 digits

The first digit indicates the kind of material and/or design and shall be coded using one of the following codes:

Code	Description
1	Concrete
2	Concrete continuous
3	Steel
4	Steel continuous
5	Prestressed concrete
6	Prestressed concrete continuous
7	Timber
8	Masonry
9	Aluminum, Wrought Iron, or Cast Iron
0	Other

Item 43 - Structure Type, Main (cont'd)

The second and third digits indicate the predominant type of design and/or type of construction and shall be coded using one of the following codes:

Code	Description
01	Slab
02	Stringer/Multi-beam or Girder
03	Girder and Floorbeam System
04	Tee Beam
05	Box Beam-or Girders - Multiple
06	Box Beam or Girders - Single or Spread
07	Frame
08	Orthotropic
09	Truss - Deck
10	Truss - Thru
11	Arch - Deck
12	Arch - Thru
13	Suspension
14	Stayed Girder
15	Movable - Lift
16	Movable - Bascule
17	Movable - Swing
18	Tunnel
19	Culvert
20 *	Mixed types
21	Segmental Box Girder
22	Channel Beam
00	Other

* Applicable only to approach spans - Item 44

EXAMPLES:	Code
Timber Through Truss	710
Masonry Culvert	819
Steel Suspension	313
Continuous Concrete Multiple Box Girders	205
Simple Span Concrete Slab	101
Tunnel in Rock	018

Item 44 - Structure Type, Approach Spans — 3 digits

Indicate with a 3-digit code composed of 2 segments, the type of structure for the approach spans to a major bridge or for the spans where the structural material is different. The codes are the same as for Item 43 preceding. However, code 000 if this item is not applicable. Use code 20 (Item 44B) when no one type of design and/or construction is predominate for the approach units. If the kind of material (Item 44A) is varied, code the most predominant.

Item 44 - Structure Type, Approach Spans (cont'd)

Segment	Description	Length
44A	Kind of material and/or design	1 digit
44B	Type of design and/or construction	2 digits

EXAMPLES:	Code
Simple. prestressed concrete I-beam	502
Continuous concrete T-beam	204
Continuous steel deck truss	409

Item 45 - Number of Spans in Main Unit — 3 digits

Record the number and indicate with a 3-digit code the number of spans in the main or major unit. This item will include all spans of most bridges, the major unit only of a sizable structure, or a unit of material or design different from that of the approach spans.

Item 46 - Number of Approach Spans — 4 digits

Record the number and indicate with a 4-digit code the number of spans in the approach spans to the major bridge, or the number of spans of material different from that of the major bridge.

Item 47 - Inventory Route, Total Horizontal Clearance (XX.X feet) — 3 digits

The total horizontal clearance for the inventory route identified in Item 5 should be measured and recorded to supply information that meets reporting requirements of FHPM 6-10-2. The clearance should be the available clearance measured between the restrictive features -- curbs, rails, walls, or other structural features limiting the roadway (surface and shoulders). The measurement should be recorded and coded to the nearest tenth of a foot (with an assumed decimal point).

The purpose of this item is to give the largest available clearance for the movement of wide loads. This clearance has been identified in 3 ways; use the most applicable:

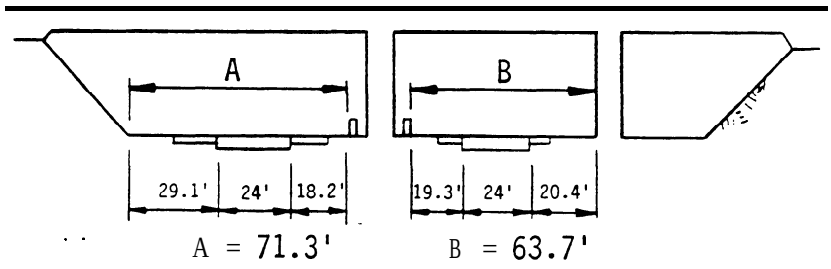
1. Roadway surface and shoulders.

2. Distance from face of pier (or rail around pier) to face of rail or toe of slope.

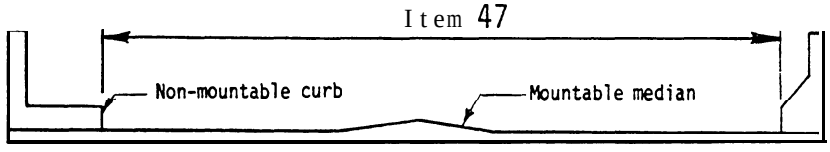
3. Include flush or mountable medians (Item 33 - Bridge Median coded 2) but not raised medians (Item 33 coded 3). For a raised or non-mountable median record the greater of the restricted widths in either direction, not both directions.

Item 47 - Inventory Route, Total Horizontal Clearance (cont'd)

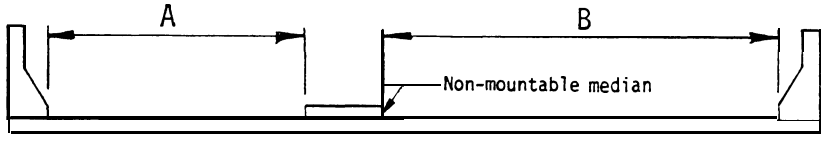
EXAMPLES:



Clearance A > B Item 47 = A



No Median or Flush or Mountable Median



Raised Median or Non-mountable Median
B > A Item 47 = B

Item 48 - Length of Maximum Span (XXXX feet) 4 digits

The length of the maximum span shall be recorded. It shall be noted whether the measurement is center to center or clear open distance between piers, bents, or abutments. The measurement shall be along the centerline of the bridge. For this item, code a 4-digit number to represent the measurement to thenearest foot.

EXAMPLES:

		Code
Length of Maximum Span	50 feet	0050
	117 feet	0117
	1,050 feet	1050

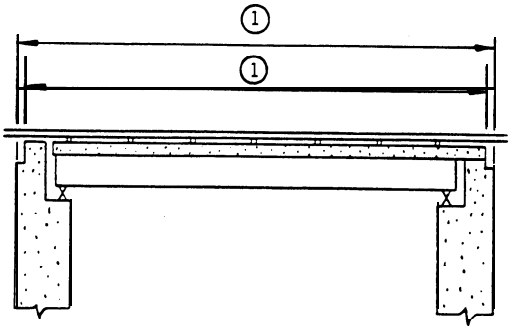
Item 49 - Structure Length (XXXXXX feet) 6 digits

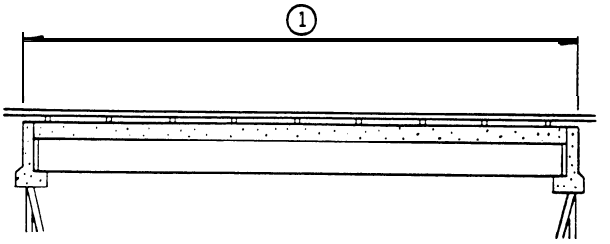
Record and code a 6-digit number to represent the length of the structure to the nearest foot. This shall be the length of roadway which is supported on the bridge structure. The length should be measured back to back of backwalls of abutments or from paving notch to paving notch.

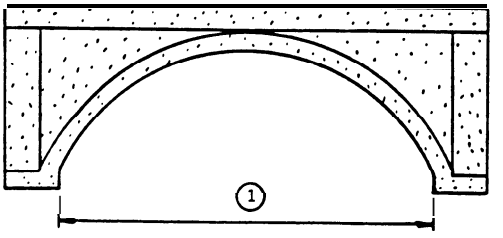
Culvert lengths should be measured along the center line of roadway regardless of their depth below grade. Measurement should be made between inside faces of exterior wails.

EXAMPLES:

		Code
Structure Length	50 feet	000050
	5,421 feet	005421
	333 feet	000333
	101,235 feet	101235



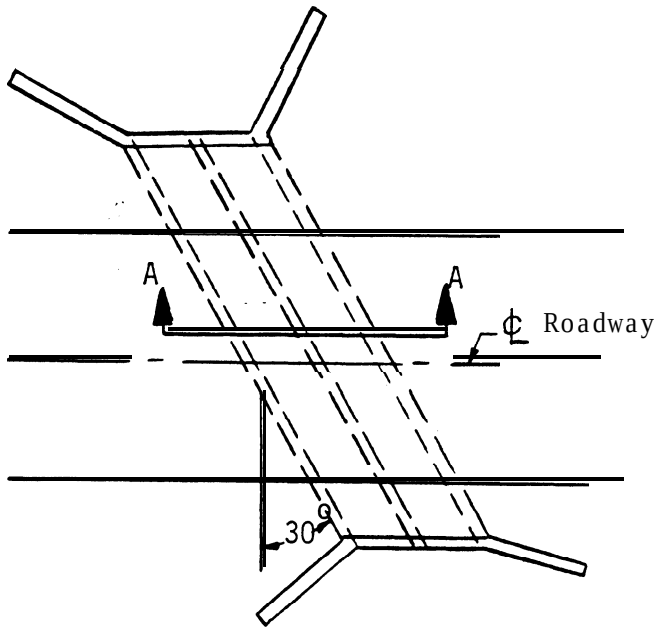


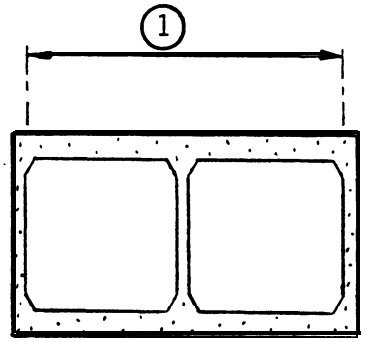


0 Item 49 - Structure Length

Item 49 - Structure Length (cont'd)

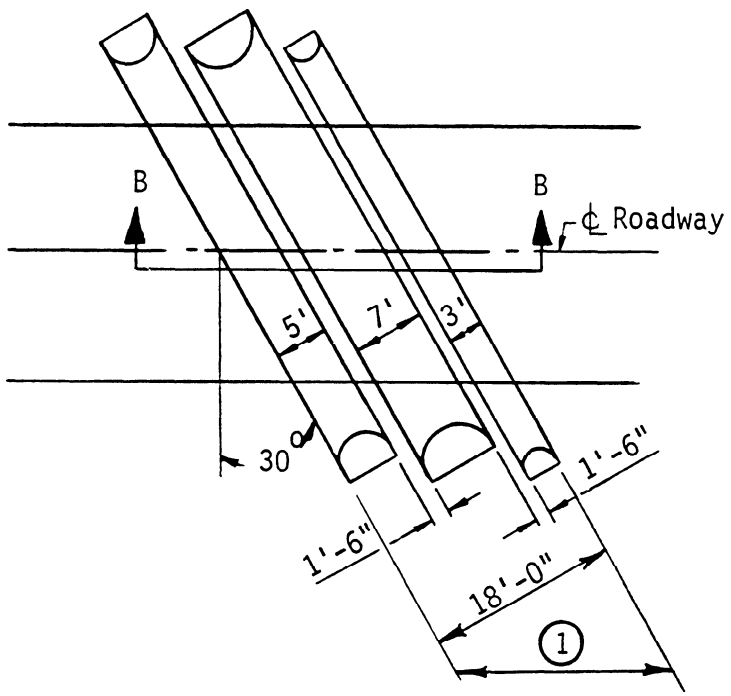
EXAMPLES:

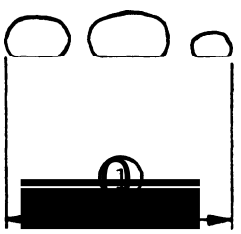




SECTION A-A

0 Item 49 - Structure Length





SECTION B-B

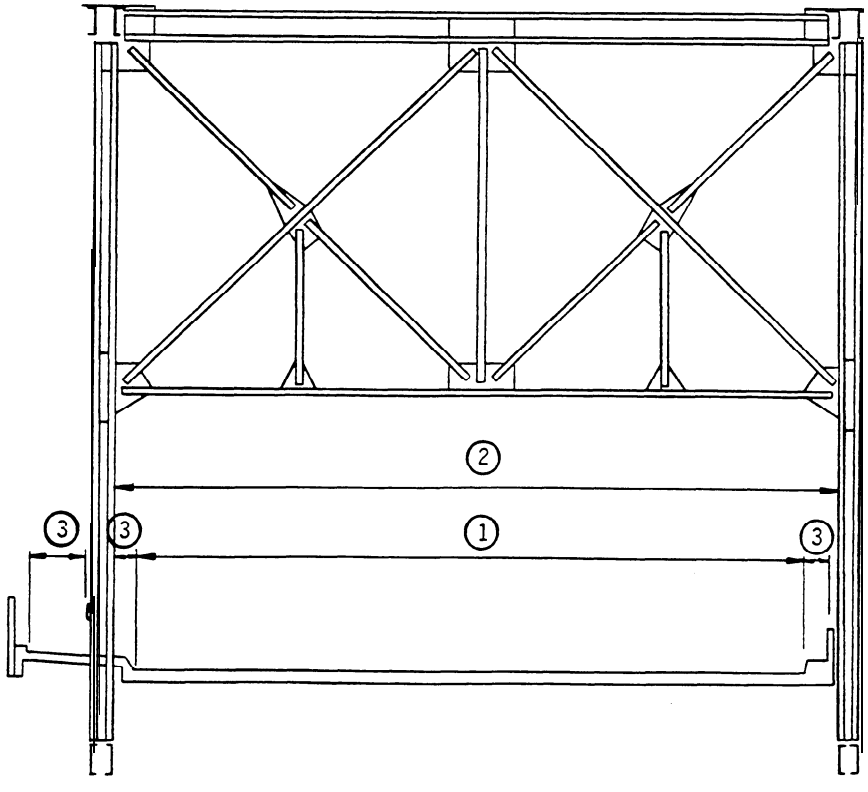
0 Item 49 - Structure Length $= \frac{18'}{\cos 30°} = 20.78'$ Code 000021

Item 50 - Curb or Sidewalk Widths (XX.X feet, XX.X feet) 6 digits

Record and code two contiguous 3-digit numbers to represent the widths of the left and right curbs or sidewalks to nearest tenth of a foot (with assumed decimal points). This is a 6-digit number composed of 2 segments, with the leftmost 3 digits representing the left curb or sidewalk and the rightmost 3 digits representing the right curb or sidewalk. "Left" and "Right" should be determined on the basis of direction of the inventory.

Segment.	Description	Length
50A	Left curb or sidewalk width	3 digits
50B	-Right curb or sidewalk width	3 digits

EXAMPLES:	Left Side	Right Side	Code
Curb or sidewalk	None	8.3'	000083
	10.0'	4.1'	100041
	8.3'	None	083000
	12.1'	11.5'	121115
	None	None	000000
	0.6'	1.5'	006015



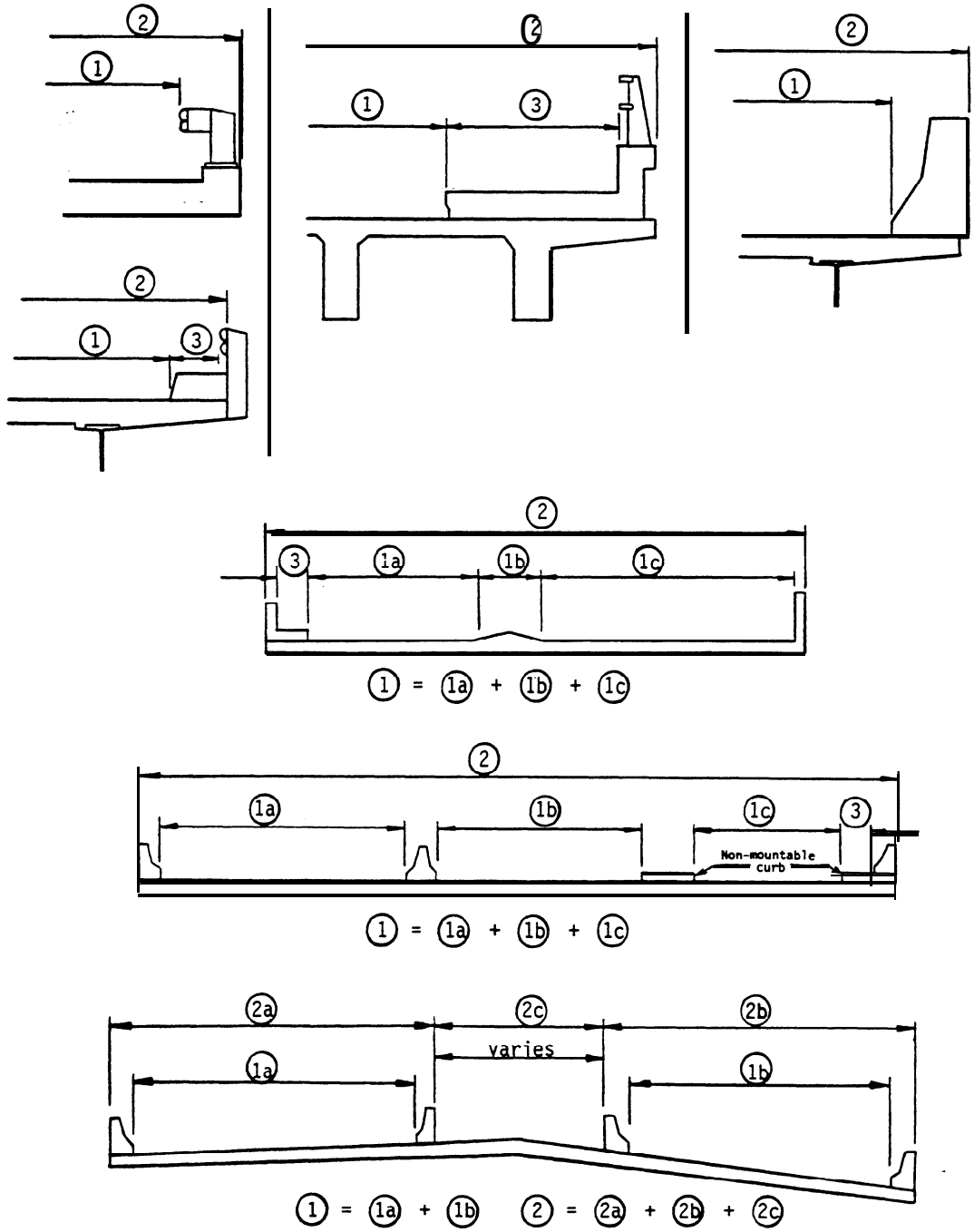
001 Item 51 - Bridge Roadway Width, Curb-to-Curb

002 Item 52 - Deck Width, Out-to-Out

003 Item 50 - Curb or Sidewalk Width

Item 50 - Curb or Sidewalk Widths (cont'd)

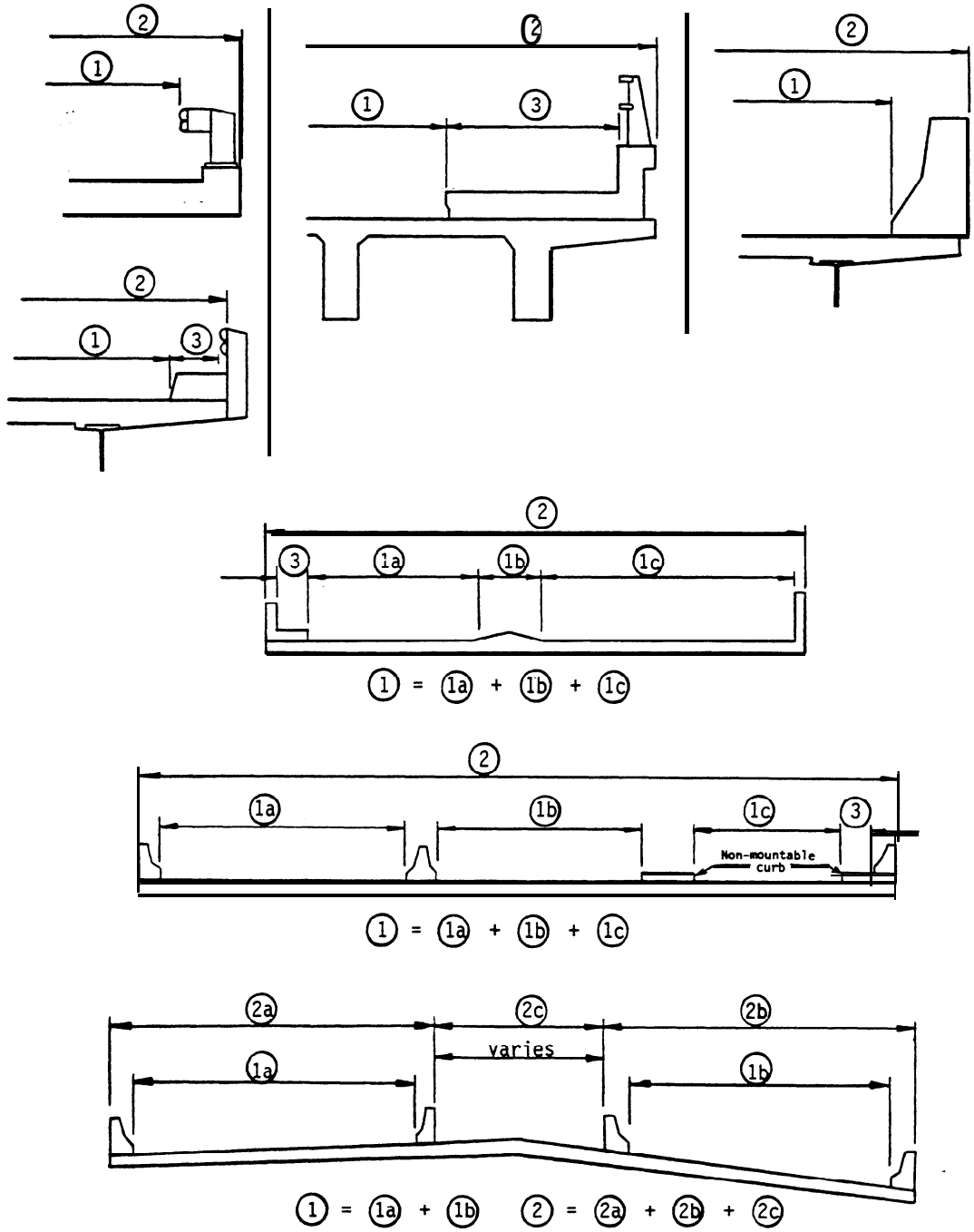
EXAMPLES:



001 Item 51 - Bridge Roadway Width, Curb-to-Curb
002 Item 52 - Deck Width, Out-to-Out
003 Item 50 - Curb or Sidewalk Width

Item 50 - Curb or Sidewalk Widths (cont'd)

EXAMPLES:



001 Item 51 - Bridge Roadway Width, Curb-to-Curb
002 Item 52 - Deck Width, Out-to-Out
003 Item 50 - Curb or Sidewalk Width

Item 52 - Deck Width, Out-to-Out (XXX.X feet) 4 digits

Record and code a 4-digit number to show the out-to-out width to the nearest tenth of a foot (with an assumed decimal point). If the structure is a through structure, the number to be coded will represent the lateral clearance between superstructure members. The measurement should be exclusive of flared areas for ramps. See examples on pages 28 and 29.

