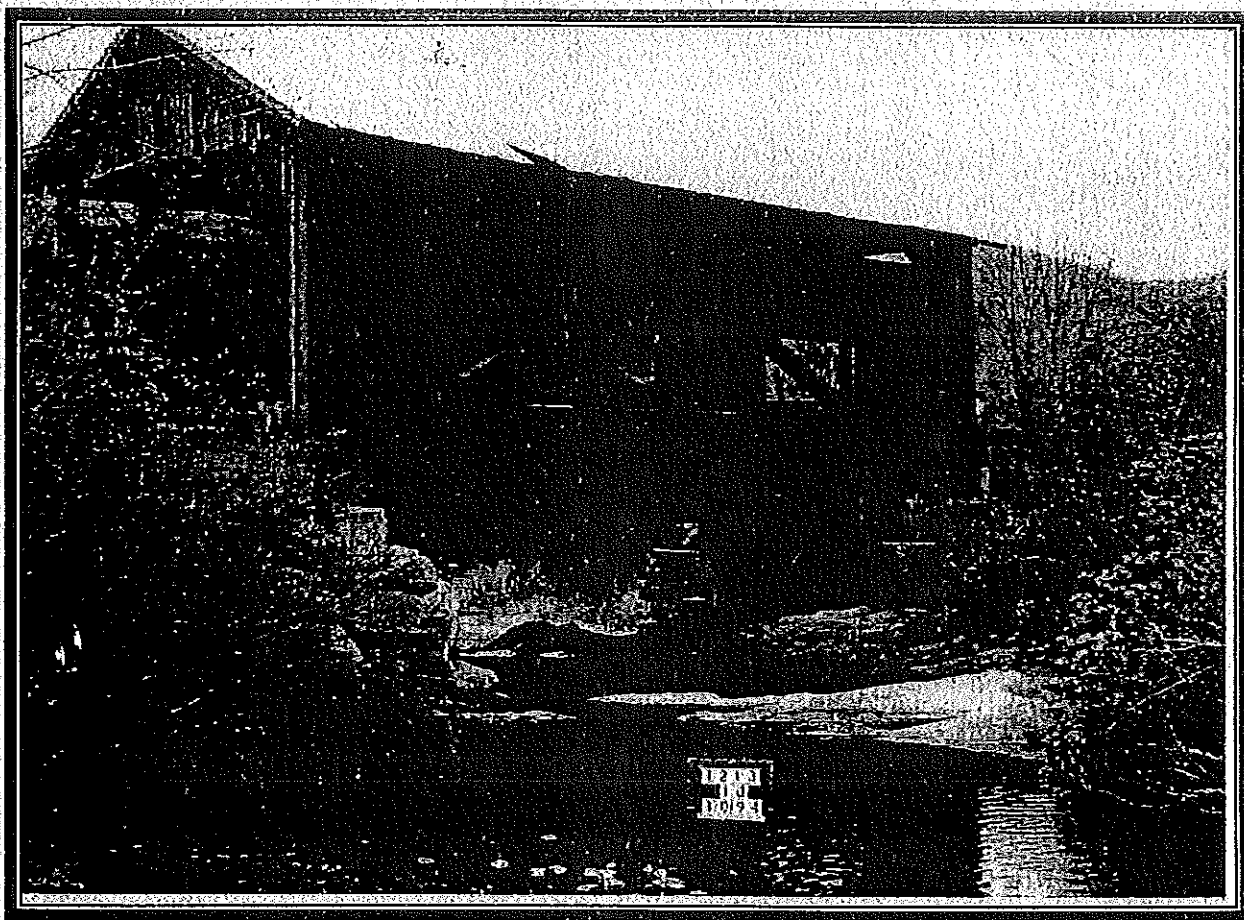


Vermont Agency of Transportation

BRIDGE INSPECTION MANUAL

VERSION 1.2

March 27, 1997



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The Manual for the Vermont Agency of Transportation (VAOT) Bridge Inspection, hereafter referred to as the Manual, has been created to provide more thorough and detailed guidance in evaluating and coding specific NBIS and VAOT bridge data and to document some of the VAOT Policies and Procedures for bridge inspection and inventory.

The bulk of the manual is the FHWA Recording and Coding Guide for Structure Inventory and Appraisal of the Nations Bridges. This guide's text has been amended in this manual to clarify some gray areas and generate more consistency between the VAOT Bridge Inspection units. No changes were made or were intended to be made to the original document.

The VAOT Bridge Inventory Items make up a large part of the manual as well. These items were created to track specific bridge details or items of information which are useful to the workings of the VAOT. With the ever changing mission and goals of the Agency, it is difficult to forecast what special information is useful, therefore it is understood that these VAOT items will continue to change and evolve, and this manual will continue to reflect these changes.

The appendices contain information that helps to document some of the working procedures of Bridge Inspection at the VAOT. Again, these procedures will be updated accordingly.

The initial version, version 1.1, of this manual was distributed to the inspection teams on March 20, 1996. In the spring of 1997 version 1.2 was released and the commentary for the changes are in the back of this manual.

The definitions of terms used in the Guide are provided below.

Bridge: The NBIS 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. * (6.1 meters)

Culvert: A structure designed hydraulically to take advantage of submergence to increase hydraulic capacity. Culverts, as distinguished from bridges, are usually covered with embankment and are composed of structural material around the entire perimeter, although some are supported on spread footings with streambed serving as the bottom of the culvert. Culverts, may qualify to be considered "bridge" length.

Inventory Route: The route for which the applicable inventory date is to be recorded. The inventory route may be on the structure or under the structure. Generally inventories along a route are made from west to east and south to north.

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

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.

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.

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

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.

Strategic Highway Corridor Network (STRAHNET): A system of highways which are strategically important to the defense of the United States. It includes the Interstate Highways and 25 215 kilometers of other non-interstate highways. The Military Traffic Management command Report SE 89-4b-27, Strategic Highway Corridor Network, January 1991, contains additional information on STRAHNET.