Where traffic runs directly on the top slab (or wearing surface) of the culvert (e.g., an R/C box without fill) code the actual width (out-to-out). This will also apply where the fill is minimal and the culvert headwalls affect the flow of traffic.

Where the roadway is on a fill carried across a pipe or box culvert and the culvert headwalls do not affect the flow of traffic, code 0000. This is considered proper inasmuch as a filled section over a culvert simply maintains the roadway cross-section.

Item 53 - Minimum Vertical Clearance Over Bridge Roadway 4 digits
(XX feet, XX inches)

The information to be recorded for this item is the actual minimum vertical clearance over the bridge roadway, including shoulders, to any superstructure restriction, rounded down to the nearest inch. When no superstructure restriction exists above the bridge roadway, code 9999. When a restriction is 100 feet or greater, code 9912. A 4-digit number should be coded to represent feet and inches.

EXAMPLES:		Code
Minimum Vertical Clearance	17'-3"	1703
	75'-11"	7511
	No restriction	9999
	115'-6"	9912

Item 54 - Minimum Vertical Undercl earance 5 digits
(X code, XX feet, XX inches)

Using a l-digit code and a 4-digit number, record and code the minimum vertical clearance from the roadway or railroad track beneath the structure to the underside of the superstructure. (When both a railroad and highway are under the structure, code the most critical dimension.)

Segment	Description	Length
54A	Reference feature	1 digit
54B	Minimum Vertical Underclearance	4 digits

Item 54 - Minimum Vertical Undercl earance (cont'd)

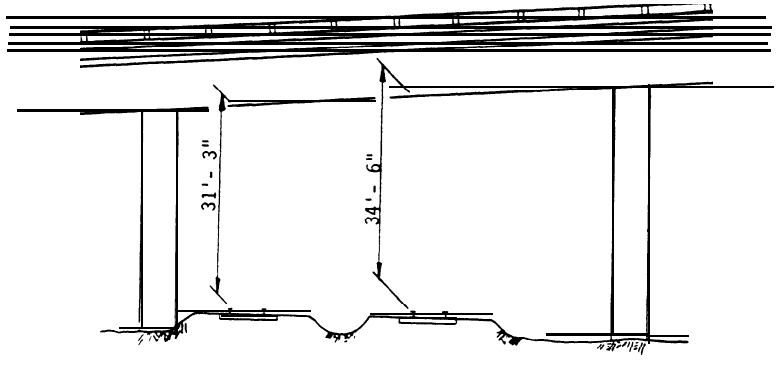
Using one of the codes below, code in the first position, the reference feature from which the clearance measurement is taken:

Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

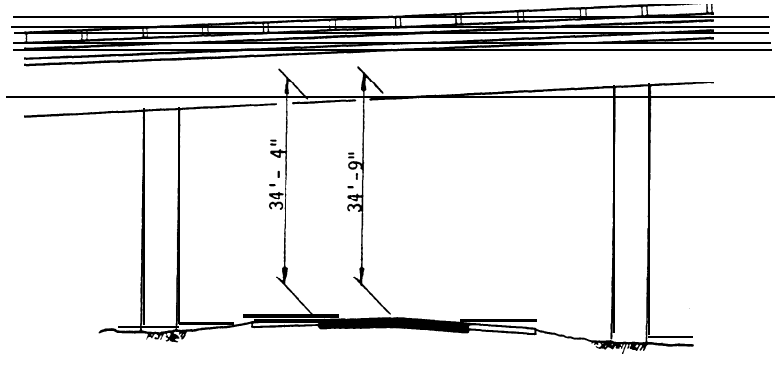
In the next 4 positions, code a 4-digit number to represent the minimum vertical clearance from that feature to the structure. If the feature is not a highway or railroad, code the minimum vertical clearance 0000.

EXAMPLES:

	Code
River beneath structure	N0000



Railroad 31'-3" beneath structure	R3103



Highway 34'-4" beneath structure	H3404

Item 55 - Minimum Lateral Underclearance on Right (X code, XX.X feet) — 4 digits

Using a l-digit code and a 3-digit number, record and code the minimum lateral underclearance on the right to the nearest tenth of a foot (with an assumed decimal point). When both a railroad and highway are under the structure, code the most critical dimension.

Segment	Description	Length
55A	Reference feature	1 digit
55B	Minimum Lateral-Underclearance	3 digits

Using one of the codes below, code in the first position the reference feature from which the clearance measurement is taken:

Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

In the next 3 positions, code a 3-digit number to represent the minimum lateral underclearance on the right. The lateral clearance should be measured from the right edge of the roadway (excluding shoulders) or from the centerline (between rails) of the right-hand track of a railroad to the nearest substructure unit (pier, abutment, etc.), to a rigid barrier, or to the toe of slope steeper than 3 to 1. The clearance measurements to be recorded will be the minimum after measuring the clearance in both directions of travel. In the case of a dual highway this would mean the outside clearances of both roadways should be measured and the smaller distance recorded and coded.

If two related features are below the bridge, measure both and record the lesser of the 2. An explanation should be written as to what was recorded. If the feature beneath the structure is not a railroad or highway, code 999 to indicate not applicable.

The presence of ramps is not considered in this item; therefore, the minimum lateral clearance on the right should be measured from the right edge of the through way.

EXAMPLES:	Code
Railroad 20.4' centerline to pier	R204
Highway 20.2' edge of pavement to pier	H202
Creek beneath structure	N999

Item 55 - Minimum Lateral Underclearance on Right (X code, XX.X feet) — 4 digits

Using a l-digit code and a 3-digit number, record and code the minimum lateral underclearance on the right to the nearest tenth of a foot (with an assumed decimal point). When both a railroad and highway are under the structure, code the most critical dimension.

Segment	Description	Length
55A	Reference feature	1 digit
55B	Minimum Lateral-Underclearance	3 digits

Using one of the codes below, code in the first position the reference feature from which the clearance measurement is taken:

Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

In the next 3 positions, code a 3-digit number to represent the minimum lateral underclearance on the right. The lateral clearance should be measured from the right edge of the roadway (excluding shoulders) or from the centerline (between rails) of the right-hand track of a railroad to the nearest substructure unit (pier, abutment, etc.), to a rigid barrier, or to the toe of slope steeper than 3 to 1. The clearance measurements to be recorded will be the minimum after measuring the clearance in both directions of travel. In the case of a dual highway this would mean the outside clearances of both roadways should be measured and the smaller distance recorded and coded.

If two related features are below the bridge, measure both and record the lesser of the 2. An explanation should be written as to what was recorded. If the feature beneath the structure is not a railroad or highway, code 999 to indicate not applicable.

The presence of ramps is not considered in this item; therefore, the minimum lateral clearance on the right should be measured from the right edge of the through way.

EXAMPLES:	Code
Railroad 20.4' centerline to pier	R204
Highway 20.2' edge of pavement to pier	H202
Creek beneath structure	N999

Item 56 - Minimum Lateral Underclearance on Left (XX.X feet) 3 digits
(for divided highways, l-way streets, and ramps; not applicable to railroads)

Using a 3-digit number, record and code the minimum lateral underclearance on the left (median side for divided highways) to the nearest tenth of a foot (with an assumed decimal point). The lateral clearance should be measured from the left edge of the roadway (excluding shoulders) to the nearest substructure unit, to a rigid barrier, or to the toe of slope steeper than 3 to 1. Refer to examples on page 34 under Item 55 - Minimum Lateral Underclearance on Right.

In the case of a dual highway, the median side clearances of both roadways should be measured and the smaller distance recorded and coded. If there is no obstruction in the median area, a notation of "open" should be recorded and 999 should be coded. For clearances greater than 99.8 feet, code 998. Code 000 to indicate not applicable.

Item 57 - Wearing Surface - Protective System

Item no longer used. See Items 107 and 108.

Items 58 through 62 - Indicate the Condition Ratings

In order to promote uniformity between bridge inspectors, these guidelines will be used to rate and code Items 58, 59, 60, 61, and 62.

Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. Evaluation is for the materials related, physical condition of the deck, superstructure, and substructure components of a bridge. The condition evaluation of channels and channel protection and culverts is also included. Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being rated. Conversely, they are improperly used if they attempt to describe localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being rated.

The load-carrying capacity will not be used in evaluating condition items. The fact that a bridge was designed for less than current legal loads and may be posted shall have no influence upon condition ratings.

Portions of bridges that are being supported or strengthened by temporary members will be rated based on their actual condition; that is, the temporary members are not considered in the rating of the item. (See Item 103 - Temporary Structure Designation for the definition of a temporary bridge.)

Completed bridges not yet opened to traffic, if rated, shall be coded as if open to traffic.

Condition Ratings (cont'd)

The following general condition ratings shall be used as a guide in evaluating Items 58, 59, 60, 61, and 62:

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - no problems noted.
7	GOOD CONDITION - some minor problems.
6	SATISFACTORY CONDITION - structural elements show some minor deterioration.
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
4	POOR CONDITION - advanced section loss, deterioration, spalling or scour.
3	SERIOUS CONDITION - loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	"IMMINENT" FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	FAILED CONDITION - out of service - beyond corrective action.

Item 58 - Deck 1 digit

This item describes the overall condition rating of the deck. Rate and code the condition in accordance with the above general condition ratings. Code N for all culverts.

Concrete decks should be inspected for cracking, scaling, spalling, leaching, chloride contamination, potholing, delamination, and full or partial depth failures. Steel grid decks should be inspected for broken welds, broken grids, section loss, and growth of filled grids from corrosion. Timber decks should be inspected for splitting, crushing, fastener failure, and deterioration from rot.

Thecondition of the wearing surface/protective system, joints, expansion devices, curbs, sidewalks, parapets, fascias, bridge rail, and scuppers shall not be considered in the overall deck evaluation. However, their condition should be noted on the inspection form.

Decks integral with the superstructure will be rated as a deck only and not how they may influence the superstructure rating (for example, rigid frame, slab, deckgirder or T-beam, voided slab, box girder, etc.). Similarly, the superstructure of an integral deck-type bridge will not influence the deck rating.

Item 59 - Superstructure 1 digit

This item describes the physical condition of all structural members. Rate and code the condition in accordance with the previously described general condition ratings. Code N for al 1 culverts.

The structural members should be inspected for signs of distress which may include cracking, deterioration, section loss, and malfunction and misalignment of bearings.

The condition of bearings, joints, paint system, etc. shall not be included in this rating, except in extreme situations, but should be noted on the inspection form.

On bridges where the deck is integral with the superstructure, the superstructure condition rating may be affected by the deck condition. The resultant superstructure condition rating may be lower than the deck condition rating where the girders have deteriorated or been damaged.

Fracture critical components should receive careful attention because failure could lead to collapse of a span or the bridge.

Item 60 - Substructure 1 digit

This item describes the physical condition of piers, abutments, piles, fenders, footings, or other components. Rate and code the condition in accordance with the previously described general condition ratings. Code N for all culverts.

All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion. The rating given by Item 113 - Scour Critical Bridges, may have a significant effect on Item 60 if scour has substantially affected the overall condition of the substructure.

The substructure condition rating shall be made independent of the deck and superstructure.

Integral-abutment wingwalls to the first construction or expansion joint shall be included in the evaluation. For non-integral superstructure and substructure units, the substructure shall be considered as the portion below the bearings. For structures where the substructure and superstructure are integral, the substructure shall be considered as the portion below the superstructure.

Item 61 - Channel and Channel Protection 1 digit

This item describes the physical conditions associated with the flow of water through the bridge such as stream stability and the condition of the channel, riprap, slope protection, or stream control devices including spur dikes. The inspector should be particularly concerned with visible signs of excessive water velocity which may affect undermining of slope protection or footings, erosion of banks, and realignment of the stream which may result in immediate or potential problems. Accumulation of drift and debris on the superstructure and substructure should be noted on the inspection form but not included in the condition rating.

Rate and code the condition in accordance with the previously described general condition ratings and the following descriptive codes:

Code	Description
N	Not applicable. Use when bridge is not over a waterway.
9	There are no noticeable or noteworthy deficiencies which affect the condition of the channel.
8	Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in a stable condition.
7	Bank protection is in need of minor repairs. River control devices and embankment protection have a little minor damage. Banks and/or channel have minor amounts of drift.
6	Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor stream bed movement evident. Debris is restricting the waterway slightly.
5	Bank protection is being eroded. River control devices and/or embankment have major damage. Trees and brush restrict the channel.
4	Bank and embankment protection is severely undermined. River control devices have severe damage. Large deposits of debris are in the waterway.
3	Bank protection has failed. River control devices have been destroyed. Stream bed aggradation, degradation or lateral movement has changed the waterway to now threaten the bridge and/or approach roadway.
2	The waterway has changed to the extent the bridge is near a state of collapse.
1	Bridge closed because of channel failure. Corrective action may put back in light service.
0	Bridge closed because of channel failure. Replacement necessary.

Item 62 - Culverts 1 digit

This item evaluates the alignment, settlement, joints, structural condition, scour, and other items associated with culverts. The rating code is intended to be an overall condition evaluation of the culvert. Integral wingwalls to the first construction or expansion joint shall be included in the evaluation. For a detailed discussion regarding the inspection and rating of culverts, consult Report No. FHWA-IP-86-2, Culvert Inspection Manual, July 1986.

Item 58 - Deck, Item 59 - Superstructure, and Item 60 - Substructure shall be coded N for all culverts.

Rate and code the condition in accordance with the previously described general condition ratings and the following descriptive codes:

Code	Description
N	Not applicable. Use if structure is not a culvert.
9	No deficiencies.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift,
7	Shrinkage cracks, light scaling, and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
5	Moderate to major deterioration or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
4	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joint permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.

(codes continued on the next page)

Item 62 - Culverts (cont'd)

3 Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.

Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic. Metal culverts have extreme distortion and deflection throughout with extensive perforations due to corrosion.

1 Bridge closed. Corrective action may put back in light service.

0 Bridge closed. Replacement necessary.

Item 63 - Estimate Remaining Life

Item no longer used.

Item 64 - Operating Rating 3 digits

This capacity rating, referred to as the operating rating, will result in the absolute maximum permissible load level to which the structure may be subjected for the vehicle type used in the rating. Code the operating rating as a 3-digit code composed of 2 segments.

Segment	Description	Length
64A	Type of loading	1 digit
64B	Gross load in tons	2 digits

It should be emphasized that for HS loading, the total weight in tons of the entire vehicle should be coded; that is, HS20 shall be coded 236 even though the HS20 lane loading controls and is used to determine the rating. Likewise HS10 shall be coded 218.

Even though any of the AASHTO loads or other special State loads may be used to calculate the operating rating, it shall be submitted to the National Bridge Inventory in an equivalent HS loading.

The required reporting of an equivalent HS loading may be phased in over a 5-year period. Therefore, all National Bridge Inventory updates in 1993 shall report the operating and inventory ratings in an equivalent HS loading regardless of the loading used to calculate the ratings. The following types of loadings will be acceptable until 1993.

Item 64 - Operating Rating (cont'd)

Code	Description
1	H Loading
2	HS loading
3	Alternate Interstate Loading
4	Type 3 unit
5	Type 3-S2 unit
6	Type 3-3 unit
7	Railroad loading
8	Pedestrian or special loading
9	Gross load only

The AASHTO Manual for Maintenance Inspection of Bridges permits the calculation of the inventory and operating ratings by either the working stress or load factor method. This AASHTO manual will be revised during 1989 through a National Cooperative Highway Research Program (NCHRP) effort. It is anticipated that the revision will include load rating of bridges using the Load and Resistance Factor Design (LRFD) methodology. The use of the different methods for calculating the load ratings has produced non-uniform evaluations nationwide for these ratings and for the overall Structural Evaluation - Item 67 The use of uniform and benchmark data is very important in bridge program administration at the Federal level. However, requiring all load capacity ratings to be calculated by only one method on an immediate basis is not practical. Therefore, either method is acceptable for submittal of the inventory and operating ratings to the National Bridge Inventory for the immediate future. However, States and other bridge owners should anticipate that the FHWA will require that a single uniform method be used to calculate the inventory and operating ratings reported to the National Bridge Inventory sometime in the 1990's.

If the bridge is closed and/or will not carry any live load, the second and third digits shall be coded 00.

The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, Items 64 and 66 should be coded as 200 or 900 even though the temporary structure is rated for as much as full legal load. The 200 code shall be used when converting to HS equivalents. Until that time, a 900 code is acceptable.

A bridge shored up or repaired on a temporary basis is considered a temporary bridge and the inventory and operating rating should be coded as if the temporary shoring were not in place. See Item 103 - Temporary Structure Designation for definition of a temporary bridge.

Item 64 - Operating Rating (cont'd)

EXAMPLES:	Code
HS30	254
Temporary bridge	200
Shored-up bridge	203*
Structure under sufficient fill that live load is insignificant (according to AASHTO design)	299

* load capacity without shoring.

Item 65 - Approach Roadway Alignment

Item no longer used.

Item 66 - Inventory Rating 3 digits

This capacity rating, for the vehicle type used in the rating, will result in a load level which can safely utilize an existing structure for an indefinite period of time. Code the Inventory Rating as a 3-digit code composed of 2 segments. The statements and codes in Item 64 - Operating Rating apply to this item also.

Segment	Description	Length
66A	Type of loading	1 digit
66B	Gross load in tons	2 digits

Code 299 for a structure under sufficient fill such that, according to AASHTO design, the live load is insignificant in the structure load capacity.

Items 67, 68, 69, 71, and 72 - Indicate the Appraisal Ratings

The items in the Appraisal section are used to evaluate a bridge in relation to the level of service which it provides on the highway system of which it is a part. The structure will be compared to a new one which is built to current standards for that particular type of road as further defined in this section except for Item 72 - Approach Roadway Alignment. See Item 72 for special criteria for rating that item.

Items 67, 68, 69, 71, and 72 will be coded with a l-digit code that indicates the appraisal rating for the item. The ratings and codes are as follows:

Code	Description
N	Not applicable
9	Superior to present desirable criteria
8	Equal to present desirable criteria

(codes continued on the next page)

Code	Description (cont'd)
7	Better than present minimum criteria
6	Equal to present minimum criteria
5	Somewhat better than minimum adequacy to tolerate being left in place as is
4	Meets minimum tolerable limits to be left in place as is
3	Basically intolerable requiring high priority of corrective action
2	Basically intolerable requiring high priority of replacement
1	This value of rating code not used
0	Bridge closed

Tables are provided to evaluate items 67, 68, 69 and 71, and shall be used by all evaluators to code these items. They have been developed to closely match the descriptions for the appraisal evaluation codes of 0 to 9. The tables shall be used in all instances to evaluate the item based on the designated data in the inventory, even if a table does not appear to match the descriptive codes. For unusual cases where the site data does not exactly agree with the table criteria, use the most appropriate table to evaluate the item.

Level of service goals is a concept that several States have introduced into their bridge management to determine the need for bridge improvements.

Level of service goals are target values for selected bridge characteristics that are used to assess bridge adequacy. The goals may vary depending on the highway functional classification, traffic volume, and other factors. The goals are set with the recognition that widely varying traffic needs exist throughout highway systems and that many bridges on local roads can adequately serve traffic needs with lower load and capacity geometric standards than would be necessary for bridges on heavily traveled main highways. The degree to which a bridge is deficient can be measured by comparing bridge characteristics with level of service goals. Shortfalls from the goals determine the type and extent of improvement needs. The shortfalls are useful for comparing bridge needs and setting improvement priorities. Needs determined by level of service goals that are graduated to traffic levels and the characteristics of the vehicles served can differ greatly from those determined by a single standard that applies to all bridges, for example the AASHTO A Policy on Geometric Design of Highways and Streets 1984.

However, the application of particular level of service concepts as developed by individual States do not result in the desired consistency when evaluating structures on a national basis. If uniformity and consistency are to be achieved, similar structure, roadway, and vehicle characteristics must be evaluated using identical standards. Therefore, tables and charts have been developed which shall be used to evaluate and code appraisal items for all bridges submitted to the National Bridge Inventory regardless of individual State criteria used to evaluate bridges.

Completed bridges not yet opened to traffic, if rated, shall be appraised as if open to traffic. Design values, for example ADT, shall be used for the evaluation. The data provided will include a code of G for Item 41 - Structure Open, Posted, or Closed to Traffic.

Item 67 - Structural Evaluation 1 digit

Evaluate and code the overall condition taking into account all major structural deficiencies. The appraisal rating is to be based on the condition rating of Item 59 - Superstructure, Item 60 - Substructure, and Item 66 - Inventory Rating. This item generally should be coded no higher than the lowest condition rating of the superstructure or the substructure. The code will also be based on the value obtained from Table 1 which evaluates the inventory rating (HS equivalent) shown for various traffic volumes.

For other than culverts, the lowest of the codes obtained from Item 59 - Superstructure, Item 60 - Substructure-, or Table 1 should generally be used.

For culverts, the lowest of the codes obtained from Item 62 - Culverts, or Table 1 should generally be used.

Table 1 Notes:

1. Use the lower rating code for values between those listed in the table.

2. The live load used in establishing the Inventory Rating shall be one of the standard AASHTO vehicles or the maximum legal loads of the State.

3. To use Table 1, the Inventory Rating must be the coded HS rating or its equivalent. If the comparable HS equivalent is not calculated for the controlling rating, using a factor to determine the HS equivalent is acceptable even though converting other rating loads to an HS equivalent is not a constant.

4. Those highway agencies which have used other than an HS loading for calculating the inventory rating may use the following purposely conservative factors to convert to an equivalent coded HS rating load for use with Table 1. These factors will be used for conversion of data transmitted to the NBI.

1st digit of Item 66	Multiply 2nd and 3rd digits by
1	1.25
2	1.00
3	1.20
4	1.00
5	.70
6	.64
9	1.00

5. All bridges on the Interstate system shall be evaluated using the ADT column of >5000 regardless of the actual ADT on the bridge.

Table 1. Rating by Comparison of ADT - Item 29 and Inventory Rating - Item 66

Structural Evaluation Rating Code	Inventory Rating		
	Average Daily Traffic (ADT)		
	0-500	501-5000	>5000
9	>236* (HS20)**	>236 (HS20)	>236 (HS20)
8	236 (HS20)	236 (HS20)	236 (HS20)
7	231 (HS17)	231 (HS17)	231 (HS17)
6	223 (HS13)	225 (HS14)	227 (HS15)
5	218 (HS10)	220 (HS11)	222 (HS12)
4	212 (HS7)	214 (HS8)	218 (HS10)
3	Inventory rating less than value in rating code of 4 and requiring corrective action.		
2	Inventory rating less than value in rating code of 4 and requiring replacement.		
0	Bridge closed.		

* Coded HS rating load (typical)
** HS Designation (typical)

Item 68 - Deck Geometry 1 digit

The overall rating for deck geometry will include two evaluations: (a) the curb-to-curb or face-to-face of rail bridge width using Table 2A, B, C or D and (b) the minimum vertical clearance over the bridge roadway using Table 2E. The lower of the codes obtained from these tables shall be used. When an individual table lists several deck geometry rating codes for the same roadway width under a specific ADT, use the lower code. (For example, Table 2A lists deck geometry rating codes of 6, 7 and 8 for a 44-foot roadway width and an ADT of >5000. Use the code of 6.) Use the lower code for values between those listed in the tables.

The curb-to-curb or-face-to-face of rail dimension shall be taken from Item 51 - Bridge Roadway Width, Curb-to-curb. Item 53 - Minimum Vertical Clearance Over Bridge Roadway shall be used to evaluate the vertical clearance.

The values provided in the tables are for rating purposes only. Current design standards must be used for structure design or rehabilitation.

Table 2A & 2B. Rating by Comparison of ADT - Item 29 and Bridge Roadway Width, Curb-to-Curb - Item 51

TABLE 2A							TABLE 2B	
Deck Geometry Rating Code	Bridge Roadway Width 2 Lanes; 2 Way Traffic						Bridge Roadway Width 1 Lane; 2-Way Traffic	
	ADT (Both Directions)						ADT (Both Directions)	
	0-100	101-400	401-1000	1001-2000	2001-5000	>5000	0-100	>100
9	>32	>36	>40	>44	>44	>44	-	-
8	32	36	40	44	44	44	15'-11"	-
7	28	32	36	40	44	44	15	
6	24	28	30	34	40	44	14	
5	20	24	26	28	34	38	13	
4	18	20	22	24	28	32 (28*)	12	
3	16	18	20	22	26	30 (26*)	11	15'-11"
2	Any width less than required for a rating code of 3 and structure is open.							
0	Bridge closed.							

* Use value in parentheses for bridges longer than 200 feet.

Notes:

1. Use the lower rating code for values between those listed in the table.
2. Dimensions are in feet.
3. For 3 or more undivided lanes of 2-way traffic, use Table 2C, Other Multilane Divided Facilities.
4. Do not use Table 2B for code 9 and for codes 8 through 4 inclusive when the ADT >100. Single lane bridges less than 16 feet wide carrying 2-way traffic are always appraised at 3 or below if they carry more than an ADT of 100.

Table 2C & 2D. Rating by Comparison of Number of Lanes - Item 28 and Bridge Roadway Width, Curb-to-Curb - Item 51

Deck Geometry Rating Code	TABLE 2C				TABLE 2D	
	Bridge Roadway Width 2 or More Lanes Each Direction				Bridge Roadway Width 1-Way Traffic	
	Interstate and Other Divided Freeways		Other Multilane Divided Facilities		Ramps Only	
	2 Lanes	3 or more Lanes	2 Lanes	3 or more Lanes	1 Lane	2 or more Lanes
9	>42	>12N+24	>42	>12N+18	>26	>12N+12
8	42	12N+24	42	12N+18	26	12N+12
7	40	12N+20	38	12N+15	24	12N+10
6	38	12N+16	36	12N+12	22	12N+8
5	36	12N+14	33	11N+10	20	12N+6
4	34(29)*	11N+12 (11N+7)*	30	11N+6	18	12N+4
3	33(28)*	11N+11 (11N+6)*	27	11N+5	16	12N+2
2	Any width less than required for a rating code of 3 and structure is open.					
0	Bridge closed.					

* Use value in parentheses for bridges longer than 200 feet.
N = number of lanes of traffic.

Notes

1. Use the lower rating code for values between those listed in the tables.
2. Dimensions are in feet.
3. Use Table 2C, other Multilane Divided Facilities, for 3 or more undivided lanes of 2-way traffic.

Table 2E. Rating by Comparison of Minimum Vertical Clearance over Bridge Roadway - Item 53 and Functional Classification - Item 26

Deck Geometry Rating-Code	Minimum Vertical Clearance			
	Functional Class			
	Interstate and Other Freeway		Other Principal and Minor Arterials	Major and Minor Collectors and Locals
	All Routes - Except as noted for Urban Areas	Undesignated Routes, Urban Areas*		
9	>17'-0"	>16'-6"	>16'-6"	>16'-6"
8	17'-0"	16'-6"	16'-6"	16'-6"
7	16'-9"	15'-6"	15'-6"	15'-6"
6	16'-6"	14'-6"	14'-6"	14'-6"
5	15'-9"	14'-3"	14'-3"	14'-3"
4	15'-0"	14'-0"	14'-0"	14'-0"
3	Vertical clearance less than value in rating code of 4 and requiring corrective action.			
2	Vertical clearance less than value in rating code of 4 and requiring replacement.			
0	Bridge closed.			

* Use for routes in highly developed urban areas only when there is an alternative Interstate, freeway, or expressway facility with a minimum of 16'-0" clearance.

Notes

1. Use the lower rating code for values between those listed in the table.

Item 69 - Underclearances, Vertical and Horizontal 1 digit

This refers to vertical and horizontal underclearances from the through roadway to the superstructure or substructure units, respectively. Code "N" unless the bridge is over a highway or railroad.

The vertical underclearance shall be evaluated using Table 3A. The horizontal underclearance shall be evaluated using Table 3B. The lower of the codes obtained from Table 3A and Table 3B shall be used.

Bridges seldom are closed due to deficient underclearances, however, these bridges may be good candidates for rehabilitation or replacement.

Item 54 - Minimum Vertical Underclearance, Item 55 - Minimum Lateral Underclearance on Right, and Item 56 - Minimum Lateral Underclearance on Left shall be used to evaluate this item.

The functional classification to be used in the table is for the underpassing route. Therefore, the functional classification must be obtained from the record for the route "under" the bridge (see Item 5 - Inventory Route).

If the underpassing route is not on a Federal-aid system, is not a defense route, or is not otherwise important, an "under" record may not be available. If no "under" record exits, it is assumed that the route under the bridge is a major or minor collector or a local road for use in Tables 3A and 3B.

Table 3A. Rating by Comparison of Minimum Vertical Underclearance - Item 54 and Functional Classification of Underpassing Route

Underclearance Rating Code	Minimum Vertical Underclearance				
	Functional Class				
	Interstate and Other Freeway		Other Principal and Minor Arterials	Major and Minor Collectors and Locals	Railroad
	All Routes - Except as noted for Urban Areas	Undesignated Routes, Urban Areas*			
9	>17'-0"	>16'-6"	>16'-6"	>16'-6"	>23'-0"
8	17'-0"	16'-6"	16'-6"	16'-6"	23'-0"
7	16'-9"	15'-6"	15'-6"	15'-6"	22'-6"
6	16'-6"	14'-6"	14'-6"	14'-6"	22'-0"
5	15'-9"	14'-3"	14'-3"	14'-3"	21'-0"
4	15'-0"	14'-0"	14'-0"	14'-0"	20'-0"
3	Underclearance less than value in rating code of 4 and requiring corrective action.				
2	Underclearance less than value in rating code of 4 and requiring replacement.				
0	Bridge closed.				

* Use for routes in highly developed urban areas only when there is an alternative Interstate, freeway or expressway facility with a minimum of 16'-0" clearance.

Notes

1. Use the lower rating code for values between those listed in the tables.
2. The functional classification of the underpassing route shall be used in the evaluation. If an "under" record is not coded, the underpassing route shall be considered a major or minor collector or a local road.

Table 3B. Rating by Comparison of Minimum Lateral Underclearances Right & Left - Items 55 & 56 and Functional Classification of Underpassing Route

Underclearance Rating Code	Minimum Lateral Underclearance						
	Functional Class						
	1-Way Traffic				2-Way Traffic		
	Principal Arterials - Interstate, Freeways or Expressways				Other Principal and Minor Arterials	Major and Minor Collectors and Locals	Railroad
	Main Line		Ramp				
	Left	Right	Left	Right			
9	>30	>30	>4	>10	>30	>12	>20
8	30	30	4	10	30	12	20
7	18	21	3	9	21	11	17
6	6	12	2	8	12	10	14
5	5	11	2	6	10	8	11
4	4	10	2	4	8	6	8
3	Underclearance less than value in rating code of 4 and requiring corrective action.						
2	Underclearance less than value in rating code of 4 and requiring replacement.						
0	Bridge closed.						

Notes:

1. Use the lower rating code for values between those listed in the tables.
2. Dimensions are in feet.
3. When acceleration or deceleration lanes or ramps are provided under 2-way traffic, use the value from the right ramp column to determine code.
4. The functional classification of the underpassing route shall be used in the evaluation. If an "under" record is not coded, the underpassing route shall be considered a major or minor collector or a local road.

Item 70 - Bridge Posting 1 digit

The National Bridge Inspection Standards require the posting of load limits only if the maximum legal load in the State produces stresses in excess of the operating stress level. If the load capacity at the operating level is such that posting is required, this item shall be coded 0 through 4. If no posting is required at the operating level, this item shall be coded 5.

This item evaluates the load capacity of a bridge in comparison to the State legal load. It differs from Item 67 - Structural Evaluation in that Item 67 uses the inventory rating while the bridge posting requirement is based on the operating rating.

Although posting a bridge for load-carrying capacity is required only when the maximum legal load exceeds the operating rating capacity, highway agencies may choose to post at lower rating capacities. This posting practice may appear to produce conflicting coding when Item 41 - Structure Open, Posted or Closed to Traffic is coded to show the bridge as actually posted at the site and Item 70 - Bridge Posting is coded as bridge posting is not required. Since different criteria are used for coding these 2 items, this coding is acceptable and correct when the highway agency elects to post at less than the operating rating stress level. Item 70 shall be coded 0 through 4 only if the legal load of the State exceeds that permitted under the operating rating.

The use or presence of a temporary bridge affects the coding. The load capacity shall reflect the actual capacity of the temporary bridge at the operating rating. This also applies to bridges shored up or repaired on a temporary basis.

Code	Description
0, 1, 2, 3 or 4	Posting required
5	No posting required

The degree that the operating rating stress level is under the maximum legal load stress level may be used to differentiate between codes. As a guide and for coding purposes only, the following values may be used to code this item:

Code	Relationship of Operating Rating Stress to Legal Load Stress
5	Equal to or above legal loads
4	0.1 - 9.9% below
3	10.0 - 19.9% below
2	20.0 - 29.9% below
1	30.0 - 39.9% below
0	> 39.9% below

Item 71 - Waterway Adequacy 1 digit

This item appraises the waterway opening with respect to passage of flow through the bridge. The following codes shall be used in evaluating waterway adequacy. Site conditions may warrant somewhat higher or lower ratings than indicated by the table (e.g., flooding of an urban area due to a restricted bridge opening).

Where overtopping frequency information is available, the descriptions given in the table for chance of overtopping mean the following:

Remote-	-	greater than 100 years
Slight __	-	11 to 100 years
Occasional	-	3 to 10 years
Frequent	-	less than 3 years

Adjectives describing traffic delays mean the following:

Insignificant	-	Minor inconvenience. Highway passable in a matter of hours.
Significant	-	Traffic delays of up to several days.
Severe	-	Long term delays to traffic with resulting hardship.

Functional Classification			
Principal Arterials - Interstates, Freeways, or Expressways	Other Principal and Minor Arterials and Major Collectors	Minor Collectors, Locals	Description
Code			
N	N	N	Bridge not over a waterway.
9	9	9	Bridge deck and roadway approaches above flood water elevations (high water). Chance of overtopping is remote.
8	8		Bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.
6			Slight chance of overtopping bridge deck and roadway approaches.
4			Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with insignificant traffic delays.

(codes continued on the next page)

Item 71 - Waterway Adequacy (cont'd)

Functional Classification			Description
Principal Arterials - Interstates, Freeways, or Expressways	Other Principal and Minor Arterials and Major Collectors	Minor Collectors, Locals	
Code			
3	4	5	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with significant traffic delays.
2	3	4	Occasional overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	3	Frequent overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	2	Occasional or frequent overtopping of bridge deck and roadway approaches with severe traffic delays.
0	0	0	Bridge closed.

Item 72 - Approach Roadway Alignment 1 digit

Code the rating based on the adequacy of the approach roadway alignment. This item identifies those bridges which do not function properly' or adequately due to the alignment of the approaches. It is not intended that the approach roadway alignment be compared to current standards but rather to the existing highway alignment. This concept differs from other appraisal evaluations. The establishment of set criteria to be used at all bridge sites is not appropriate for this item. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway the bridge is on.

The individual structure shall be rated in accordance with the general appraisal rating guide in lieu of specific design values. The approach roadway alignment will be rated intolerable (a code of 3 or less) only if the horizontal or vertical curvature requires a substantial reduction in the vehicle operating speed from that on the highway section. A very minor speed reduction will be rated a 6, and when a speed reduction is not required, the appraisal code will be an 8. Additional codes may be selected between these general values.

Item 72 - Approach Roadway Alignment (cont'd)

For example, if the highway section requires a substantial speed reduction due to vertical or horizontal alignment, and the roadway approach to the bridge requires only a very minor additional speed reduction at the bridge, the appropriate code would be a 6. This concept shall be used at each bridge site.

Speed reductions necessary because of structure width and not alignment shall not be considered in evaluating this item.

Item 73 - Year Needed

Item no longer used.

Item 74 - Type of Service

Item no longer used.

Item 75 - Type of Work 3 digits

The information to be recorded for this item will be the type of work proposed to be accomplished on the structure to improve it to the point that it will provide the type of service needed and whether the proposed work is to be done by contract or force account. Code a 3-digit number composed of 2 segments.

Segment	Description	Length
75A	Type of Work Proposed	2 digits
75B	Work Done by	1 digit

This item must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other bridges at the option of the highway agency. Use one of the following codes to represent the proposed work type:

Code	Description
31	Replacement of bridge or other structure because of substandard load carrying capacity or substandard bridge roadway geometry.
32	Replacement of bridge or other structure because of relocation of road.
33	Widening of existing bridge or other major structure without deck rehabilitation or replacement; includes culvert lengthening.

(codes continued on the next page)

Item 75 - Type of Work (cont'd)

34	Widening of existing bridge with deck rehabilitation or replacement.
35	Bridge rehabilitation because of general structure deterioration or inadequate strength.
36	Bridge deck rehabilitation with only incidental widening.
37	Bridge deck replacement with only incidental widening.
38	Other structural work.

The third digit shall be coded using one of the following codes to indicate whether the proposed work is to be done by contract or by force account:

Code	Description
1	Work to be done by contract
2	Work to be done by owner's forces

EXAMPLES:	Code
A bridge is to be replaced by contract because it has deteriorated to the point that it can no longer carry legal loads. The same code should be used if the bridge is replaced because it is now too narrow or the original design was too light to accommodate today's legal loads.	311
A bridge is to be replaced because the roadway must be straightened to eliminate a dangerous curve. The work will be done by contract.	321
A bridge is to be widened to increase shoulder width or the number of traffic lanes. The existing deck is in good condition and will be incorporated as is into the new structure. The work is to be done by contract.	331
A culvert is to be extended by contract to accommodate additional roadway width as part of a reconstruction contract to improve the safety of the adjacent slopes.	331
A deck is to be rehabilitated and the bridge widened to provide a full 12-foot shoulder. The existing shoulder is only 4 feet wide and an extra line of girders with appropriate substructure widening must be added. The work will be done by contract.	341
A bridge superstructure and substructure are to be rehabilitated by State forces to increase the bridge's load capacity.	352

Item 75 - Type of Work (cont'd)

EXAMPLES:

	Code
A bridge deck is to be rehabilitated by contract and a safety curb to be removed which results in incidental widening of 2 feet.	361
A bridge deck is to be replaced by contract and the deck cantilever overhang extended 2 feet, which is the maximum that can be done without adding another line of stringers or girders to the superstructure.	371
A bridge which-is no longer needed is to be demolished and an at-grade crossing built by State forces. (This code could also be used to designate incidental safety work on a bridge such as bridge-rail upgrading or replacement.)	382

Item 76 - Length of Structure Improvement (XXXXXX feet) 6 digits

Code a 6-digit number that represents the length of the proposed bridge improvement to the nearest foot. For replacement or rehabilitation of the entire bridge, the length should be back to back of backwalls of abutments or from pavement notch to pavement notch. For replacement or rehabilitation of only part of the structure, use the length of the portion to be improved.