STRAHNET Connectors are roads that connect military installations and ports of embarkation to the STRAHNET. The connector routes represent about 3042 kilometers of roads that complement STRAHNET.

Indian Reservation Road (IRR): A public road that is located within or provides access to an Indian reservation as described in Title 23, U.S. C., Sect. 101. The terminus of a road providing access to an Indian reservation or other Indian land is defined as the point at which the road intersects with a road functionally classified as a collector or higher classification (outside the reservation boundary) in both urban and rural areas. In the case of access from an Interstate Highway, the terminus is the first interchange outside the reservation.

Land Management Highway System (LMHS): Consists of adjoining state and local public roads that provide major public access to Bureau of Land Management administered public lands, resources, and facilities.

Forest Highway (FH): A road, under the jurisdiction of, and maintained by, a public authority and open to public travel; wholly or partly within, or adjacent to, and serving the National Forest System (NFS) and which is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources. (23 CFR 660).

Forest Service Development Road: A forest road wholly under the jurisdiction of the Forest Service, which may be "open to public travel". Bridges on Forest Service Development Roads which are "open to public travel" are subject to the NBIS.

ITEM 1 - State Code

3 digits

The first 2 digits are the Federal Information Processing Standards (FIPS) code for States, and 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	Dist. 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 - Highway Agency District**2 Digits**

The AOT 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.

Vermont Districts:

District	Town	Phone #:
01	Bennington	447-2790
02	Dummerston	254-5011
03	Rutland	773-5826
04	White River Mt.	295-8888
05	Essex Jct. Colchester	655-1580
06	Barre Berlin	828-2691
07	St. Johnsbury	748-6670
08	St. Albans	524-5926
09	Derby	334-7934

ITEM 3 - County 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.

See Appendix K.

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.

See Appendix K.

ITEM 5 - Inventory Route**9 digits**

The inventory route is a 9-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 types of NBI 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 a Federal-aid highway, is a STRAHNET route or connector 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 the structure. If 2 or more routes go under a structure on separate roadways, the code of 2 shall not be used. Code A, B, C, D, etc. consecutively for multiple routes on separate roadways under the same structure. SHRAHNET 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, 26-30, 42, 43, 47-49, 100-104, 109, 110, and 204. All other items may remain blank. Also, code Item 226, and Item 205 for interstates, for duplicate reports.

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 road 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
St. 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 9	217000810
County Highway 173, on	1 4 1 00173 9	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	8 3 2 00130 0	832001399
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. When Item 5A indicates an "under" record, this item describes the inventory route and/or features under the structure. 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 STRAHNET or STRAHNET Connector highway and considered to be a critical facility, 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. In all situations this item describes the use "on" the structure. This item shall be left justified without trailing zeros.

EXAMPLES:

COUNTY ROAD 450
US 66
MAIN STREET
C & O 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. Closed medians may have either mountable or non-mountable curbs or barriers.

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, all 15 digits are to be filled. For any structure number changes, 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 or diskette and a printed listing in the FHWA required format.

The identical structure number must appear on the "on" and all "under" record 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.

State of Vermont:

8A	State System - 20 Town System - 10	2 digits
8B	State System - Federal Aid Route No. Town System - County/Town Code (Appendix J)	4 digits
8C	Inventory Bridge Number	4 digits
8D	County Code	2 digits
8E	Town Code - County/Town Code is used in structure number	2 digit
8F	Federal Aid or County/Town Indicator 1. County/Town used in 8B 2. Federal Aid Route used in 8B	1 digit

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**

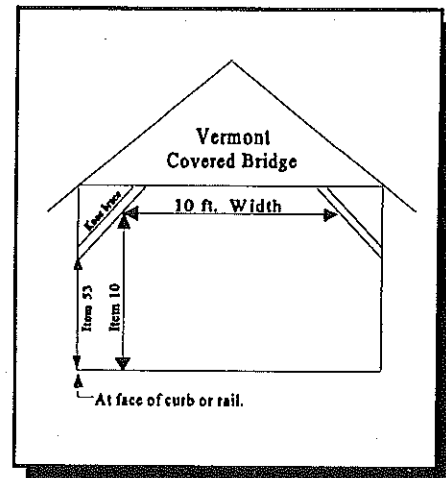
Code the minimum vertical clearance over the inventory route identified in Item 5, whether the route is "on" the structure or "under" the structure. The minimum clearance for a 10-foot width of the pavement or traveled part of the roadway where the clearance is the greatest shall be recorded and coded in feet and inches. For structures having multiple openings, clearances for each opening shall be recorded, but only the greatest 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 restrictions exist, code 9999.

For horizontal clearances less than 10 feet, measurement will be taken at the horizontal restriction.

ITEM 11 - Kilometerpoint (XXXX.XXX miles)**7 digits**

The linear referencing system (LRS) kilometerpoint is used to establish the location of the bridge on the Base Highway Network (see Item 12). It must be from the same LRS Inventory Route and kilometerpoint system as reported in the Highway Performance Monitoring System (HPMS). The kilometerpoint coded in this item directly relates to Item 13 - LRS Inventory Route, Subroute Number.

This item must be coded for all structures located on or overpassing the Base Highway Network. Code a 7-digit number to represent the LRS kilometerpoint distance in kilometers to the nearest thousandth (with an assumed decimal point). For structures carrying the LRS Inventory Route, code the kilometerpoint at the beginning of the structures (i.e. the lowest kilometerpoint on the bridge). When the LRS Inventory Route goes under the structure (Item 5A coded 2 or A-Z), then code the kilometerpoint on the underpassing route where the structure is first encountered.

Figure 10

Code all zeros in this field for all records where kilometerpoints are not provided. Kilometerpoints may be coded for bridges that are not located on the Base Highway Network, however Item 12 - Base Highway Network shall be coded 0 for these records.

The kilometerpoint is coded aligned to the assumed decimal point and zero filled where needed to fill the 7 digits.

EXAMPLES:

Code

Kilometerpoint is 130.34

0130340

Kilometerpoint is 9.60

0009600

ITEM 12 - Base Highway Network

1 digit

This item is to be coded for all records in the inventory. The Base Highway Network includes the through lane (mainline) portions of the NHS, rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network. For the inventory route identified in Item 5 - Inventory Route, indicate whether the inventory route is on the Base Highway Network or not on that network. Use one of the following codes:

CodeDescription

0

Inventory Route is not on the Base Network

1

Inventory Route is on the Base Network

ITEM 13 - LRS Inventory Route, Subroute Number

12 digits

If Item 12 - Base Highway Network has been coded 1, the information to be recorded for this item is inventory route for the State's linear referencing system (LRS). If Item 12 has been coded 0, this entire item should be left blank. This item is a 12-digit code composed of 2 segments.

SegmentDescriptionLength

13A

LRS Inventory Route

10 digits

13B

Subroute Number

2 digits

The LRS inventory route and subroute numbers to be reported in this item must correspond to the LRS inventory route and subroute numbers reported by the State for the HPMS. The LRS inventory route number is coded in the ten positions of segment 13A, right justified and zero filled. The subroute number, if it exists, is coded in the two positions of segment 13B, right justified and zero filled.

The LRS inventory route number can be alphanumeric, but must not contain blanks. The LRS inventory route number is not necessarily the same as that posted along the roadway, but is a number used to uniquely identify a route within at least a county and perhaps throughout the State.

The subroute number is a number that uniquely identifies portions of an inventory route sections where duplicate kilometerpoints occur. These subroute numbers, if they exist, are identified in the State's HPMS-LRS records. If there is no subroute number, code 00 in this segment.

EXAMPLES:

Code

Inventory Route 2775, Subroute Number 0

000000277500

Inventory Route 2775, Subroute Number 3

000000277503

ITEM 16 - Latitude (XX degrees XX minutes XX.XX seconds)

8 digits

For bridges on STRAHNET and STRAHNET Connector highways and on the NHS, record and code the latitude of each in degrees, minutes and seconds to the nearest hundredth of a second (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 consistent point of reference on the bridge which is compatible with the LRS. If the bridge is not on a STRAHNET highway or the NHS, a code of all zeros is acceptable, but it is preferable to code the latitude if available.

The reason for the increased precision is to facilitate the use of Global Positioning System (GPS) data directly into this item. The increased precision is not currently mandatory and, if GPS readings are not available, the current measuring methods and level of precision may continue to be used. The minimum precision should be to the nearest minute, but the preferred precision is to the nearest hundredth of a second using GPS methods.

EXAMPLE:

Code

Latitude is 35 degrees, 27.3'

(current precision)

35271800

(acceptable coding)

35270000

35 degrees, 27'18.55"

(GPS reading)

35271855

ITEM 17 - Longitude (XXX degrees XX minutes XX.XX seconds)

9 digits

For bridges on STRAHNET and STRAHNET Connector highways and on the NHS, record and code the longitude of each in degrees, minutes and seconds to the nearest hundredth of a second (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 consistent point of reference on the bridge which is compatible with the LRS. If the bridge is not

on a STRAHNET highway or the NHS, a code of all zeros is acceptable, but it is preferable to code the longitude if available.

The reason for the increased precision is to facilitate the use of Global Positioning System (GPS) data directly into this item. The increased precision is not currently mandatory and, if GPS readings are not available, the current measuring methods and level of precision may continue to be used. The minimum precision should be to the nearest minute, but the preferred precision is to the nearest hundredth of a second using GPS methods.

EXAMPLE:

		Code
Longitude is 81 degrees, 5.8'	(current precision)	081054800
	(acceptable coding)	081060000
81 degrees, 50.65"	(GPS reading)	081055065

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"). In the State of Vermont, interstate, US, and Vermont routes can only be detoured onto state system routes. Town highway routes will be detoured onto town highways no less than Class III.

EXAMPLE:

	Code
Diamond Interchange, structure by-passable	00
Cloverleaf, not by-passable; 8-mile detour	08
Structure over river; 121-mile detour	99
Structure over highway, no interchange, by-passable at ground level	00

Structure on dead end road

99

Figure 19 A

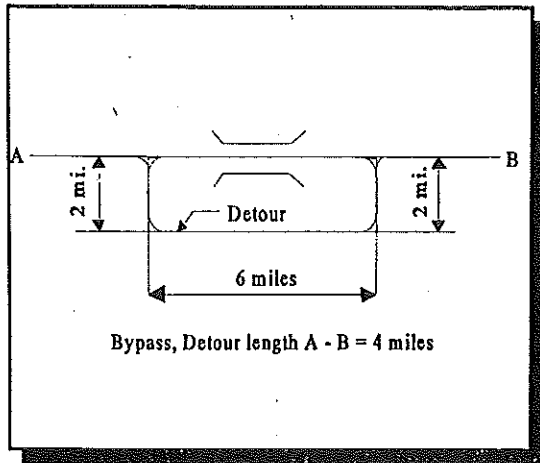
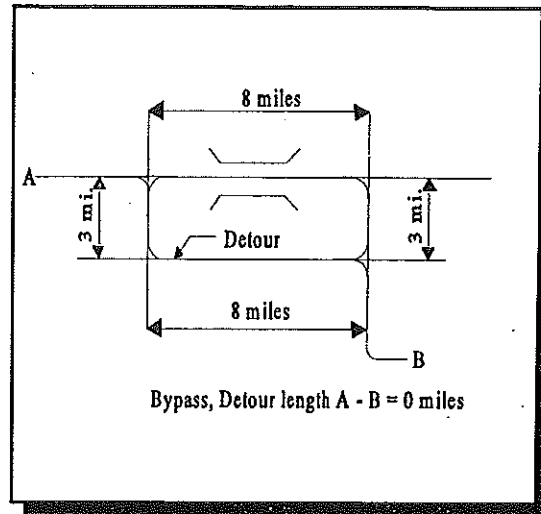