This item must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other bridges at the option of the highway agency.

For culvert improvements, use the proposed length measured along the centerline of the barrel regardless of the depth below grade. The measurement should be made between the inside faces of the top parapet or edge-stiffening beam of the top slab.

EXAMPLES:

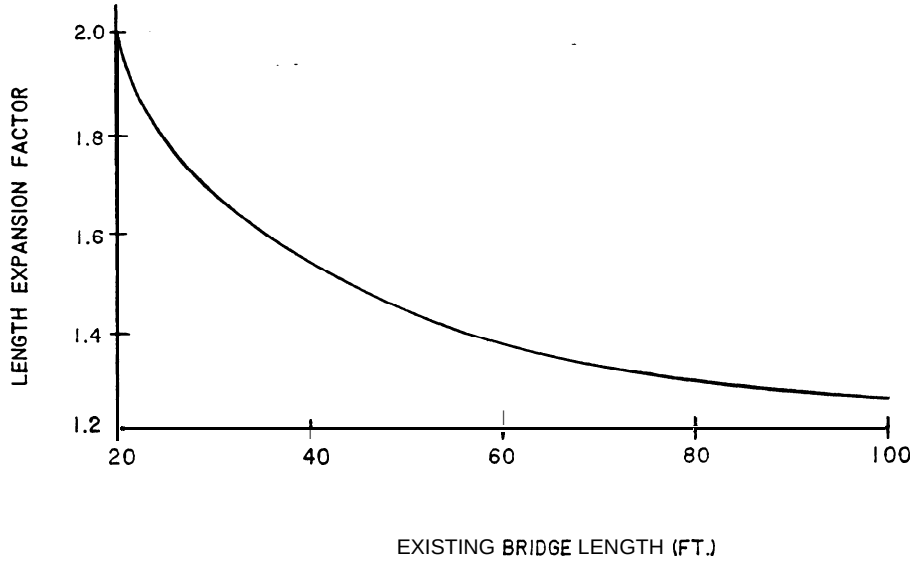
		Code
Length of Structure Improvement	250 feet	000250
	1,200 feet	001200
	12,345 feet	012345

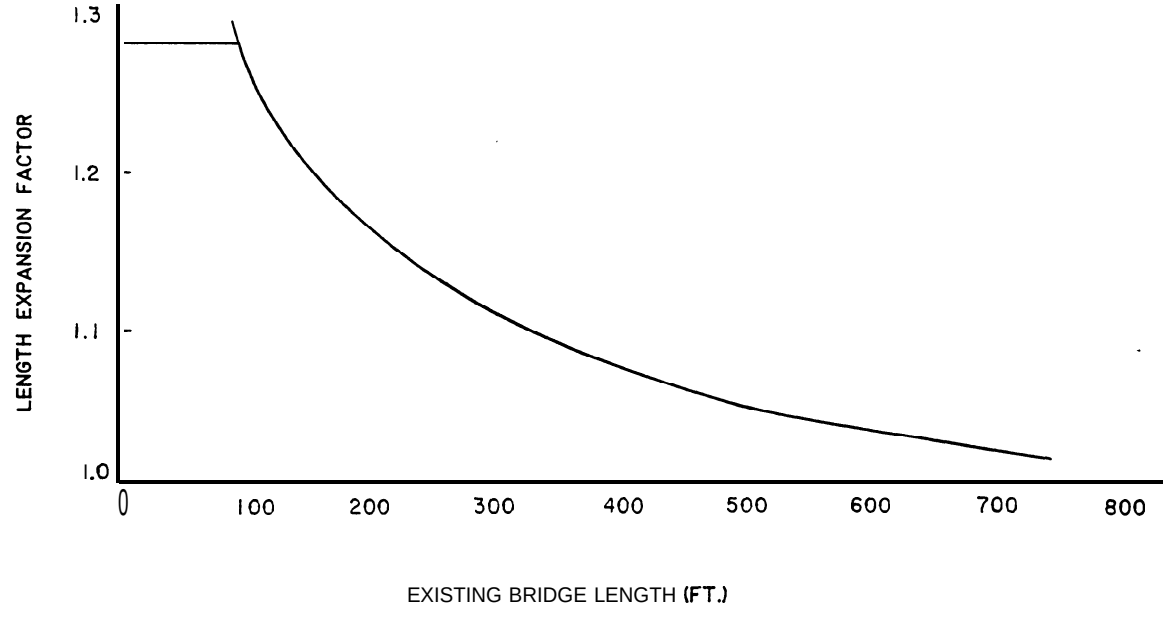
For substructure or channel work only, code the length of superstructure over, or supported by, the substructure or channel.

Typically, a replacement bridge is longer than the existing bridge. Nationwide averages for the increase in bridge length with replacement as a function of the existing length are given in the following figure. The length-expansion factors represent data for the years 1981 to 1985. Where site-specific data is lacking, these factors are suggested for estimating the length of replacement bridges. For exceedingly long bridges (i.e., 1000 feet or more) the length-expansion factor approaches 1.0.

INCREASED LENGTH OF REPLACED BRIDGES

REPLACED BRIDGE LENGTH = EXISTING BRIDGE LENGTH X LENGTH EXPANSION FACTOR





Item 77 - Proposed Design Loading of Improvement

Item no longer used.

Item 78 - Proposed Roadway Width

Item no longer used.

Item 79 - Proposed Number of Lanes

Item no longer used.

Item 80 - Design ADT

Item no longer used.

Item 81 - Year of Estimated ADT

Item no longer used.

Item 82 - Year of Proposed Adjacent Roadway Improvements

Item no longer used.

Item 83 - Type of Proposed Adjacent Roadway Improvements

Item no longer used.

Item 84 - Cost of Improvements

Item no longer used. See Item Numbers 94, 95, 96, and 97.

Item 85 - Preliminary Engineering

Item no longer used.

Item 86 - Demolition

Item no longer used.

Item 87 - Substructure

Item no longer used.

Item 88 - Superstructure

Item no longer used.

Item 89

(Reserved)

Item 90 - Inspection Date

4 digits

Record the month and-year that the last routine inspection of the structure was performed. This inspection date may be different from those recorded in Item 93 - Critical Feature Inspection Date. Code a 4-digit number to represent the month and year. The number of the month should be coded in the first 2 digits with leading zeros as required and the last 2 digits of the year coded as the third and fourth digits of the field.

EXAMPLES:	Code
Inspection date November 1986	1186
March 1987	0387

Item 91 - Designated Inspection Frequency

2 digits

Code 2 digits to represent the number of months between designated inspections of the structure. Leading zeros shall be coded. This interval is usually determined by the individual in charge of the inspection program. For posted, understrength bridges, this interval should be substantially less than the 24-month standard. The designated inspection interval could vary from inspection to inspection depending on the condition of the bridge at the time of inspection.

EXAMPLES:	Code
Posted bridge with heavy truck traffic and questionable structural details which is designated to be inspected each month	01
Bridge is scheduled to be inspected every 24 months	24

It should be noted that bridges will also require special non-scheduled inspections after unusual physical traumas such as floods, earthquakes, fires or collisions. These special inspections may range from a very brief visual examination to a detailed in-depth evaluation depending upon the nature of the trauma. For example, when a substructure pier or abutment is struck by an errant vehicle, in most cases only a visual examination of the bridge is necessary. After major collisions or earthquakes, in-depth inspections may be warranted as directed by the engineer in overall charge of the program. After and during severe floods, the stability of the substructure of bridges may have

Item 91 - Designated Inspection Frequency (cont'd)

to be determined by probing, underwater sensors or other appropriate measures. Underwater inspection by divers may be required for some scour critical bridges immediately after floods. See Item 113 - Scour Critical Bridges.

Item 92 - Critical Feature Inspection 9 digits

Using a series of 3-digit code segments, denote critical features that need special inspections or special emphasis during inspections and the designated inspection interval in months as determined by the individual in charge of the inspection program. The designated inspection interval could vary from inspection to inspection depending on the condition of the bridge at the time of inspection.

Segment	Description	Length
92A	Fracture Critical Details	3 digits
92B	Underwater Inspection	3 digits
92C	Other Special Inspection	3 digits

For each of 92A, B, and C, code the first digit Y for special inspection or emphasis needed and code N for not needed. The first digit of 92A, B, and C must be coded for all structures to designate either a yes or no answer. In the second and third digits of each segment, code a 2-digit number to indicate the number of months between inspections only if the first digit is coded Y. If the first digit is coded N, the second and third digits are left blank.

EXAMPLES:	Item	Code
A 2-girder system structure which is being inspected yearly and no other special inspections are required.	92A 92B 92C	Y12 N__ N__
A structure where both fracture critical and underwater inspection are being performed on a 1-year interval. Other special inspections are not required.	92A 92B 92C	Y12 Y12 N__
A structure has been temporarily shored and is being inspected on a 6-month interval. Other special inspections are not required.	92A 92B 92C	N__ N__ Y06

Item 93 - Critical Feature Inspection Date — 12 digits

Code only if the first digit of Item 92A, B, or C is coded Y for yes. Record as a series of 4-digit code segments, the month and year that the last inspection of the denoted critical feature was performed.

Segment	Description	Length
93A	Fracture Critical Details	4 digits
93B	Underwater Inspection	4 digits
93C	Other Special Inspection	4 digits

For each segment of this item, when applicable, code a 4-digit number to represent the month and year. The number of the month should be coded in the first 2 digits with leading zeros as required and the last 2 digits of the year coded as the third and fourth digits of the field. If the first digit of any part of Item 92 is coded N, then the corresponding part of this item shall be blank.

EXAMPLES:	Item	Code
A structure has fracture critical members which were last inspected in March 1986. It does not require underwater or other special feature inspections.	93A	0386
	93B	(blank)
	93C	(blank)
A structure has no fracture critical details, but requires underwater inspection and has other special features (for example, a temporary support) for which the State requires special inspection. The last underwater inspection was done in April 1986 and the last special feature inspection was done in November 1985.	93A	(blank)
	93B	0486
	93C	1185

Item 94 - Bridge Improvement Cost — 6 digits

Code a 6-digit number to represent the cost of the proposed bridge or major structure improvements in thousands of dollars. This cost shall include only bridge construction costs, excluding roadway, right of way, detour, demolition, preliminary engineering, etc. Code the base year for the cost in Item 97 - Year of Improvement Cost Estimate. Do not use this item for estimating maintenance costs.

This item must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other bridges at the option of the highway agency.

EXAMPLES:		Code
Bridge Improvement Cost	$ 55,850	000056
	250,000	000250
	7,451,233	007451

Item 94 - Bridge Improvement Cost (cont'd)

Nationally, the deck area of replaced bridges is averaging 2.2 times the deck area before replacement. The deck area of rehabilitated bridges is averaging 1.5 times the deck area before rehabilitation. Widening square foot costs are typically 1.8 times the square foot cost of new bridges with similar spans. For example, if the average cost of a new bridge is $50 per square foot, the average cost of the widened area would be $90 per square foot.

Each highway agency is encouraged to use its best available information and established procedures to determine bridge improvement costs. In the absence of these procedures, the highway agency may wish to use the following procedure as a guide in preparing bridge improvement cost estimates.

Apply a construction unit cost to the proposed bridge area developed by using (1) current State deck geometry design standards and (2) proposed bridge length from Item 76 - Length of Structure Improvement.

Item 95 - Roadway Improvement Cost 6 digits

Code a 6-digit number to represent the cost of the proposed roadway improvement in thousands of dollars. This shall include only roadway construction costs, excluding bridge, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc. Code the base year for the cost in Item 97 - Year of Improvement Cost Estimate. Do not use this item for estimating maintenance costs.

This item must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other bridges at the option of the highway agency.

In the absence of a procedure for estimating roadway improvement costs, a guide of 10 percent of the bridge costs is suggested.

Item 96 - Total Project Cost 6 digits

Code a 6-digit number to represent the total project cost in thousands of dollars, including incidental costs not included in Items 94 and 95. This item should include all costs normally associated with the proposed bridge improvement project. The Total Project Cost will therefore usually be greater than the sum of Items 94 and 95. Code the base year for the cost in Item 97 - Year of Improvement Cost Estimate. Do not use this item for coding maintenance costs.

This item must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. It may be coded for other bridges at the option of the highway agency.

In the absence of a procedure for estimating the total project cost, a guide of 150 percent of the bridge cost is suggested.

Item 97 - Year of Improvement Cost Estimate — 2 digits

Record the year that the costs of work estimated in Item 94 - Bridge Improvement Cost, Item 95 - Roadway Improvement Cost, and Item 96 - Total Project Cost were based upon. This date and the data provided for Item 94 through Item 96 must be current; that is, Item 97 shall be no more than 8 years old. Code the last 2 digits of the year so recorded.

EXAMPLES:		Code
Year of Cost Estimate	1988 costs	88
	2010 costs	10

Item 98 - Border Bridge — 5 digits

Use this item to indicate structures crossing borders of States. Code a 5-digit number composed of 2 segments specifying the responsibility for improvements to the existing structure when it is shared with a neighboring State. Code the first 3 digits with the neighboring State code using State codes listed in Item 1 - State Code. Code the fourth and fifth digits with the percentage of total deck area of the existing bridge that the neighboring State is responsible for funding.

Segment	Description	Length
98A	Neighboring State Code	3 digits
98B	Percent Responsibility	2 digits

For the special case of a structure on the border with Canada or Mexico, code the State code value = CAN or MEX respectively. If structure is not on a border, leave blank.

EXAMPLES:	Code
A structure connects your State with New Jersey and New Jersey is responsible for funding 45 percent of future improvement costs.	34245
A structure connects your State with Mexico and Mexico is not responsible for any funding of future improvement costs.	MEX00

Item 99 - Border Bridge Structure Number — 15 digits

Code the neighboring State's 15-digit National Bridge Inventory structure number for any structure noted in Item 98 - Border Bridge. This number must match exactly the neighboring State's submitted NBI structure number. The entire 15-digit field must be accounted for including zeros and blank spaces whether they are leading, trailing, or embedded in the 15-digit field. If Item 98 is blank, this item is blank.

Item 100 - Defense Highway Designation — 1 digit

This item shall be coded for all records in the inventory. For the inventory route identified in Item 5, indicate defense highway conditions using one of the following codes:

Code	Description
0	The inventory route is not a defense highway.
1	The inventory route is a defense highway.
2	The inventory route is a defense highway that goes over or under a defense highway.

Item 101 - Parallel Structure Designation — 1 digit

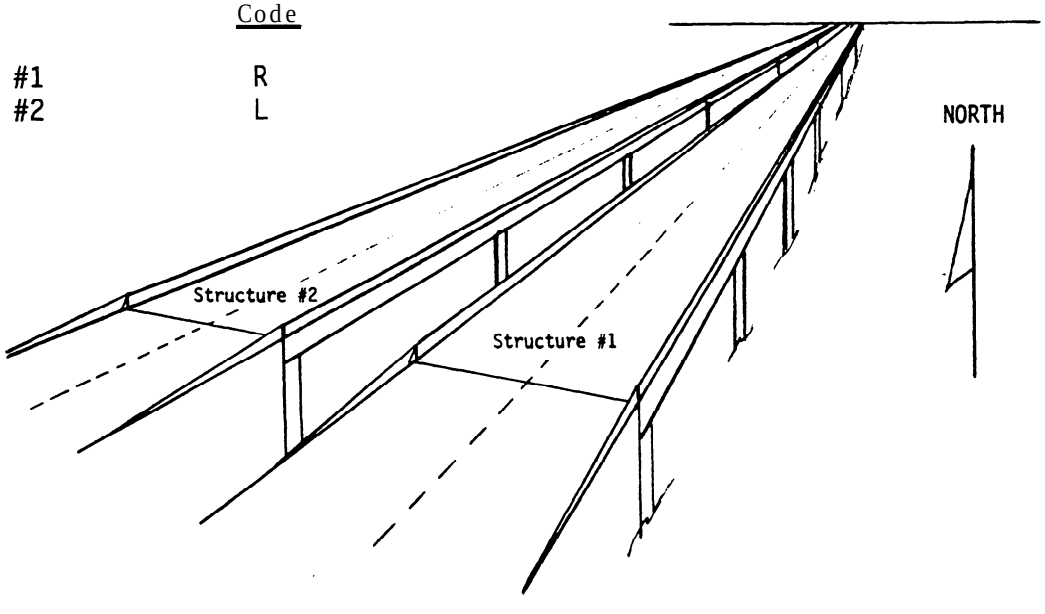
Code this item to indicate situations where separate structures carry the inventory route in opposite directions of travel over the same feature.

One of the following codes shall be used:

Code	Description
R	The right structure of parallel bridges carrying the roadway in the direction of the inventory. (For a defense highway, this is west to east and south to north.)
L	The left structure of parallel bridges. This structure carries traffic in the opposite direction.
N	No parallel structure exists.

EXAMPLE:

	Code
Structure #1	R
Structure #2	L



Item 102 - Direction of Traffic 1 digit

Code the direction of traffic as a l-digit number. This item must be compatible with other traffic-related items such as Item 29 - Average Daily Traffic and Item 51 - Bridge Roadway Width, Curb-to-Curb.

Code	Description
0	Highway traffic not carried
1	l-way traffic
2	2-way traffic
3	One lane-bridge for 2-way traffic

Item 103 - Temporary Structure Designation 1 digit

Code this item to indicate situations where temporary structures or conditions exist. This item should be blank if not applicable.

Code	Description
T	Temporary structure(s) or conditions exist.

Temporary structure(s) or conditions are those which are required to facilitate traffic flow. This may occur either before or during the modification or replacement of a structure found to be deficient. Such conditions include the following:

1. Bridges shored up, including additional temporary supports.
2. Temporary repairs made to keep a bridge open.
3. Temporary structures, temporary runarounds or bypasses.
4. Other temporary measures, such as barricaded traffic lanes to keep the bridge open.

Any repaired structure or replacement structure which is expected to remain in place without further project activity, other than maintenance, for a significant period of time shall not be considered temporary. Under such conditions, that structure, regardless of its type, shall be considered the minimum adequate to remain in place and evaluated accordingly.

If this item is coded T, then all data recorded for the structure shall be for the condition of the structure without temporary measures, except for the following items which shall be for the temporary structure:

Item 10 - Inventory Route, Minimum Vertical Clearance
41 - Structure Open, Posted, or Closed to Traffic
47 - Inventory Route, Total Horizontal Clearance
53 - Minimum Vertical Clearance Over Bridge Roadway
54 - Minimum Vertical Underclearance
55 - Minimum Lateral Underclearance on Right
56 - Minimum Lateral Underclearance on Left
70 - Bridge Posting

Item 104 - Highway System of the Inventory Route 1 digit

Using one of the codes below, code the highway system for the inventory route identified in Item 5. A frontage road can be coded according to the system of the adjacent main line roadway if no other code is appropriate. If more than one route is on the bridge, code in the hierarchy noted below:

Code	Description
1	Interstate
2	Federal-aid Primary (Other than Interstate)
3	Federal-aid Urban
4	Federal-aid Secondary (Rural Only)
8	Non-Federal-aid

Item 105

(Reserved)

Item 106 - Year Reconstructed 4 digits

Record and code the year of reconstruction of the structure. Code all 4 digits of the latest year in which reconstruction of the structure was completed. If there has been no reconstruction code 0000.

For a bridge to be defined as reconstructed, the type of work performed, whether or not it meets current minimum standards, must have been eligible for funding under any of the Federal-aid funding categories. The eligibility criteria would apply to the work performed regardless of whether all State or local funds or Federal-aid funds were used.

Some types of eligible work not to be considered as reconstruction are listed:

Safety feature replacement or upgrading (for example, bridge rail, approach guardrail or impact attenuators).

- Painting of structural steel.
- Overlay of bridge deck as part of a larger highway surfacing project (for example, overlay carried across bridge deck for surface uniformity without additional bridge work).
- Utility work.

Emergency repair to restore structural integrity to the previous status following an accident.

- Retrofitting to correct a deficiency which does not substantially alter physical geometry or increase the load-carrying capacity.
- Work performed to keep a bridge operational while plans for complete rehabilitation or replacement are under preparation (for example, adding a substructure element or extra girder).

Item 106 - Year Reconstructed (cont'd)

EXAMPLE:	Code
Reconstruction completed 1970	1970

Item 107 - Deck Structure Type — 1 digit

Record the type of deck system on the bridge. If more than one type of deck system is on the bridge, code the most predominant. Code N for a filled culvert or arch with the approach roadway section carried across the structure. Use one of the following codes:

Code	Description
1	Concrete Cast-in-Place
2	Concrete Precast Panels
3	Open Grating
4	Closed Grating
5	Steel plate (includes orthotropic)
6	Corrugated Steel
7	Aluminum
8	Timber
9	Other
N	Not applicable

Item 108 - Wearing Surface/Protective System — 3 digits

Information on the wearing surface and protective system of the bridge deck shall be coded using a 3-digit code composed of 3 segments.

Segment	Description	Length
108A	Type of Wearing Surface	1 digit
108B	Type of Membrane	1 digit
108C	Deck Protection	1 digit

Item 108 - Wearing Surface/Protective System (cont'd)

1st Digit - Type of Wearing Surface (Item 108A):

Code	Description
1	Concrete
2	Integral Concrete*
3	Latex Concrete
4	Low Slump Concrete
5	Epoxy Overlay
6	Bituminous
7	Timber
8	Gravel
9	Other
0	None
N	Not Applicable (applies only to structures with no deck)

* Separate layer of concrete added but not latex modified, low slump, etc.

2nd Digit - Type of Membrane (Item 108B):

Code	Description
1	Built-up
2	Preformed Fabric
3	Epoxy
8	Unknown
9	Other
0	None
N	Not Applicable (applies only to structures with no deck)

3rd Digit - Deck Protection (Item 108C):

Code	Description
1	Epoxy Coated Reinforcing
2	Galvanized Reinforcing
3	Other Coated Reinforcing
4	Cathodic Protection
6	Polymer Impregnated
7	Internally Sealed
8	Unknown
9	Other
0	None
N	Not Applicable (applies only to structures with no deck)

Item 109 - Average Daily Truck Traffic (XX percent) 2 digits

Code a 2-digit percentage that shows the percentage of Item 29 - Average Daily Traffic that is truck traffic. Do not include vans, pickup trucks and other light delivery trucks in this percentage.

If this information is not available, an estimate which represents the average percentage for the category of road carried by the bridge may be used. Leave blank if Item 29 - Average Daily Traffic is not greater than 100.

EXAMPLES:		Code
Average Daily Traffic	7% trucks	07
	12% trucks	12

Item 110 - Designated National Network 1 digit

The national network for trucks includes most of the Interstate System and those portions of the Federal-Aid Primary System identified in the Code of Federal Regulations (23 CFR 658). The national network for trucks is available for use by commercial motor vehicles of the dimensions and configurations described in these regulations. For the inventory route identified in Item 5, indicate conditions using one of the following codes:

Code	Description
0	The inventory route is not part of the national network for trucks.
1	The inventory route is part of the national network for trucks.

Item 111 - Pier or Abutment Protection (for Navigation) 1 digit

If Item 38 - Navigation Control has been coded 1, use the codes below to indicate the presence and adequacy of pier or abutment protection features such as fenders, dolphins, etc. The condition of the protection devices may be a factor in the overall evaluation of Item 60 - Substructure. If Item 38 - Navigation Control has been coded 0 or N, leave blank to indicate not applicable.

Code	Description
1	Navigation protection not required
2	In place and functioning
3	In place but in a deteriorated condition
4	In place but reevaluation of design suggested
5	None present but reevaluation suggested

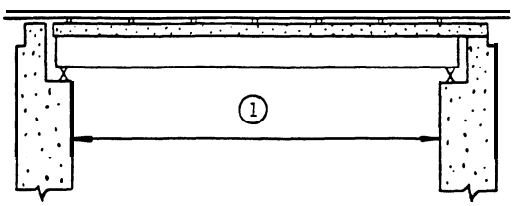
Item 112 - NBIS Bridge Length 1 digit

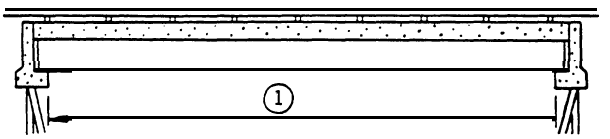
Does this structure meet or exceed the minimum length specified to be designated as a bridge for National Bridge Inspection Standards purposes? The following definition of a bridge is used by AASHTO and is given in the NBIS, 23CFR650.3:

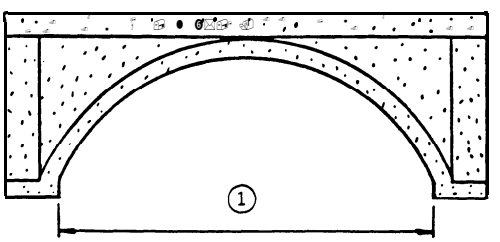
> A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

Code	Description
Y	Yes
N	No

EXAMPLES:



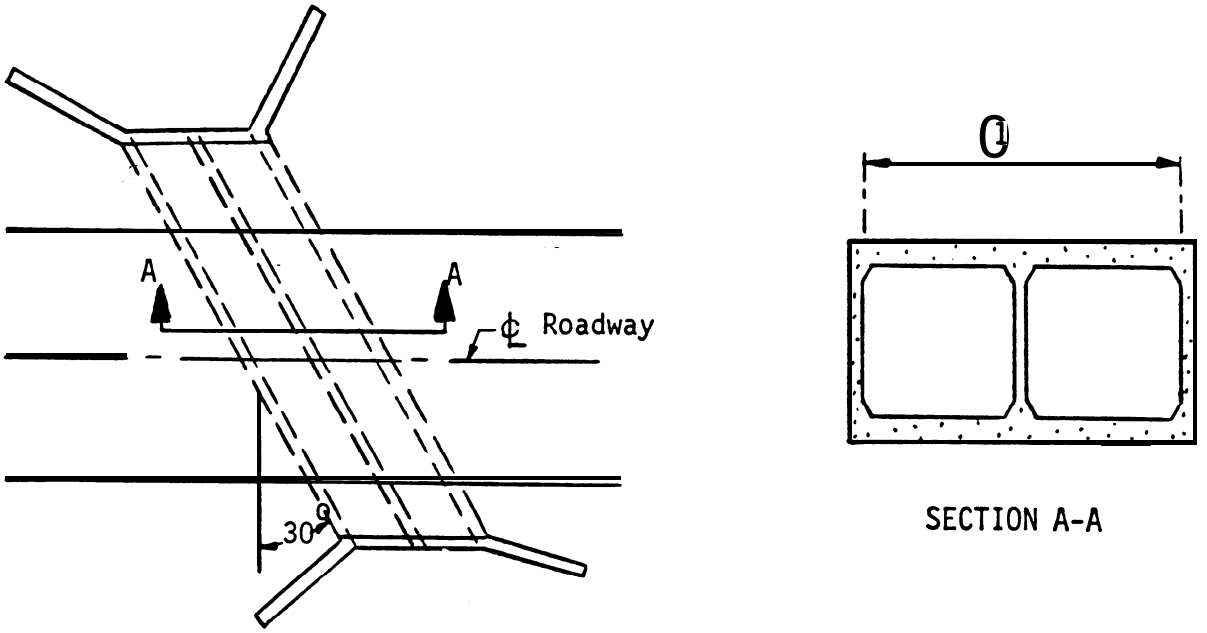




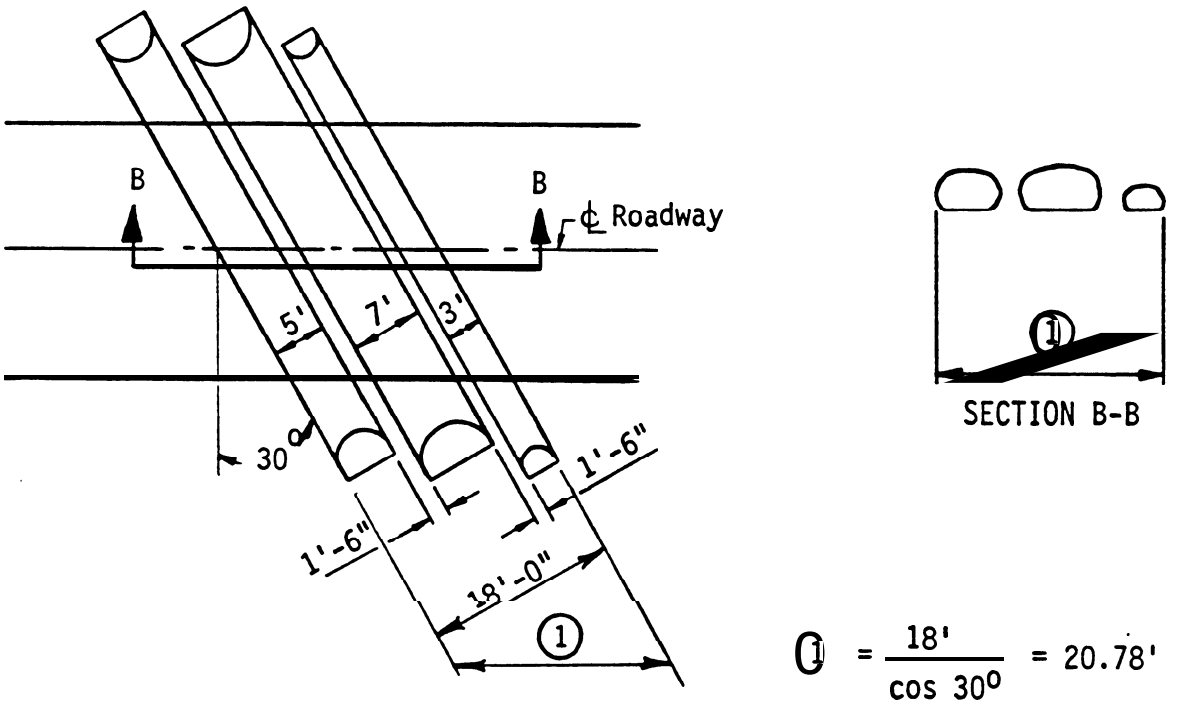
0 Item 112 - NBIS Bridge Length

Item 112 - NBIS Bridge Length (cont'd)

EXAMPLES:



① Item 112 - NBIS Bridge Length



$$① = \frac{18'}{\cos 30^{o}} = 20.78'$$

① Item 112 - NBIS Bridge Length

Item 113 - Scour Critical Bridges 1 digit

Use a single-digit code as indicated below to identify the current status of the bridge regarding its vulnerability to scour. The scour calculations/analyses and field inspections for this determination shall be made by hydraulic/foundation engineers. Details on conducting a scour analysis are included in the FHWA Technical Advisory entitled, "Scour at Bridges." Whenever a rating factor of 4 or below is determined for this item, the rating factor for Item 60 - Substructure may need to be revised to reflect the severity of actual scour' and resultant damage to the bridge. For foundations on rock where scour cannot be calculated, use the coding most descriptive of site conditions. A scour critical bridge is one with abutment or pier foundations which are rated as unstable due to (1) observed scour at the bridge site or (2) a scour potential as determined from a scour evaluation study.

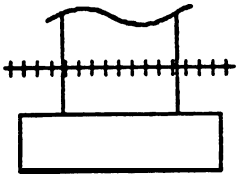
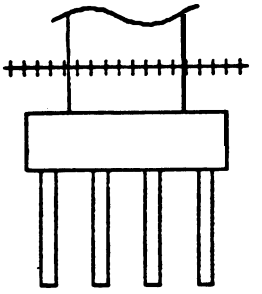
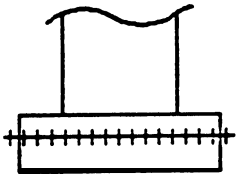
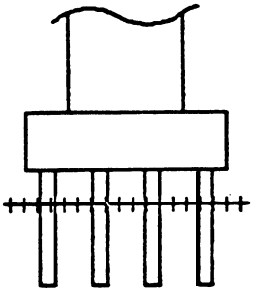
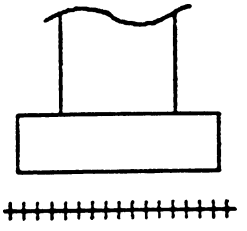
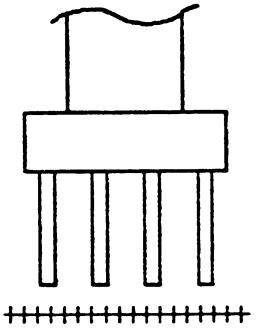
Code	Description
N	Bridge not over waterway.
9	Bridge foundations (including piles) well above flood water elevations.
8	Bridge foundations determined to be stable for calculated scour conditions; calculated scour is above top of footing. (Example A)
7	Countermeasures have been installed to correct a previously existing problem with scour. Bridge is no longer scour critical.
6	Scour calculation/evaluation has not been made. (Use only to describe case where bridge has not yet been evaluated for scour potential.)
5	Bridge foundations determined to be stable for calculated scour conditions; scour within limits of footing or piles. (Example B)
4	Bridge foundations determined to be stable for calculated scour conditions; field review indicates action is required to protect exposed foundations from effects of additional erosion and corrosion.
3	Bridge is scour critical; bridge foundations determined to be unstable for calculated scour conditions: - Scour within limits of footing or piles. (Example B) - Scour below spread-footing base or pile tips. (Example C)
	Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations. Immediate action is required to provide scour countermeasures.

(codes continued on the next page)

Item 113 - Scour Critical Bridges (cont'd)

Code	Description
1	Bridge is scour critical; field review indicates that failure of piers/abutments is imminent. Bridge is closed to traffic.
0	Bridge is scour critical. Bridge has failed and is closed to traffic.

EXAMPLES:

	CALCULATED SCOUR DEPTH		ACTION NEEDED
A. Above top of footing			None - indicate rating of 8 for this item
B. Within limits of footing or piles			Conduct foundation structural analysis
C. Below pile tips or spread footing base			Provide for monitoring and scour countermeasures as necessary
	SPREAD FOOTING (NOT FOUNDED IN ROCK)	PILE FOOTING	

++++++++++++++++ = Calculated scour depth

Item 114 - Future Average Daily Traffic 6 digits

Code for all bridges the forecasted average daily traffic (ADT) for the inventory route identified in Item 5. This shall be projected at least 17 years but no more than 22 years from the year data is submitted to the NBI. The intent is to provide a basis for a 20-year forecast. This item may be updated anytime, but must be updated when the forecast falls below the 17-year limit. If planning data is not available, use the best estimate based on site familiarity.

The future ADT must be compatible with the other items coded for the bridge. For example, parallel bridges with an- open median are coded as follows: if Item 28 - Lanes On and Under the Structure and Item 51 - Bridge Roadway Width, Curb-to-Curb are coded for each bridge separately, then the future ADT must be coded for each bridge separately (not the total for the route).

EXAMPLES:		Code
Future ADT	540	000540
	15,600	015600
	240,000	240000

Item 115 - Year of Future Average Daily Traffic 2 digits

Code the last 2 digits of the year represented by the future ADT in Item 114. The projected year of future ADT shall be at least 17 years but no more than 22 years from the year data is submitted to the NBI.

EXAMPLE:		Code
Year of Future ADT is	2008	08

Item 116 - Minimum Navigation Vertical Clearance
Vertical Lift Bridge (xxx feet) 3 digits

Record to the nearest foot (rounding down) the minimum vertical clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. Code this item only for vertical lift bridges in the dropped or closed position, otherwise 1 eave blank.

EXAMPLES:		Code
Vertical Clearance	20.6	020
	24.2	024

General

Inspection reports should generally include the following:

1. A statement of action taken, if any, pursuant to findings of inspection.

2. Any special findings stemming from the inspection and evaluation of fracture critical members, underwater inspections, and special feature inspection.

3. Any features which should be monitored closely during subsequent inspections as should any specific descriptions, instructions, or concerns.

Measurements, sketches, diagrams, test results, or calculations should generally be included on separate sheets.

Appendix A

Structure Inventory and Appraisal Sheet

Appendix A

Structure Inventory and Appraisal Sheet

Appendix A

Structure Inventory and Appraisal Sheet

NATIONAL BRIDGE INVENTORY - - - - - - - STRUCTURE INVENTORY AND APPRAISAL MM/DD/YY

********** IDENTIFICATION **********
(1) STATE NAME - _____ CODE ___
(8) STRUCTURE NUMBER #_____
(5) INVENTORY ROUTE (ON/UNDER) - _____ = _____
(2) STATE HIGHWAY DEPARTMENT DISTRICT __
(3) COUNTY CODE (4) PLACE CODE _____
(6) FEATURES INTERSECTED - _____
(7) FACILITY CARRIED - _____
(9) LOCATION _____
(11) MILEPOINT ___.___
(16) LATITUDE__ D __.__ ' (17) LONGITUDE __D __.__ '
(98) BORDER BRIDGE STATE CODE % SHARE __ %
(99) BORDER BRIDGE STRUCTURE NO.- #_____

Jr*** STRUCTURE TYPE AND MATERIAL *********
(43) STRUCTURE TYPE MAIN: MATERIAL - _____
TYPE - _____ CODE ___
(44) STRUCTURE TYPE APPR: MATERIAL - _____
TYPE - _____ CODE ___
(45) NUMBER OF SPANS IN MAIN UNIT ___
(46) NUMBER OF APPROACH SPANS ____
(107) DECK STRUCTURE TYPE - _____ CODE _
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE - _____ CODE _
B) TYPE OF MEMBRANE _____ CODE _
C) TYPE OF DECK PROTECTION - _____ CODE _

********** AGE AND SERVICE **********
(27) YEAR BUILT ____
(106) YEAR RECONSTRUCTED ____
(42) TYPE OF SERVICE: ON - _____
UNDER - _____ CODE __
(28) LANES: ON STRUCTURE __ UNDER STRUCTURE __
(29) AVERAGE DAILY TRAFFIC _____
(30) YEAR OF ADT 19__ (109) TRUCK ADT __ %
(19) BYPASS, DETOUR LENGTH __ MI

********** GEOMETRIC DATA **********
(48) LENGTH OF MAXIMUM SPAN ____ FT
(49) STRUCTURE LENGTH _____ FT
(50) CURB OR SIDEWALK: LEFT __.__ FT RIGHT __.__ FT
(51) BRIDGE ROADWAY WIDTH CURB TO CURB __.__ FT
(52) DECK WIDTH OUT TO OUT ___.__ FT
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) ___ FT
(33) BRIDGE MEDIAN - _____ CODE _
(34) SKEW DEG (35) STRUCTURE FLARED __
(10) INVENTORYROUTE MIN VERT CLEAR __ FT IN
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR __.__ FT
(53) MIN VERT CLEAR OVER BRIDGE RDWY __ FT __ IN
(54) MIN VERT UNDERCLEAR REF - _____ __ FT __ IN
(55) MIN LAT UNDERCLEAR RT REF - _____ __.__ FT
(56) MIN LAT UNDERCLEAR LT __.__ FT

********** NAVIGATION DATA **********
(38) NAVIGATION CONTROL - _____ CODE _
(111) PIER PROTECTION - _____ CODE _
(39) NAVIGATION VERTICAL CLEARANCE ___ FT
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR ___ FT
(40) NAVIGATION HORIZONTAL CLEARANCE ____ FT

****

SUFFICIENCY RATING = __.__
STATUS = _____

********** CLASSIFICATION ********** CODE
(112) NBIS BRIDGE LENGTH - ___
(104) HIGHWAY SYSTEM - _____
(26) FUNCTIONAL CLASS - _____ __
(100) DEFENSE HIGHWAY - _____
(101) PARALLEL STRUCTURE - _____
(102) DIRECTION OF TRAFFIC - _____
(103) TEMPORARY STRUCTURE - _____ -
(110) DESIGNATED NATIONAL NETWORK - _____
(20) TOLL - _____
(21) MAINTAIN - _____ __
(22) OWNER _____ __
(37) HISTORICAL SIGNIFICANCE - _____

**********CONDITION ********** CODE
(58) DECK
(59) SUPERSTRUCTURE
(60) SUBSTRUCTURE
(61) CHANNEL & CHANNEL PROTECTION
(62) CULVERTS