Figure 19 B



Item 20 - Toll

1 digit

The toll status of the structure is indicated by this item. Interstate toll segments under Secretarial Agreement (Title 23 - United States Code - Highways Section 129 as amended by 1991 ISTEA and prior legislation) shall be identified separately. Use one of the following codes:

Code Description

- 1 Toll bridge. Tolls are paid specifically to use the structure.
- 2 On toll road. The structure carries a toll road, that is, tolls are paid to use the facility, which includes both the highway and the structure.
- 3 On free road. The structure is toll-free and carries a toll-free highway.
- 4 On Interstate toll segment under Secretarial Agreement. Structure functions as a part of the toll segment.
- 5 Toll bridge is a segment under Secretarial Agreement. Structure is separate agreement from highway segment.

Item 21 - Maintenance Responsibility**2 digits**

The actual name(s) of the agency(s) responsible for the maintenance of the structure shall be recorded on the inspection form. The codes below shall be used to represent the type of agency that has primary responsibility for maintaining the structure. If more than one agency has equal maintenance responsibility, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Code	Description	Code	Description
01	State Highway Agency	31	State Toll Authority
02	County Highway Agency	32	Local Toll Authority
03	Town or Township Highway Agency	60	Other Federal Agencies (not listed)
04	City or Municipal Highway Agency	62	Bureau of Indian Affairs
11	State Park, Forest, or Reservation Agency	63	Bureau of Fish and Wildlife
12	Local Park, Forest, or Reservation Agency	66	National Park Service
21	Other State Agencies	67	Tennessee Valley Authority
25	Other Local Agencies	68	Bureau of Land Management
26	Private (other than railroad)	69	Bureau of Reclamation
27	Railroad	70	Corps of Engineers (Civil)
		71	Corps of Engineers (Military)
		80	Unknown

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 26 - Functional Classification of Inventory Route**2 digits**

For the inventory route, code the functional classification using one of the following codes. Functional classification will be determined by using the latest function classification map as compiled by the Vermont AOT Planning Division:

	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

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
Construction completed:	1892	1892

State of Vermont - use 1919 for unknown.

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).

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 1-lane bridge carrying 2-directional traffic is still considered to carry only one lane on the structure). It should be noted here that for the purpose of evaluating the Deck Geometry - Item 68, any "1-lane" bridge, not coded as a ramp (Item 5C = 7),

which has a Bridge Roadway Width, Curb-to-Curb - Item 51 coded 16 feet or greater shall be evaluated as 2 lanes.

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 being identified by that "under" record shall be coded in Item 28B.

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.

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 0803 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. If the bridge is closed, code the actual ADT from before the closure occurred.

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:	Average Daily Traffic	Code	Note: See State Item 242 for source of AOT.
	540	000540	
	15,600	015600	
	24,000	024000	

Item 30 - Year of Average Daily Traffic

4 digits

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

EXAMPLE:	Year of ADT	Code
	Year of ADT is 1994	1994

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

A = HL 93

B = Greater than HL93

C = Other

0 = Unknown

www.fhwa.dot.gov/bridge/nbi.htm

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

Code a 4-digit number to 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.

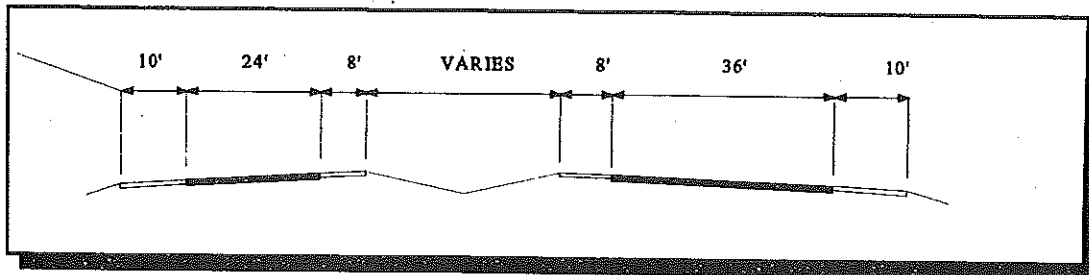
For structures with medians of any type and double-decked structures, this item should be coded as the sum of the usable roadway widths for the approach roadways (i.e., all median widths which do not qualify as shoulders should not be included in this dimension). When there is a variation between the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

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 in Figure 32 A.

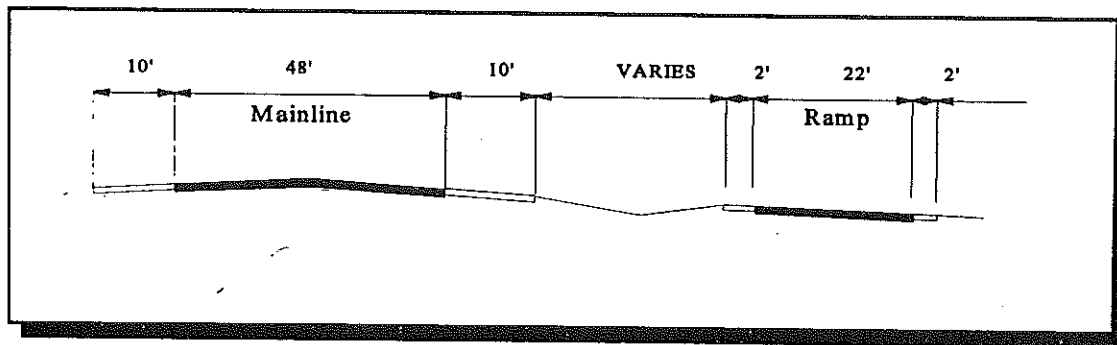
Figure 32 A



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).