********** LOAD RATING AND POSTING ******** CODE
(31) DESIGN LOAD - _____
(64) OPERATING RATING - _____ ___
(66) INVENTORY RATING - _____ ___
(70) BRIDGE POSTING - _____ -
(41) STRUCTURE OPEN, POSTED OR CLOSED -
DESCRIPTION - _____

********** APPRAISAL ********** CODE
(67) STRUCTURAL EVALUATION
(68) DECK GEOMETRY
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL
(71) WATERWAY ADEQUACY
(72) APPROACH ROADWAY ALIGNMENT
(36) TRAFFIC SAFETY FEATURES ____
(113) SCOUR CRITICAL BRIDGES

********** PROPOSED IMPROVEMENTS **********
(75) TYPE OF WORK - _____ CODE ___
(76) LENGTH OF STRUCTURE IMPROVEMENT _____ FT
(94) BRIDGE IMPROVEMENT COST $___,___,000
(95) ROADWAY IMPROVEMENT COST $___,___,000
(96) TOTAL PROJECT COST $___,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 19/20__
(114) FUTURE ADT _____
(115) YEAR OF FUTURE ADT 20__

Jr*** INSPECTIONS **********
(90) INSPECTION DATE__/__ (91) FREQUENCY __ MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL - ___ - MO A) /____
B) UNDERWATER INSP - ___ - __ MO B) __/__
C) OTHER SPECIAL INSP - ___ - __ MO C) /____

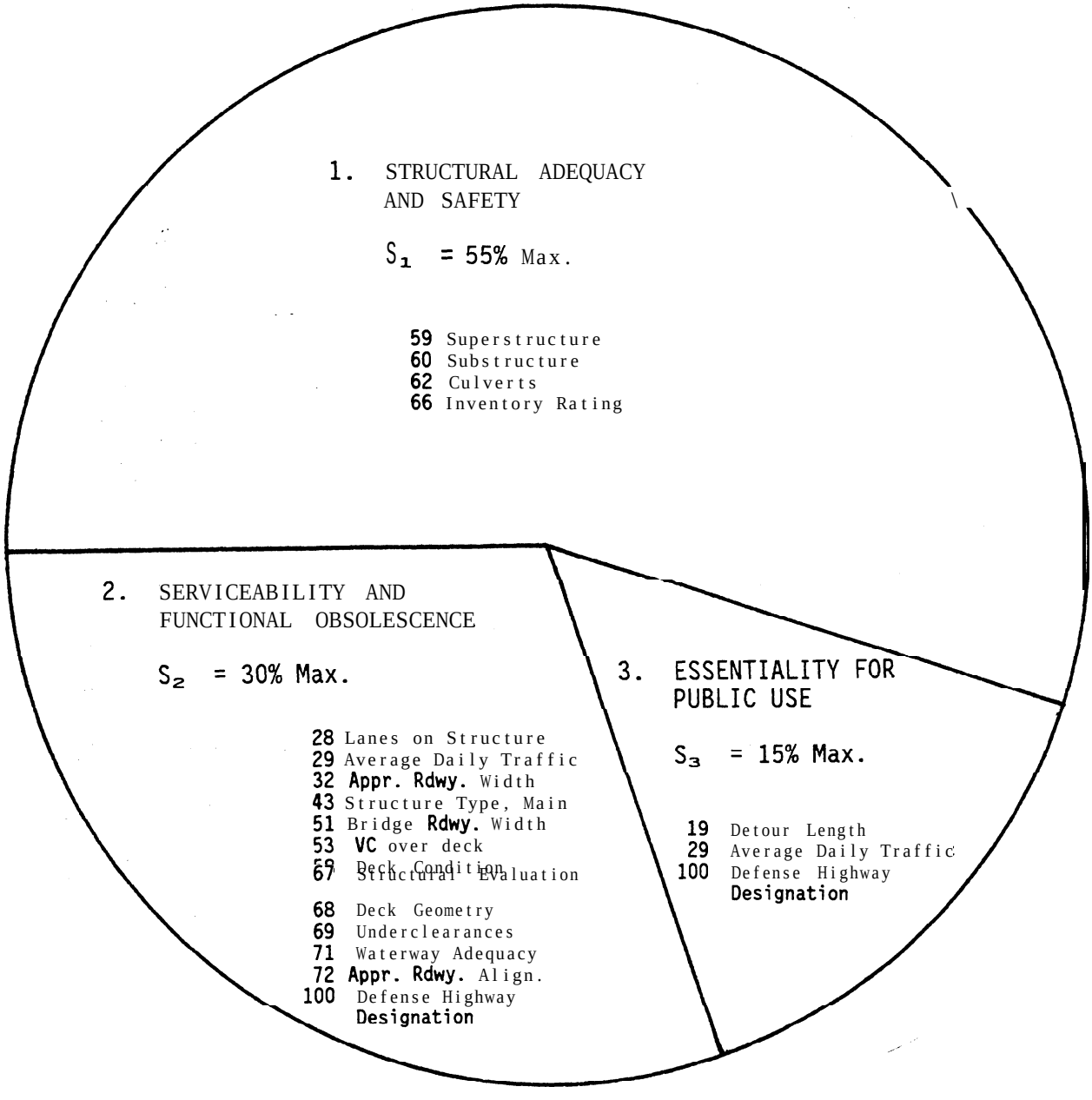
Appendix B

Sufficiency Rating Formula and Example

Appendix B

Sufficiency Rating Formula and Example

The sufficiency rating formula described herein is a method of evaluating data by calculating four separate factors to obtain a numeric value which is indicative of bridge sufficiency to remain in service. The result of this method is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient or deficient bridge.



4. SPECIAL REDUCTIONS

S_4 = 13% Max.

19 Detour Length
36 Traffic Safety Features
43 Structure Type, Main

SUFFICIENCY RATING = $S_1 + S_2 + S_3 - S_4$

Sufficiency Rating shall not be less than 0% nor greater than 100%

Figure 1. Summary of sufficiency rating factors

Sufficiency Rating Formula

1. Structural Adequacy and Safety (55% maximum)

   a. Only the lowest code of Item 59, 60, or 62 applies.

If #59 (Superstructure Rating) or #60 (Substructure Rating) is	≤ 2	then	A = 55%
	= 3		B = 40%
	= 4		C = 25%
	= 5		D = 10%
If #59 and #60 = N and #62 (Culvert Rating) is	≤ 2	then	E = 55%
	= 3		F = 40%
	= 4		G = 25%
	= 5		H = 10%

   b. Reduction for Load Capacity:

      (1) Calculate AIT (Adjusted Inventory Tonnage) as follows:

      If the 1st digit of #66 = 1, AIT = the 2nd & 3rd digits x 1.56;

      If the 1st digit of #66 = 2, AIT = the 2nd & 3rd digits x 1.00;

      If the 1st digit of #66 = 3, AIT = the 2nd & 3rd digits x 1.56;

      If the 1st digit of #66 = 4, AIT = the 2nd & 3rd digits x 1.01;

      If the 1st digit of #66 = 5, AIT = the 2nd & 3rd digits x 0.77;

      If the 1st digit of #66 = 6, AIT = the 2nd & 3rd digits x 0.67;

      If the 1st digit of #66 = 9, AIT = the 2nd & 3rd digits x 1.00;

      (2) Calculate using the following formulas or use Figure 2:

      $I = (36 - AIT)^{1.5} \times 0.2778$

      If $(36 - AIT) \leq 0$, then I = 0

      "I" shall not be less than 0% nor greater than 55%.

$S_1 = 55 - (A + B + C + D + E + F + G + H + I)$

S_1 shall not be less than 0% nor greater than 55%.

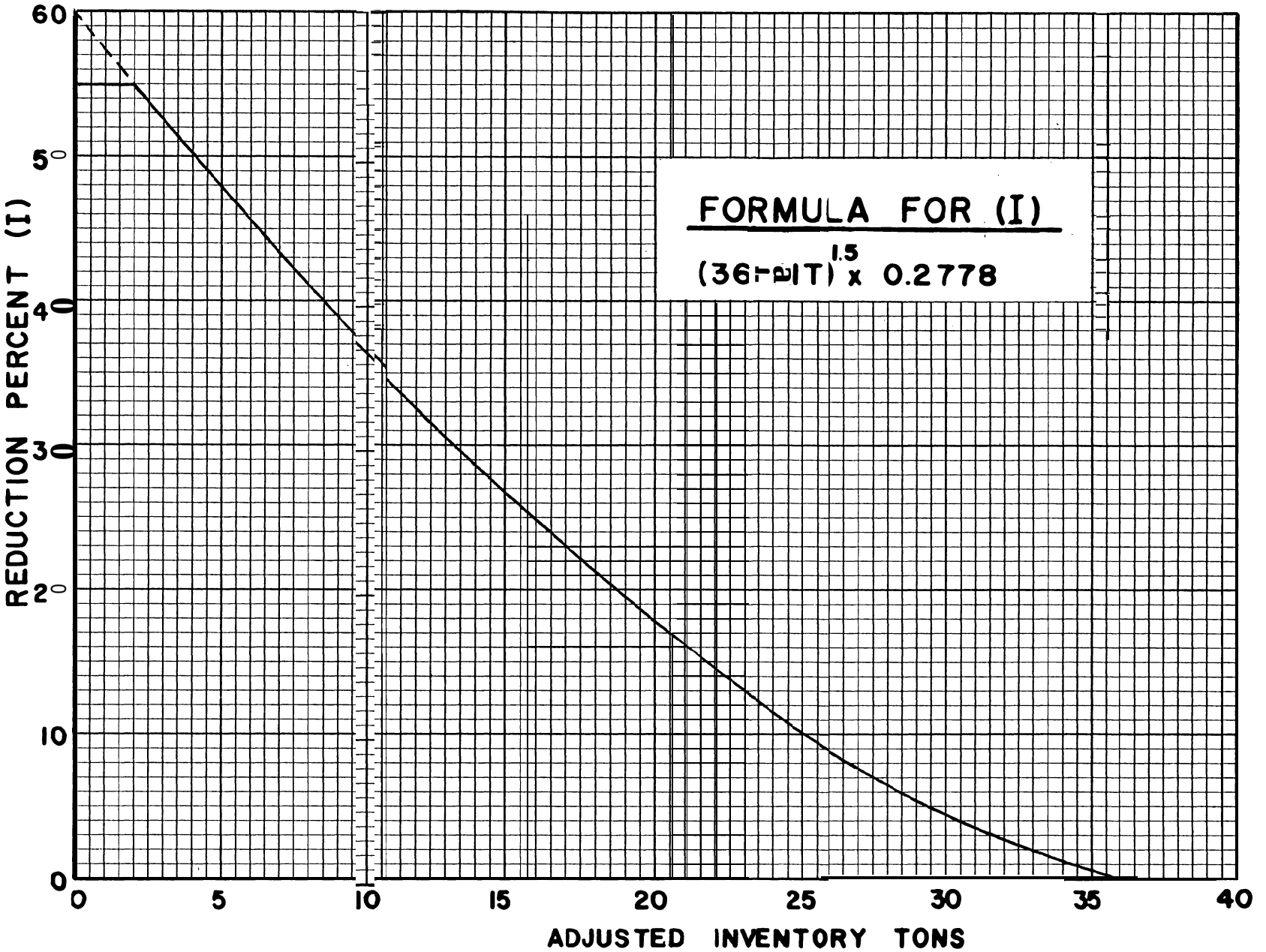


Figure 2. Reduction for adjusted inventory tons

2. Serviceability and Functional Obsolescence (30% maximum)

a. Rating Reductions (13% maximum)

If #58 (Deck Condition) is	≤ 3	then	A = 5%
	$= 4$		A = 3%
	$= 5$		A = 1%
If #67 (Structural Evaluation) is	≤ 3	then	B = 4%
	$= 4$		B = 2%
	$= 5$		B = 1%
If #68 (Deck Geometry) is	≤ 3	then	C = 4%
	$= 4$		C = 2%
	$= 5$		C = 1%
If #69 (Underclearances) is	≤ 3	then	D = 4%
	$= 4$		D = 2%
	$= 5$		D = 1%
If #71 (Waterway Adequacy) is	≤ 3	then	E = 4%
	$= 4$		E = 2%
	$= 5$		E = 1%
If #72 (Approach Road Alignment) is	≤ 3	then	F = 4%
	$= 4$		F = 2%
	$= 5$		F = 1%

J = (A + B + C + D + E + F)

J shall not be less than 0% nor greater than 13%.

b. Width of Roadway Insufficiency (15% maximum)

Use the sections that apply:
(1) applies to all bridges;
(2) applies to 1-lane bridges only;
(3) applies to 2 or more lane bridges;
(4) applies to all except 1-lane bridges.

Also determine X and Y:

X (ADT/Lane) = #29 (ADT) ÷ first 2 digits of #28 (Lanes)

Y (Width/Lane) = #51 (Bridge Rdwy. Width) ÷ first 2 digits of #28

(1) Use when the last 2 digits of #43 (Structure Type) are not equal to 19 (Culvert):

If (#51 + 2 Ft.) < #32 (Approach Roadway Width) G = 5%

(2) For l-lane bridges only, use Figure 3 or the following:

If the first 2 digits of #28 (Lanes) are equal to 01 and

$Y < 14$	then	$H = 15\%$
$Y > 14 < 18$		$H = 15\left(\frac{18-Y}{4}\right)\%$
$Y > 18$		$H = 0\%$

(3) For 2 or more lane bridges If these limits apply do not continue on to (4) as no lane width reductions are allowed.

If the first 2 digits of #28 = 02 and $Y \geq 16$, $H = 0\%$

If the first 2 digits of #28 = 03 and $Y \geq 15$, $H = 0\%$

If the first 2 digits of #28 = 04 and $Y \geq 14$, $H = 0\%$

If the first 2 digits of #28 $\geq$ 05 and $Y \geq 12$, $H = 0\%$

(4) For all except l-lane bridges, use Figure 3 or the following:

If	$Y < 9$ and $X > 50$	then	$H = 15\%$
	$Y < 9$ and $X < 50$		$H = 7.5\%$
	$Y \geq 9$ and $X \leq 50$		$H = 0\%$

If $X > 50$ but ≤ 125 and

$Y < 10$	then	$H = 15\%$
$Y > 10 < 13$		$H = 15\left(\frac{13-Y}{3}\right)\%$
$Y > 13$		$H = 0\%$

If $X > 125$ but ≤ 375 and

$Y < 11$	then	$H = 15\%$
$Y > 11 < 14$		$H = 15\left(\frac{14-Y}{3}\right)\%$
$Y > 14$		$H = 0\%$

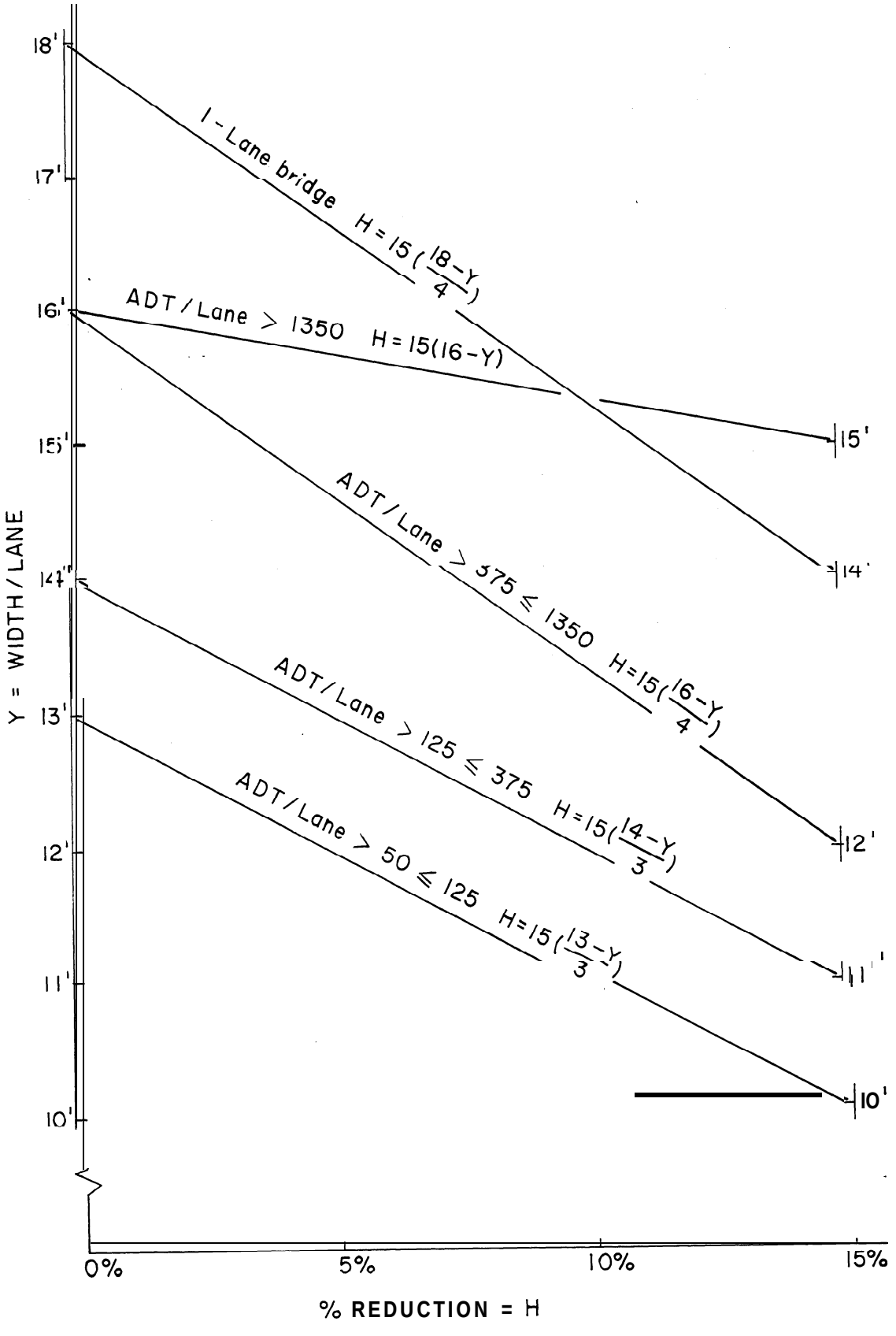


Figure 3. Width of roadway sufficiency

If $X > 375$ but ≤ 1350 and

$Y < 12$	then $H =$	15%
$Y \geq 12 < 16$		$H = 15 \left(\frac{16-Y}{4}\right)\%$
$Y \geq 16$		$H = 0\%$

If $X > 1350$ and

$Y < 15$	then $H =$	15%
$Y \geq 15 < 16$		$H = 15\ (16-Y)\%$
$Y \geq 16$		$H = 0\%$

G + H shall not be less than 0% nor greater than 15%.

c. Vertical Clearance Insufficiency - (2% maximum)

If #100 (Defense Highway Designation) > 0 and

#53 (VC over Deck) ≥ 1600	then $I =$	0%
$\#53 < 1600$		$I = 2\%$

If #100 = 0 and

$\#53 \geq 1400$	then $I =$	0%
$\#53 < 1400$		$I = 2\%$

$$S_2 = 30 - \left[J + (G + H) + I\right]$$

S_2 shall not be less than 0% nor greater than 30%.

3. Essentiality for Public Use (15% maximum)

a. Determine:

$$K = \frac{S_1 + S_2}{85}$$

b. Calculate:

$$A = \frac{\#29\ (ADT) \times \#19\ (\text{Detour Length}) \times 15}{200{,}000 \times K}$$

"A" shall not be less than 0% nor greater than 15%.

c. Defense Highway Designation:

If #100 is > 0 then B = 2%

If #100 = 0 then B = 0%

$$S_3 = 15 - (A + B)$$

S_3 shall not be less than 0% nor greater than 15%.

4. Special Reductions (Use only when $S_1 + S_2 + S_3 \geq 50$)

a. Detour Length Reduction, use Figure 4 or the following:

$$A = (\#19)^4 \times (5.205 \times 10^{-8})$$

"A" shall not be less than 0% nor greater than 5%.

b. If the 2nd and 3rd digits of #43 (Structure Type, Main) are equal to 10, 12, 13, 14, 15, 16, or 17; then

B = 5%

c.

If 2 digits of #36 (Traffic Safety Features)	= 0	C = 1%
If 3 digits of #36	= 0	C = 2%
If 4 digits of #36	= 0	C = 3%

$$S_4 = A + B + C$$

S_4 shall not be less than 0% nor greater than 13%.

Sufficiency Rating = $S_1 + S_2 + S_3 - S_4$

The Rating shall not be less than 0% nor greater than 100%.