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 in Figure 32 B is 94 feet (a code of 094).

Figure 32 B



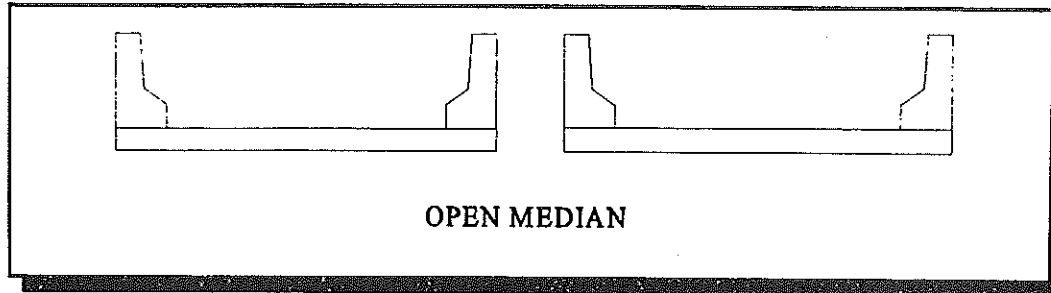
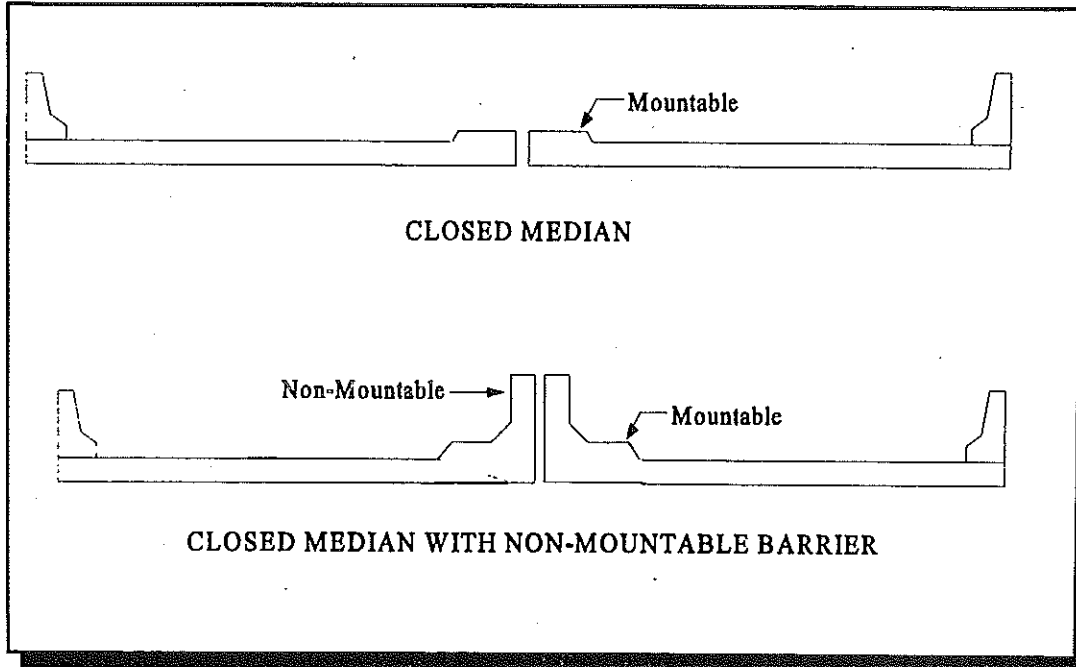
Item 33 - Bridge Median

1 digit

Indicate with a 1-digit code if the median is non-existent, open or closed. The median is closed when the area between the 2 roadways at the structure is bridged over and is capable of supporting traffic. All bridges that carry either 1-way traffic or 2-way traffic separated only by a centerline will be coded 0 for no median.

Code	Description
0	No median

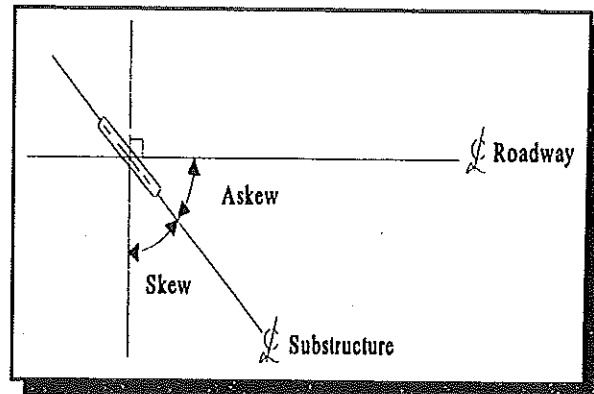
- | | |
|---|---|
| 1 | Open median |
| 2 | Closed median (no barrier) |
| 3 | Closed median with non-mountable barriers |

Figure 33 A**Figure 33 B****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 9 degrees, 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:

Skew Angle: 0 degrees	Code: 00
10 degrees	10
8 degrees	08
29 degrees	29

Figure 34**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 cause. 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 current AASHTO Standard Specifications for Highway Bridges, which calls for railings to meet specific geometric criteria and to resist specified static loads without exceeding the allowable stresses in their elements. Bridge railing should be crash tested per FHWA policy. Railings that meet these criteria and loading conditions are considered acceptable. Other railings that have been successfully crash tested are considered acceptable even though they may not meet the static loading analysis and geometric requirements. Acceptable guidelines for bridge railing design and testing are also found in the AASHTO Guide Specifications for Bridge Railings 1989. Additional guidance for testing is found in National Cooperative Highway Research Program - Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features 1993.