3. Essentiality for Public Use (15% maximum)

a. Determine:

$$K = \frac{S_1 + S_2}{85}$$

b. Calculate:

$$A = \frac{\#29\ (ADT) \times \#19\ (\text{Detour Length}) \times 15}{200{,}000 \times K}$$

"A" shall not be less than 0% nor greater than 15%.

c. Defense Highway Designation:

If #100 is > 0 then B = 2%

If #100 = 0 then B = 0%

$$S_3 = 15 - (A + B)$$

S_3 shall not be less than 0% nor greater than 15%.

4. Special Reductions (Use only when $S_1 + S_2 + S_3 \geq 50$)

a. Detour Length Reduction, use Figure 4 or the following:

$$A = (\#19)^4 \times (5.205 \times 10^{-8})$$

"A" shall not be less than 0% nor greater than 5%.

b. If the 2nd and 3rd digits of #43 (Structure Type, Main) are equal to 10, 12, 13, 14, 15, 16, or 17; then

B = 5%

c.

If 2 digits of #36 (Traffic Safety Features)	= 0	C = 1%
If 3 digits of #36	= 0	C = 2%
If 4 digits of #36	= 0	C = 3%

$$S_4 = A + B + C$$

S_4 shall not be less than 0% nor greater than 13%.

Sufficiency Rating = $S_1 + S_2 + S_3 - S_4$

The Rating shall not be less than 0% nor greater than 100%.

Example

Calculation of Sufficiency Rating

1. Structural Adequacy and Safety

A, B, C, E, F, G, H = Not Applicable

D = 10%

$$I = \left[36 - (1.00 \times 22)\right]^{1.5} \times 0.2778 = 14.6$$

$$S_1 = 55 - (10 + 14.6) = 30.4$$

2. Serviceability and Functional Obsolescence

A = 3%, B = 1%, C = 4%, D = NA, E = NA, F = NA

J = (3 + 1 + 4) = 8%

$$X = \frac{18500}{2} = 9250 \qquad Y = \frac{26.0}{2} = 13.0$$

(1) If (26.0 + 2) < 40 then G = 5

(2) Not Applicable

(3) Not Applicable

(4) If X = 9250 and Y = 13.0 then H = 15

G + H = 5 + 15 = 20 (however, maximum allowable = 15)

I = 0

$$S_2 = 30 - \left[8 + (15) + 0\right] = 7.0$$

3. Essentiality For Public Use

$$K = \frac{30.4 + 7.0}{85} = 0.44$$

$$A = \frac{18500 \times 8}{200{,}000 \times 0.44} \times 15 = 25.2$$ (however, maximum allowable = 15)

B = 0

$$S_3 = 15 - (15 + 0) = 0$$

4. Special Reductions

$S_1 + S_2 + S_3 = (30.4 + 7.0 + 0.0) = 37.4 < 50$

$S_4 = NA$

SUFFICIENCY RATING = 30.4 + 7.0 + 0.0 = 37.4

NATIONAL BRIDGE INVENTORY - - - - - - - STRUCTURE INVENTORY AND APPRAISAL 12/15/88

********** IDENTIFICATION **********
(1) STATE NAME - YOUR STATE NAME CODE 999
(8) STRUCTURE NUMBER #075000090502564
(5) INVENTORY ROUTE (ON/UNDER) - ON = 131000440
(2) STATE HIGHWAY DEPARTMENT DISTRICT 03
(3) COUNTY CODE 075 (4) PLACE CODE 59767
(6) FEATURES INTERSECTED - SR 772, ROARING LION R.*
(7) FACILITY CARRIED - STATE ROUTE 44
(9) LOCATION - 6 MI. SW. OF RICHMOND
(11) MILEPOINT 022.375
(16) LATITUDE 40 D 37.8' (17) LONGITUDE 087 D 43.4'
(98) BORDER BRIDGE STATE CODE 888 % SHARE 40 %
(99) BORDER BRIDGE STRUCTURE NO. #ABC003790243009

********** STRUCTURE TYPE AND MATERIAL *********
(43) STRUCTURE TYPE MAIN: MATERIAL - STEEL
TYPE - DECK TRUSS CODE 309
(44) STRUCTURE TYPE APPR: MATERIAL - STEEL
TYPE - GIRDER & FLOORBEAM SYSTEM CODE 303
(45) NUMBER OF SPANS IN MAIN UNIT 002
(46) NUMBER OF APPROACH SPANS 0004
(107) DECK STRUCTURE TYPE - CONCRETE C-I-P CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE - CONCRETE CODE 1
B) TYPE OF MEMBRANE - NONE CODE 0
C) TYPE OF DECK PROTECTION - UNKNOWN CODE 8

********** AGE AND SERVICE **********
(27) YEAR BUILT 1948
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON - HIGHWAY-PEDESTRIAN
UNDER - HIGHWAY-WATERWAY CODE 56
(28) LANES: ON STRUCTURE 02 UNDER STRUCTURE 02
(29) AVERAGE DAILY TRAFFIC 018500
(30) YEAR OF ADT 1988 (109) TRUCK ADT 05 %
(19) BYPASS, DETOUR LENGTH 08 MI

********** GEOMETRIC DATA **********
(48) LENGTH OF MAXIMUM SPAN 0320 FT
(49) STRUCTURE LENGTH 001040 FT
(50) CURB OR SIDEWALK: LEFT 00.0 FT RIGHT 08.3 FT
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 026.0 FT
(52) DECK WIDTH OUT TO OUT 038.6 FT
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 040 FT
(33) BRIDGE MEDIAN - NO MEDIAN CODE 0
(34) SKEW 00 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99 FT 99 IN
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 26.0 FT
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99 FT 99 IN
(54) MIN VERT UNDERCLEAR REF - HIGHWAY 34 FT 04 IN
(55) MIN LAT UNDERCLEAR RT REF - HIGHWAY 20.2 FT
(56) MIN LAT UNDERCLEAR LT 00.0 FT

********** NAVIGATION DATA **********
(38) NAVIGATION CONTROL - BR PERMIT REQ CODE 1
(111) PIER PROTECTION - FUNCTIONING CODE 2
(39) NAVIGATION VERTICAL CLEARANCE 060 FT
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR ___ FT
(40) NAVIGATION HORIZONTAL CLEARANCE 0155 FT

****

SUFFICIENCY RATING = 37.4
STATUS = STRUCTURALLY DEFICIENT

********** CLASSIFICATION ********** CODE
(112) NBIS BRIDGE LENGTH - YES
(104) HIGHWAY SYSTEM - FED-AID URBAN 3
(26) FUNCTIONAL CLASS - OTHER PRIN ART URBAN 14
(100) DEFENSE HIGHWAY - NOT DEFENSE 0
(101) PARALLEL STRUCTURE - NONE EXISTS N
(102) DIRECTION OF TRAFFIC - 2 WAY 2
(103) TEMPORARY STRUCTURE - NOT TEMPORARY
(110) DESIGNATED NATIONAL NETWORK - PART OF NET 1
(20) TOLL - ON FREE ROAD 3
(21) MAINTAIN - STATE HIGHWAY AGENCY 01
(22) OWNER - STATE HIGHWAY AGENCY 01
(37) HISTORICAL SIGNIFICANCE - NOT ELIGIBLE 5

**********CONDITION ********** CODE
(58) DECK 4
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 8
(62) CULVERTS N

********** LOAD RATING AND POSTING ******** CODE
(31) DESIGN LOAD - H-15 2
(64) OPERATING RATING - HS-16 228
(66) INVENTORY RATING - HS-12 222
(70) BRIDGE POSTING - POSTING REQUIRED 2
(41) STRUCTURE OPEN, POSTED OR CLOSED - P
DESCRIPTION - POSTED FOR LOAD

**********APPRAISAL ********** CODE
(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL 9
(71) WATERWAY ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 1100
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********
(75) TYPE OF WORK - REPLACE FOR DEFICIENCY CODE 311
(76) LENGTH OF STRUCTURE IMPROVEMENT 001040 FT
(94) BRIDGE IMPROVEMENT COST $ 4,200,000
(95) ROADWAY IMPROVEMENT COST $ 300,000
(96) TOTAL PROJECT COST $ 5,000,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2008
(114) FUTURE ADT 025600
(115) YEAR OF FUTURE ADT 2008

**********INSPECTIONS **********
(90) INSPECTION DATE 03/88 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL - YES - 06 MO A) 09/88
B) UNDERWATER INSP - NO - MO B) /
C) OTHER SPECIAL INSP - NO - MO C) - /

Appendix C

National Bridge Inspection Standards

Section 650.311 - The January 1979 Coding Guide has been superseded by a December 1988 Guide.

Appendix C

National Bridge Inspection Standards

Section 650.311 - The January 1979 Coding Guide has been superseded by a December 1988 Guide.

National Bridge Inspection Standards

CODE OF FEDERAL REGULATIONS

23 HIGHWAYS - PART 650

Subpart C - National Bridge Inspection Standards

§650.301 Application of standards.

The National Bridge Inspection Standards in this part apply to all structures defined as bridges located on all public roads. In accordance with the AASHTO (American Association of State Highway and Transportation Officials) Transportation Glossary, a "bridge" is defined as a structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

§650.303 Inspection procedures.

(a) Each highway department shall include a bridge inspection organization capable of performing inspections, preparing reports, and determining ratings in accordance with the AASHTO Manual' and the Standards contained herein.

(b) Bridge inspectors shall meet the minimum qualifications stated in §650.307.

(c) Each structure required to be inspected under the Standards shall be rated as to its safe load carrying capacity in accordance with Section 4 of the AASHTO Manual. If it is determined under this rating procedure that the maximum legal load under State law exceeds the load permitted under the Operating Rating, the bridge must be posted in conformity with the AASHTO Manual or in accordance with State law.

(d) Inspection records and bridge inventories shall be prepared and maintained in accordance with the Standards.

(e) The individual in charge of the organizational unit that has been delegated the responsibilities for bridge inspection, reporting and inventory shall determine and designate on the individual inspection and inventory records and maintain a master list of the following:

(1) Those bridges which contain fracture critical members, the location and description of such members on the bridge and the inspection frequency and procedures for inspection of such members. (Fracture critical members are tension members of a bridge whose failure will probably cause a portion of or the entire bridge to collapse.)

(2) Those bridges with underwater members which cannot be visually evaluated during periods of low flow or examined by feel for condition, integrity and safe load capacity due to excessive water depth or turbidity. These members shall be described, the inspection frequency stated, not to exceed five years, and the inspection procedure specified.

(3) Those bridges which contain unique or special features requiring additional attention during inspection to ensure the safety of such bridges and the inspection frequency and procedure for inspection of each such feature.

(4) The date of last inspection of the features designated in paragraphs (e)(l) through (e)(3) of this section and a description of the findings and follow-up actions, if necessary, resulting from the most recent inspection of fracture critical details, underwater members or special features of each so designated bridge.

§650.305 Frequency of inspections.

(a) Each bridge is to be inspected at regular intervals not to exceed 2 years in accordance with Section 2.3 of the AASHTO Manual.

'The "AASHTO Manual" referred to in this part is the "Manual for Maintenance Inspection of Bridges 1983" together with subsequent interim changes or the most recent version of the AASHTO manual published by the American Association of State Highway and Transportation Officials. A copy of the Manual may be examined during normal business hours at the office of each Division Administrator of the Federal Highway Administration, at the office of each Regional Federal Highway Administrator, and at the Washington Headquarters of the Federal -Highway Administration. The addresses of those document inspection facilities are set forth in Appendix D to Part 7 of the regulations of the Office of the Secretary (40 CFR Part 7). In addition, a copy of the Manual may be secured upon payment in advance by writing to the American Association of State Highway and Transportation Officials, 444 N. Capitol Street, N.W., Suite 225, Washington, D.C. 20001.

(b) Certain types or groups of bridges will require inspection at less than 2-year intervals. The depth and frequency to which bridges are to be inspected will depend on such factors as age, traffic characteristics, state of maintenance, and known deficiencies. The evaluation of these factors will be the responsibility,. of the individual in charge of the inspection program.

(c) The maximum inspecti on interval may be increased for certain types or groups of bridges where past inspection reports and favorable experience and analysis justifies the increased interval of inspection. If a State proposes to inspect some bridges at greater than the specified Z-year interval, the State shall submit a detailed proposal and supporting data to the Federal Highway Administrator for approval.

§650.307 Qualifications of personnel.

(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, and subsequent additions to the manual.[3]

(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.

(3) Current certification as a Level III or IV Bridge Safety Inspector under the National Society of Professional Engineer's program for National Certification in Engineering Technologies (NICET)[4] is an alternative acceptable means for establishing that a bridge inspection team leader is qualified.

§650.309 Inspection report.

The findings and results of bridge inspections shall be recorded on standard forms. The data required to complete the forms and the functions which must be performed to compile the data are contained in Section 3 of the AASHTO Manual.

---

[2] *The **"Bridge Inspector's Training Manual" may be purchased from the Superintendent of Documents, US. Government Printing Office, Washington, D.C. 20402.***

---

[3] *The **following publications are supplements to the "Bridge Inspector's Training Manual": "Bridge Inspector's Manual for Movable Bridges," 1977, GPO Stock No. 050-002-00103-5; "Culvert Inspector's Training Manual," July 1986, GPO Stock No. 050-001-0030-7; and "Inspection of Fracture Critical Bridge Members," 1986, GPO Stock No. 050-001-00302-3.***

---

§650.311 Inventory.

(a) Each State shall prepare and maintain an inventory of all bridge structures subject to the Standards. Under these Standards, certain structure inventory and appraisal data must be collected and retained within the various departments of the State organization for collection by the Federal Highway Administration as needed. A tabulation of this data is contained in the structure inventory and appraisal sheet distributed by the Federal Highway Administration as part of the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) in January of 1979. Reporting procedures have been developed by the Federal Highway Administration.

(b) Newly completed structures, modification of existing structures which would alter previously recorded data on the inventory forms or placement of load restriction signs on the approaches to or at the structure itself shall be entered in the State's inspection reports and the computer inventory file as promptly as practical, but no later than 90 days after the change in the status of the structure for bridges directly under the State's jurisdiction and no later than 180 days after the change in status of the structure for all other bridges on public roads within the State.

---

[4] *For **information on NICET program certification contact: National Institute for Certification in Engineering** Technologies, 1420 **King Street, Alexandria, Virginia** 22314. **Attention: John** D. Antrim, P.E., **Phone** (703) 684-2835.*

Effective date October 25, 1988.

(b) Certain types or groups of bridges will require inspection at less than 2-year intervals. The depth and frequency to which bridges are to be inspected will depend on such factors as age, traffic characteristics, state of maintenance, and known deficiencies. The evaluation of these factors will be the responsibility,. of the individual in charge of the inspection program.

(c) The maximum inspecti on interval may be increased for certain types or groups of bridges where past inspection reports and favorable experience and analysis justifies the increased interval of inspection. If a State proposes to inspect some bridges at greater than the specified Z-year interval, the State shall submit a detailed proposal and supporting data to the Federal Highway Administrator for approval.

§650.307 Qualifications of personnel.

(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, and subsequent additions to the manual.[3]

(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.

(3) Current certification as a Level III or IV Bridge Safety Inspector under the National Society of Professional Engineer's program for National Certification in Engineering Technologies (NICET)[4] is an alternative acceptable means for establishing that a bridge inspection team leader is qualified.

§650.309 Inspection report.

The findings and results of bridge inspections shall be recorded on standard forms. The data required to complete the forms and the functions which must be performed to compile the data are contained in Section 3 of the AASHTO Manual.

---

[2] *The **"Bridge Inspector's Training Manual" may be purchased from the Superintendent of Documents, US. Government Printing Office, Washington, D.C. 20402.***

---

[3] *The **following publications are supplements to the "Bridge Inspector's Training Manual": "Bridge Inspector's Manual for Movable Bridges," 1977, GPO Stock No. 050-002-00103-5; "Culvert Inspector's Training Manual," July 1986, GPO Stock No. 050-001-0030-7; and "Inspection of Fracture Critical Bridge Members," 1986, GPO Stock No. 050-001-00302-3.***

---

§650.311 Inventory.

(a) Each State shall prepare and maintain an inventory of all bridge structures subject to the Standards. Under these Standards, certain structure inventory and appraisal data must be collected and retained within the various departments of the State organization for collection by the Federal Highway Administration as needed. A tabulation of this data is contained in the structure inventory and appraisal sheet distributed by the Federal Highway Administration as part of the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) in January of 1979. Reporting procedures have been developed by the Federal Highway Administration.

(b) Newly completed structures, modification of existing structures which would alter previously recorded data on the inventory forms or placement of load restriction signs on the approaches to or at the structure itself shall be entered in the State's inspection reports and the computer inventory file as promptly as practical, but no later than 90 days after the change in the status of the structure for bridges directly under the State's jurisdiction and no later than 180 days after the change in status of the structure for all other bridges on public roads within the State.

---

[4] *For **information on NICET program certification contact: National Institute for Certification in Engineering** Technologies, 1420 **King Street, Alexandria, Virginia** 22314. **Attention: John** D. Antrim, P.E., **Phone** (703) 684-2835.*

Effective date October 25, 1988.

Appendix D

Commentary

This commentary provides a ready reference for item by item changes between the 1979 Guide and this current Guide.

Introduction

o Discussion has been rewritten.

o It is noted that-a good data base is the foundation of an effective bridge management system.

o Use of the codes and instructions in the Guide are optional. However, any agency not using the Guide must convert its data to the codes used in the Guide before transmitting the data to the National Bridge Inventory.

o It is noted that the Structure Inventory and Appraisal sheet is not an inspection form but merely a summary sheet of bridge data required by the Federal Highway Administration.

o The values provided in the tables or otherwise listed in the Guide are for rating purposes only. Current design standards must be used for structure design or rehabilitation.

Definition of Terms

o For clarity, the definitions of some terms used in the Guide are provided.

DATA ITEMS

(Items 1 through 90 are from the 1979 Guide and Items 91 through 116 are new items.)

Item 1 - State Code

o No change.

Item 2 - State Highway Department District

o "Should" has been changed to "shall."

Item 3 - County (Parish) Code

o "Should" has been changed to "shall."

o The current FIPS code is specified rather than the 1970 code.

Item 4 - Place Code

- Title has been changed from "City/Town Code."
- "Should" has been changed to "shall."
- The current FIPS place code is specified rather than the 1970 code.
- Field length is expanded from 4 digits to 5 digits to accommodate the current FIPS place code.

Item 5 - Inventory Route

- Basic data coding remains the same.
- The 5 parts of the item are given separate titles.
- Text has been changed to more clearly explain "on" and "under" records.
- Revised listing of required items for "under" records is provided.
- Toll roads and truck routes have been removed from the l-digit code for designated level of service. These codes are not consistent with the other codes listed.
- A tunnel is noted as appropriate for "under" record only.

Item 6 - Features Intersected

- "Should" has been changed to "shall."
- Examples are provided.
- A method of providing a second identification of the same feature is given.

Item 7 - Facility Carried by Structure

- "Should" has been changed to "shall."
- Examples are provided.
- Railroad and pedestrian bridges are noted as appropriate for "under" record only.

Item 8 - Structure Number

- It is noted that the identical structure number must appear on the "on" and all "under" records associated with, a particular structure.
- If structure numbers are changed, a cross reference listing and tape must be furnished to the FHWA Bridge Division.
- The suggested uniform number format has been removed.

Item 9 - Location

- "Should" has been changed to "shall" for left justified without trailing zeros.
- Examples are provided.

Item 10 - Inventor-v Route, Minimum Vertical Clearance

- "Should" has been changed to "shall."
- Item has been partially rewritten.

Item 11 - Milepoint

- Number of digits has been increased from 5 digits to 6 (hundredths of a mile to thousandths of a mile). This change is made to provide the same field length as data submitted to the Highway Performance Monitoring System (HPMS).
- Following the same procedure as permitted for HPMS, if mileage is coded to the hundredth, it may be used and the item zero filled.

Item 12 - Road Section Number

- This item has been identified as no longer needed by those who use the defense-related items. Therefore, the item has been deleted.

Item 13 - Bridge Description

- This item has been a very confusing item to both code and read with some of the data not reliable.
- The item has been deleted with the endorsement of those who use the defense items. However, the data collected has been revised and retained as new Items: 100 - Defense Highway Designation, 101 - Parallel Structure Designation, 102 - Direction of Traffic, and 103 - Temporary Structure Designation.