- 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.
- C. Approach guard rail: 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 Roadside Design Guide and subsequent FHWA or AASHTO guidelines.
- 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 Roadside Design Guide.

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. * (Culverts need no rail if slopes are flat enough. See Question and Answer, next sheet).

* Until a national set of standards is approved, it will 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

Acceptable Standards on Town Bridges:

All bridges should not be acceptable, with the exception of those types our inspectors "feel good about".

Some examples not meeting current acceptance standards:

Pipe rail

All light duty timber rail

All cable rail

Beam rail without offset blocks

Non-continuous rails

Post spacings over 6'-3" on bridge

Question: Please explain the proper coding of Item 36 for the following conditions:

- a. Box culvert under deep fill with no guardrail pre-sent.

Assume the same roadway cross section is carried across the culvert as on the roadway. If the inspecting authority determines that acceptable standards do not require railing on the roadway section, then none would be required over the culvert. Code NNNN (Safety feature is not required).

However, if the same roadway section is not carried across the culvert (for example, the slope is significantly steepened or the inspecting agency standards require a guardrail), then the site condition is unacceptable. Code 0000 (safety feature is required and none is provided).

- b. Box culvert under deep fill having guardrail with buried ends present:

It is assumed that all features of the installed guardrail (bridge railing, transitions, approach guard rail, approach guardrail ends) are required and/or meet currently acceptable standards. Code 1111.

- c. Direct traffic culvert (i.e., no fill) for conditions (a) and (b) above:

1. For a culvert carrying traffic directly on its top slab, even if the culvert carries the full width roadway, in most all instances guardrail would be required. **Code 0000** (Safety feature is required and none is provided).
2. It is assumed that all installed guardrail, transitions, etc., meet currently acceptable standards. **Code 1111**.

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 that 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.

*Based on reports from Vermont Historical Society or Historic Specialist in Planning.

Item 38 - Navigation Control**1 digit**

Indicate for this item, whether or not navigation control (a bridge permit for navigation) 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 vehicular traffic). 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:

Code Description

- A Open, no restriction (up to legal load for inventory route)
- B Open, Posting recommended but not legally implemented (signs not all in place or not correctly implemented)
- 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 such as temporary bridges which are load posted)

Ends of roads not in view of the bridge, yet posting a bridge ahead, will be coded a "P". However, if the bridge is not designated and only the road is posted, the bridge will not be coded "P". (i.e: "Bridge Ahead 3 Tons" will be coded "P".)

- R Posted for other load-capacity restriction (speed, number of vehicles on bridge, vertical clearances etc.) (Not used for bridges with caution signs such as "one lane bridge")

* Items that need different coding if bridge is closed (item 41 coded K)

Item	Code
41	K
58	0, 1, or 2
59	0, 1, or 2
60	0, 1, or 2
61	0 or 1 (only if channel caused failure)
62	0 or 1
64 & 66	200 *
67	0
68	0
69	0 (code "N" unless over railroad or highway)
71	0

* Guide
says 000
↑ check.
not a
valid 64A/66A
value

113	0 or 1 (scour critical)
236	06200

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 services 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 (ski trail, penstock, etc.)

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 & post-tensioned
6	Prestressed & post-tensioned concrete continuous
7	Timber
8	Masonry (arches) & slabs
9	Aluminum, wrought iron, or cast iron
0	Other

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 (except frame culverts)

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 (includes frame culverts)
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 448) when no one type of design and/or construction is predominant for the approach units. If the kind of material (Item 44A) is varied, code the most predominant.

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. 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).

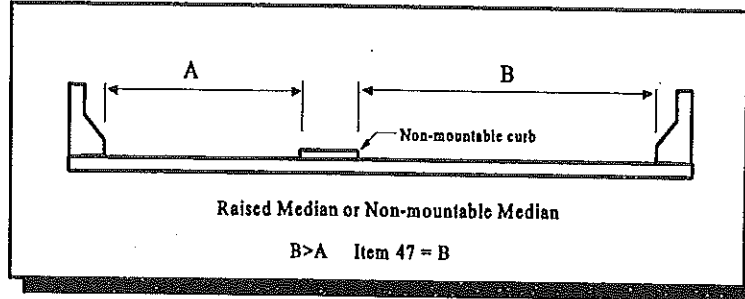
The purpose of this item is to give the largest available clearance for the movement of wide loads. This clearance has been identified in 3 ways; use the most applicable:

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.

EXAMPLES:

Clearance $A > B$ Item 47 = A

Figure 47 C



A height often used as a breakpoint is 9" or more for a "non-mountable" median or curb.

Figure 47 A

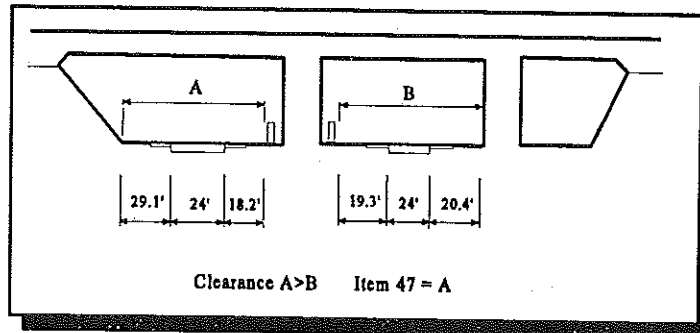
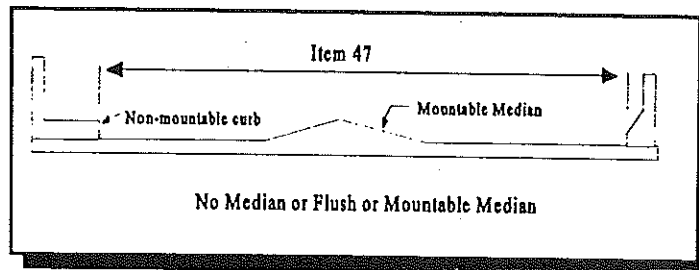


Figure 47 B



Items 47 and 51 Notes:

1. If no bridge rail or no 9" + high curb exists, use full width of deck as the measurement for coding Items 47 and 51.
2. If bridge rail (only) or 9" + high curb (only) exists, then measurement should be made between these features.
3. Timber deck bridges with short curbing (less than 9") will be measured to the bridge rail, or, if no bridge rail, measured to the fascia of the deck.
4. In no case shall these items be greater than out-to-out (Item 52).