Item 14 - Defense Milepoint

o This item has been identified as no longer needed by those who use the defense items and has been deleted.

Item 15 - Defense Section Length

o This item has been identified as no longer needed by those who use the defense items and has been deleted.

Item 16 - Latitude

o No change in coding.

o It is noted that it is preferable to code the latitude for non-defense highways although a code of all zeros is acceptable.

Item 17 - Longitude

o "Should" has been changed to "shall."

o It is noted that it is preferable to code the longitude for non-defense highways although a code of all zeros is acceptable.

Item 18 - Physical Vulnerability

o Item is no longer needed. The physical vulnerability code can be determined from Item 43 - Structure Type, Main.

Item 19 - Bypass, Detour length

o Sketches are added to clarify determination of detour length.

o Example of a structure on a dead-end road has been added.

Item 20 - Toll

o The "old" code of 4 was for toll parkway - no trucks. Toll parkways are now combined with toll roads (Code of 2).

o Two new descriptive codes have been added.

o To eliminate miscodings, all existing codes of 4 must be changed to 2 before applying the new codes.

o "Should" has been changed to "shall."

Item 21 - Maintenance Responsibility

o Title has been changed from Custodian to Maintenance Responsibility.

o Field length has been expanded from 1 digit to 2 digits to provide additional codes for more detailed data.

o The codes have been completely revised since some codes required changes. Care is required to assure that all existing codes are given the proper new code.

o The combination code has been deleted to require the coding of one agency with primary maintenance responsibility.

o A hierarchy of coding for multiple responsibility has been provided.

o "Should" has been changed to "shall."

Item 22 - Owner

o The comments provided for Item 21, with the exception of the title change, are applicable to this item.

Item 23 - Federal-aid Project Number

o This data item is no longer needed and has been eliminated.

Item 24 - Highway System

o This item has been eliminated as a reporting requirement to the NBI but is still available for State use since the item number has not been reused.

o The highway system will still be required (Item 104) but in a varied format. The new format will be identical to that provided in the Highway Performance Monitoring System (HPMS).

Item 25 - Administration Jurisdiction

o This data item has been eliminated. The data can be obtained from Item 22 - Owner.

Item 26 - Functional Classification of Inventory Route

o Title has been revised.

o Codes have been revised to correspond to current HPMS codes.

o The bridge shall be coded rural if not inside a designated urban area.

Item 27 - Year Built

o This item is now used exclusively for year built with all 4 digits of the year recorded. Therefore, the year of reconstruction, if any, must be removed and placed in Item 106.

o Bridges built before 1900 will have the actual date of construction coded.

o A best estimate shall be provided if the year built is unknown.

Item 28 - Lanes On and Under the Structure

o Additional explanation and examples have been added.

o All full-width traffic lanes, including merge and ramp lanes, are now to be recorded where only through lanes were previously counted.

o Alternate methods of coding double-deck bridges are provided.

Item 29 - Average Daily Traffic

o "Should" has been changed to "shall."

o The ADT coded is to include the trucks referred to in Item 109 - Average Daily Truck Traffic.

Item 30 - Year of Average Daily Traffic

o Example is provided.

Item 31 - Design Load

o A loading of HS25 is added under a code previously used for "Other." The codes for "Other" and "Unknown" are now combined. Therefore, all design loads coded as 9 must be revised.

o Any loading not specifically listed is now to be classified and coded using the nearest equivalent of the listed codes. Previously, the nearest equivalent H loading was to be coded.

Item 32 - Approach Roadway Width

o Additional explanation and example sketches have been added.

o The definition of shoulders to be used in coding this item is revised.

Item 33 - Bridge Median

o The code has been expanded to identify 2 types of closed medians.

o Additional explanation and sketches have been added.

o A method for coding traffic separated by a centerline only is provided.

Item 34 - Skew

o No change.

Item 35 - Structure Flared

o Explanation has been rewritten without a coding change.

Item 36 - Traffic Safety Features

o Item has been rearranged.

o Additional explanation is provided.

o Note concerning acceptable standards has been revised.

o It is now noted that collision damage or deterioration of the elements are not to be considered when coding this item.

o If a safety feature is not required, it is to be coded N.

Item 37 - Historical Significance

o No change.

Item 38 - Navigation Control

o Wording has been changed from whether control "exists" to control "required."

o Navigation control has been tied to the requirement of a bridge permit.

o A code of N has been added for not applicable.

Item 39 - Navigation Vertical Clearance

- "Should" has been changed to "shall."
- Numbers are now rounded down to the nearest foot.
- Reference is made to Item 116 for Minimum Navigation Vertical Clearance for closed position of Vertical Lift Bridge.

Item 40 - Navigation Horizontal Clearance

- Further clarification for coding has been added.

Item 41 - Structure Open, Posted, or Closed to Traffic

- The codes have been redefined to provide more data on the operational status of the bridge. The A and P codes remain from previous coding.
- Existing codes must be reviewed and revised as needed to correspond to the redefined codes.
- It is noted that the actual operational status is to be coded.
- Comparison with Item 70 - Bridge Posting is given.

Item 42 - Type of Service

- The codes remain the same although a rewording of the write-up has been made.
- "Relief" service under the bridge is indicated for waterway.

Item 43 - Structure Type, Main

- New codes of 21 and 22 have been added to the type of design and/or type of construction.
- The code of 20, mixed types, is applicable only to approach spans.

Item 44 - Structure Type, Approach Spans

- Changes are the same as for Item 43.
- If the design and/or material is varied, code the most predominant rather than "other."

Item 45 - Number of Spans in Main Unit

o No change.

Item 46 - Number of Approach Spans

o No change.

Item 47 - Inventory Route, Total Horizontal Clearance

o Title has been changed from Total Horizontal Clearance.

o Identification of a third method of measuring clearance and example sketches have been added.

o Description has been reworded slightly.

o It is noted that the largest available clearance is to be coded.

Item 48 - Length of Maximum Span

o "Should" has been changed to "shall."

Item 49 - Structure Length

o Example sketches have been added.

Item 50 - Curb or Sidewalk Widths

o Additional sketches have been added.

Item 51 - Bridge Roadway Width, Curb-to-Curb

o A more detailed description is provided and an example sketch has been added.

o Coding of double deck structures has been added.

Item 52 - Deck Width, Out-to-Out

o Additional example sketches have been added.

Item 53 - Minimum Vertical Clearance Over Bridge Roadway

o Explanation is revised to note that the bridge roadway includes shoulders.

o The vertical clearance is to be rounded down to the nearest inch.

Item 54 - Minimum Vertical Underclearance

o A l-digit prefix has been added to indicate if a highway or railroad controls the underclearance.

o Description has- been rewritten.

o Examples and sketches have been added.

Item 55 - Minimum Lateral Underclearance on Right

o A l-digit prefix has been added to indicate if a highway or railroad controls the underclearance.

o Description has been rewritten.

o Examples have been added.

Item 56 - Minimum Lateral Underclearance on Left
(for divided highways, l-way streets, and ramps; not applicable to railroads)

o A change has been made to the explanation to emphasize that measurement is from edge of the roadway and not from edge of the shoulder.

o Slopes steeper than 3 to 1 are to be considered an obstruction.

Item 57 - Wearing Surface - Protective System

o This item is no longer used.

o Data will be recorded in 2 new items, Item 107 - Deck Structure Type and Item 108 - Wearing Surface/Protective System.

Condition Ratings

- A new explanation of the proper use of codes to be used in evaluating Items 58 through 62 is provided.
- The descriptions of the general codes to be used in evaluating the structure have been completely revised.. In particular, references to maintenance and rehabilitation activities have been removed and general material condition criteria have been added.
- It is noted that load-carrying capacity will not be used in evaluating condition items.
- If rated, completed bridges not yet open to traffic shall be coded as if open to traffic.

Item 58 - Deck

- The explanation has been expanded to provide guidance in evaluating the deck for different materials in accordance with the general condition descriptions.
- The specialized concrete bridge-deck evaluation table has been deleted.
- It is noted that this item shall be coded N for all culverts.
- The coding of integral decks is discussed.
- Some items not to be included in the rating are noted.

Item 59 - Superstructure

- The explanation has been expanded to provide guidance in evaluating the superstructure in accordance with the general condition descriptions.
- It is noted that this item shall be coded N for all culverts.
- Special attention is called to fracture critical components.
- The coding of integral decks is discussed.

Item 60 - Substructure

- The explanation has been expanded to provide guidance in evaluating the substructure in accordance with the general condition descriptions.
- It is noted that this item shall be coded N for all culverts.
- It is noted that scour critical bridges as given by Item 113 may have an effect on the item if scour has substantially affected the overall condition of the substructure.
- The coding of integral wingwalls is noted.

Item 61 - Channel and Channel Protection

- The explanation has been expanded to provide guidance in evaluating the channel and channel protection.
- New specialized descriptions and codes are provided as a guide to evaluate this item.

Item 62 - Culverts

- The title has been changed to remove retaining walls from evaluation under this item.
- The explanation has been expanded to provide guidance in evaluating culverts.
- New specialized descriptions and codes are provided as a guide to evaluate this item.
- The Culvert Inspection Manual, July 1986, is referenced for a detailed discussion on inspection and rating.
- The coding of integral wingwalls is noted.
- It is noted that Items 58, 59, and 60 shall be coded N for all culverts.

Item 63 - Estimate Remaining Life

- Item is no longer needed.

Item 64 - Operating Rating

- The text of this item has been rewritten to require that an equivalent HS loading be reported regardless of the loading used to calculate the rating. However, the equivalent HS loading may be phased in over a 5-year period.

- An additional example is added for structures under sufficient fill so that live load is insignificant.

- Bridge owners are alerted to anticipate a FHWA requirement sometime in the 1990's that a single uniform method will be used to calculate the inventory and operating ratings reported to the NBI.

Item 65 - Approach Roadway Alignment

- Item is no longer needed'.

Item 66 - Inventory Rating

- The comments for Item 64 - Operating Rating also apply to this item.

Appraisal Ratings

- The descriptions of the general codes to be used in evaluating the structure have been revised.

- Tables are provided to evaluate Items 67, 68, 69, and 71 and shall be used by all evaluators.

- Coding of completed bridges not yet opened to traffic is explained.

- The level of service concept has been explained as it relates to the appraisal ratings.

Item 67 - Structural Evaluation

- The title has been changed.

- The explanation has been changed to revise the coding of this item.

- The definitive procedure to be used by all evaluators, without exception, is provided to establish the rating for this item using Items 59, 60, 62, and 66.

- Table 1 has been developed relating Item 66 - Inventory Rating to Item 29 - ADT for nationwide uniformity of evaluation.

Item 68 - Deck Geometry

- The description and evaluation procedures have been completely rewritten to provide for nationwide uniformity of evaluation.

- All evaluations are to be made, without exception, using the explicit tables provided for the following:

  - Bridge Roadway Width, Curb-to-Curb, Item 51
  - Vertical Clearance Over Bridge Roadway, Item 53

- It is noted that the values in the table are for rating purposes only.

Item 69 - Underclearances, Vertical and Horizontal

- The description has been expanded to explain the specific procedure to be used for nationwide uniformity of evaluation.

- Explicit tables are provided to select evaluation codes.

- All evaluations are to be made, without exception, using the tables provided for vertical and horizontal underclearance, Items 54, 55, and 56.

- The functional classification of the underpassing route shall be used in the evaluation.

Item 70 - Bridge Posting

- The title has been changed to reflect the intended use of this item.

- A major change in coding procedure has been made to code a bridge "Posting Required" only if the maximum State legal load produces stress in excess of the operating rating. This change will correspond to the requirements of the NBIS.

- This coding procedure shall be used regardless of whether the State or local government elects to post at a lower stress level.

- Coding of this Item and Item 41 - Structure Open, Posted, or Closed is compared.

- Suggested values are provided for coding which relate the operating stress level to the legal load stress.

Item 71 - Waterway Adequacy

- The description has been completely rewritten for better clarity in understanding the coding procedure.

- For nationwide uniformity, all evaluations shall be made using the codes and descriptions provided.

Item 72 - Approach Roadway Alignment

- The description has been rewritten and expanded to define procedures for evaluating this item.
- The rating concept has been changed and differs from evaluation of other appraisal items in that the rating is based on existing highway alignment rather than current standards.
- The basic criteria is how the alignment of the roadway approaches to the bridge relate to the existing highway alignment. The criteria is based on reduction in vehicle-operating speed.

Item 73 - Year Needed

- Item is no longer needed.

Item 74 - Type of Service

- Item is no longer needed.

Item 75 - Type of Work

- The descriptions and codes have been changed and expanded.
- Examples for the expanded codes are provided.
- Existing codes must be reviewed and revised as needed to correspond to the redefined codes.
- Coding is required for bridges eligible for the HBRRP and optional for other bridges.

Item 76 - Length of Structure Improvement

- Title has been changed.
- This item now records only the structure improvement length rather than total improvement length.
- Improvement length of culverts shall be measured along the centerline of the barrel.
- Existing code must be reviewed and revised as needed to correspond to the redefined code.
- Coding is required for bridges eligible for the HBRRP and optional for other bridges.

Item 77 - Proposed Design Loading of Improvement

o Item is no longer needed.

Item 78 - Proposed Roadway Width

o Item is no longer needed.

Item 79 - Proposed Number of Lanes

o Item is no longer needed.

Item 80 - Design ADT

o Item is no longer needed.

Item 81 - Year of Estimated ADT

o Item is no longer needed.

Item 82 - Year of Proposed Adjacent Roadway Improvements

o Item is no longer needed.

Item 83 - Type of Proposed Adjacent Roadway Improvements

o Item is no longer needed.

Item 84 - Cost of Improvement

o Item is no longer used.

o Improvement costs are now provided by Items 94 through 97.

Item 85 - Preliminary Engineering

o Item is no longer needed.

Item 86 - Demolition

o Item is no longer needed.

Item 87 - Substructure

o Item is no longer needed.

Item 88 - Superstructure

o Item is no longer needed.

Item 89

o (Reserved)

Item 90 - Inspection Date

o Item has been revised to record only month and year of inspection. Therefore, the number of digits has been reduced from 6 to 4.

Item 91 - Designated Inspection Frequency

o This item will provide the designated inspection interval, in months, for each bridge in the inventory.

o It is noted that bridges will require special non-scheduled inspections after unusual physical traumas.

o The designated inspection interval could vary from inspection to inspection.

Item 92 - Critical Feature Inspection

o Critical features which need special inspections or special emphasis during inspections are identified, along with the designated inspection interval.

o This item will comply with the requirements of the revised National Bridge Inspection Standards.

o The designated inspection interval could vary from inspection to inspection.

Item 93 - Critical Feature Inspection Date

o The date of last inspection of the critical feature(s) identified in Item 92 is recorded.

o This item will comply with the requirements of the revised National Bridge Inspection Standards.

Item 94 - Bridge Improvement Cost

- o Only bridge construction costs shall be included.
- o This item is not to be used for estimating maintenance costs.
- o A guide is provided to aid highway agencies that do not have a procedure for computing improvement costs.
- o Coding is required for bridges eligible for the HBRRP and is optional for other bridges.

Item 95 - Roadway Improvement Cost

- o Only roadway construction costs shall be included.
- o This item is not to be used for estimating maintenance costs.
- o A guide is provided to aid highway agencies that do not have a procedure for computing improvement costs.,
- o Coding is required for bridges eligible for the HBRRP and is optional for other bridges.

Item 96 - Total Project Cost

- o This item is to include all costs normally associated with a bridge improvement project.
- o The total will be more than the sum of Items 94 and 95 as incidental costs are to be included.
- o This item is not to be used for estimating maintenance costs.
- o A guide is provided to aid highway agencies that do not have a procedure for computing improvement costs.
- o Coding is required for bridges eligible for the HBRRP and is optional for other bridges.

Item 97 - Year of Improvement Cost Estimate

- o The base year of the improvement costs provided in Items 94 through 96 is to be recorded.
- o Cost data provided shall be no more than 8 years old.
- o Coding is required for bridges eligible for the HBRRP and is optional for other bridges.

Item 98 - Border Bridge

- Identification of bridges between States has been a trouble area for some time. Many States split maintenance responsibilities and costs for any replacement or rehabilitation work.

- The data is important for tracking these bridges in the NBI and in crediting deficient bridges in each State.

Item 99 - Border Bridge Structure Number

- This number must match the neighboring State's NBI structure number exactly in the 15-digit field, including blanks, letters, special characters, etc.

Item 100 - Defense Highway Designation

- This item is one of four (Items 100 through 103) which replace old Item 12 - Road Section Number and Item 13 - Bridge Description. With the elimination of Item 12, Item 100 is essential to identify bridges on the designated defense highway network, including minor off-system roads.

- Instead of providing the road section number, a l-digit code is used to identify one of three different situations.

Item 101 - Parallel Structure Designation

- This item simplifies and clarifies the coding of old Item 13.

- An example sketch is provided to identify right and left structures.

Item 102 - Direction of Traffic

- This item provides information needed for evaluation of Item 68 - Deck Geometry.

- It also provides information for defense highways.

Item 103 - Temporary Structure Designation

- A separate item is now used to identify temporary structures rather than old Item 13.

- An expanded description of a temporary bridge is provided.

- A listing of items which should be provided for the temporary condition is included.

Item 104 - Highway System of the Inventory Route

o This item has been revised from old Item 24 to correspond to highway data submitted to the Highway Performance Monitoring System (HPMS) data set.

o The original codes of 01-05, 07, 09-12 and 14 must be converted to a single digit code. Caution must be taken in the conversion since "old" codes of 02, 03 and 04 do not correspond to "new" codes of 2, 3 and 4 respectively.

Item 105

0 (Reserved)

Item 106 - Year Reconstructed

o This item was originally included as a 2-digit code with Item 27 - Year Built; it will now be a separate 4-digit code.

o A definition of reconstruction is included for coding this item. Some types of work not to be considered as reconstruction are also listed.

o Caution is urged in transferring the data from Item 27 to assure that the recorded data matches the definition.

Item 107 - Deck Structure Type

o This item provides detailed information on deck structure type as a separate item from the wearing surface.

o Note that if more than one type of deck system is on the bridge, the most predominant type is to be coded.

Item 108 - Wearing Surface/Protective System

o This item is an expansion of old Item 57 to provide additional data for type of wearing surface, protective membrane, and deck protection.

o The code of unknown should be used only when the information requested is not available from design or construction records or the records are not available.

Item 109 - Average Daily Truck Traffic

o This information has become increasingly important in the overall structure evaluation, both for load-carrying capacity and for priority for replacement or rehabilitation.

o The percentage of truck traffic is to be recorded only when Item 29 - Average Daily Traffic is greater than 100 vehicles.

Item 110 - Designated National Network

- The designated national network for trucks is identified by statute: Code of Federal Regulations - 23 CFR 658.
- The importance of this item has increased due to the need to provide adequate access to major truck routes.

Item 111 - Pier or Abutment Protection (for Navigation)

- This item is to be evaluated only for bridges over navigable channels (see Item 38 - Navigation Control).
- This item could affect the overall evaluation of Item 60 - Substructure.

Item 112 - NBIS Bridge Length

- This item will establish a positive identification of all bridges subject to the NBIS. Some States have used the NBIS bridge length for determining submittals to the NBI while a few States have submitted bridges of less than the NBIS bridge length to the NBI.
- The definition to be used for determining the code for this item is provided.
- Examples of NBIS bridge length are provided.

Item 113 - Scour Critical Bridges

- Knowledge of a bridge's vulnerability to scour has been increasingly important.
- The determination of coding for this item should be made by qualified hydraulic/foundation engineers.
- Field inspection of scour critical bridges is important not only at regular inspections but during and after floods.
- Evaluation of scour critical bridges may need to be reflected in the overall condition rating of Item 60 - Substructure.
- Codes and descriptions are provided for evaluation of this item.

Item 114 - Future Average Daily Traffic

- Average daily traffic is to be projected at least 17 years but not more than 22 years from the year data is provided to the NBI.
- Data must be compatible with other data items.

Item 115 - Year of Future Average Daily Traffic

o To provide meaningful data for Item 114, the year of the future ADT is to be coded.

Item 116 - Minimum Navigation Vertical Clearance Vertical Lift Bridge

0 Item 39 - Navigation Vertical Clearance provides clearance in the raised or open position. This item will provide the clearance in the lowered or closed position.

General

o The "Remarks" section has been replaced with a "General" section.

o Additional statements have been added concerning inspection of fracture critical members, underwater inspection, special features inspection, and other features requiring special monitoring.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1991 — 524-630/40508