There has been some confusion on the coding of Items 47 and 51, where:

Item 47 - Inventory route, total horizontal clearance

Item 51 - Bridge roadway width, curb to curb

Both items are measured between restrictive features such as non-mountable (9" +) curbs, rails, or sidewalks. For overpasses, the horizontal clearance may also be restricted between substructure units.

The main difference between the two is as follows:

Item 47 - is the maximum distance between restrictive features

Item 51 - is the summation of distances between restrictive features

The necessity of having both items is that on multi-opening structures, the total horizontal clearance (Item 47) has to be on inventory for the movement of wide loads, whereas the roadway width (Item 51) codes the width of deck used for all traffic.

The majority of Vermont bridges are not multi-opening, and as a result, the majority of our bridges have the items coded the same dimension.

Another possible occasion when Items 47 and 51 are not coded the same is when Item 103 is coded "T". Under Temporary Condition, Item 47 is coded for the temporary bridge and Item 51 is coded for the original structure.

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 the nearest foot.

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

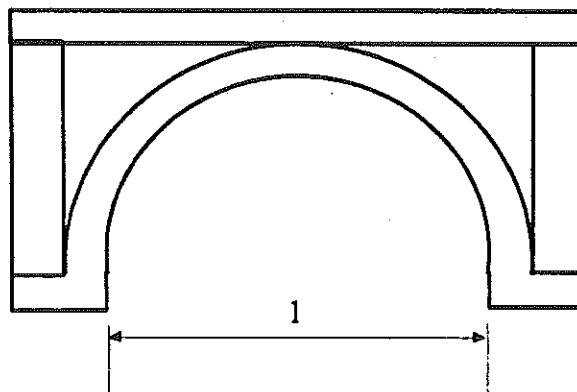
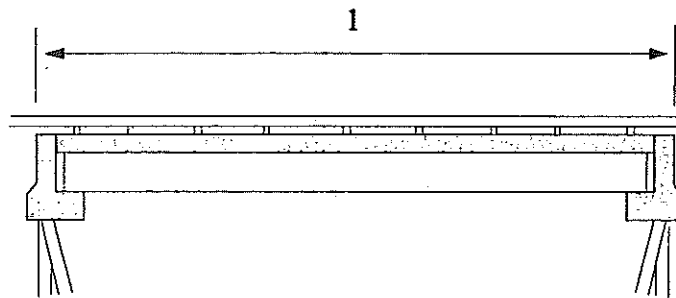
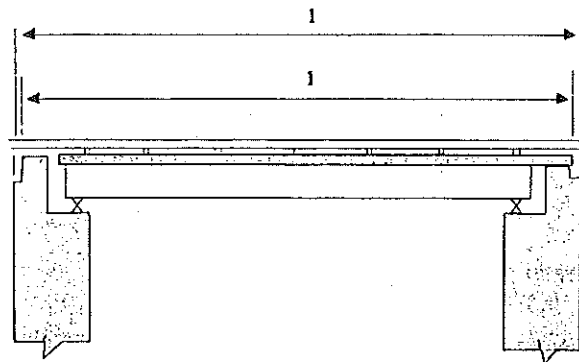
***Vermont:** Slabs - center to center of abutment stems
Bridges - centerline of bearing
Culverts - face to face of interior walls
Deck Arches - spring line
Timber Trusses - center of the bearing blocks

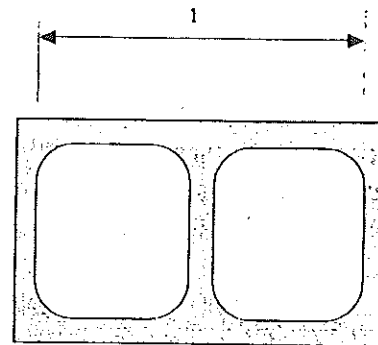
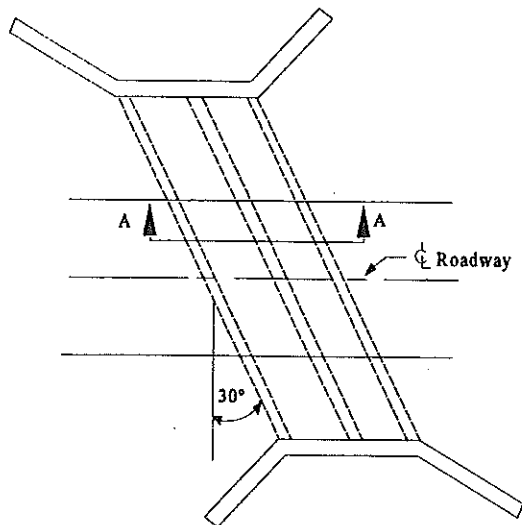
Item 49 - Structure Length (XXXXXX feet)**6 digits**

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, including covered bridges.

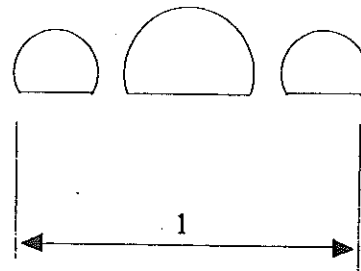
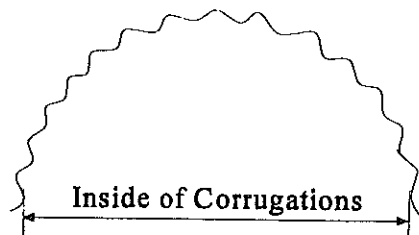
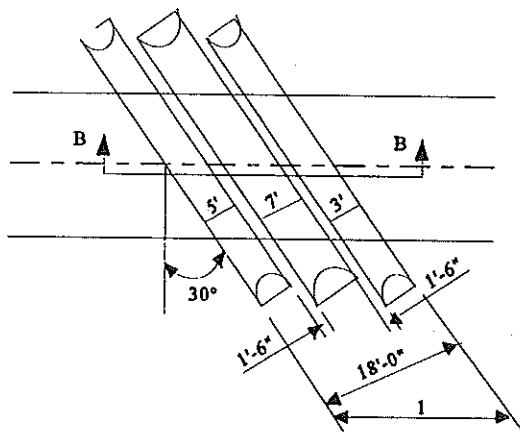
Culvert lengths should be measured along the center line of roadway, regardless of their depth below grade. Measurement should be made between inside faces of exterior walls. Tunnel length should be measured along the centerline of the roadway. Be sure to code Item 5A = 2 for all tunnels.

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





SECTION A-A



SECTION B-B

At least one pipe or barrel has to be 6' in length to make long structure inventory.

Item 49 - Structure length = $\frac{18}{\cos 30 \text{ degrees}}$ = 20.78

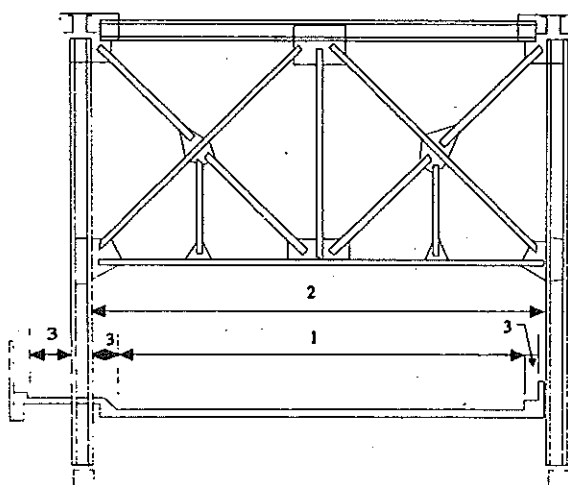
Code: 000021

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

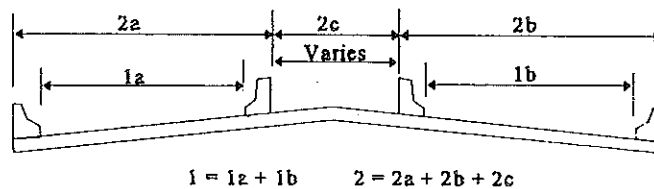
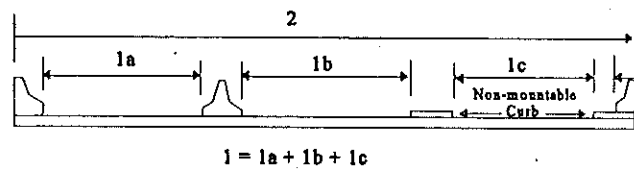
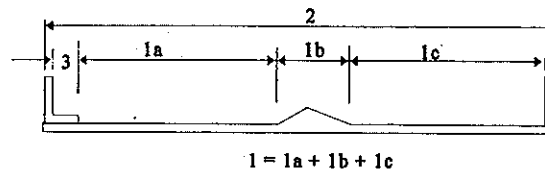
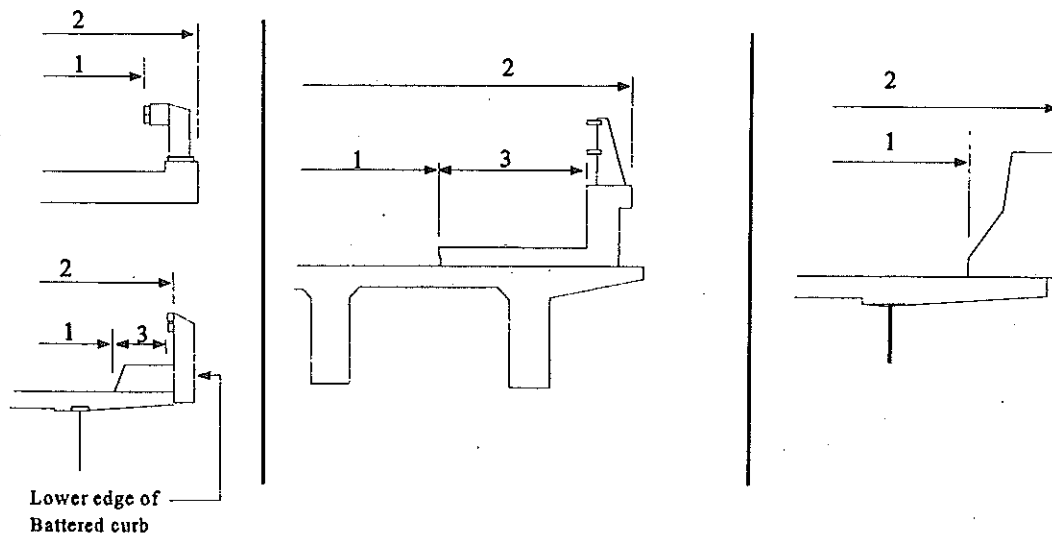
Record and code two contiguous 3-digit numbers to represent the widths of the left and right curbs or sidewalks to nearest tenth of a foot (with assumed decimal points). This is a 6-digit number composed of 2 segments, with the leftmost 3 digits representing the left curb or sidewalk and the rightmost 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
	0.06	1.5'	006015



- 1 Item 51 - Bridge Roadway Width, Curb to Curb
- 2 Item 52 - Deck Width, Out to Out
- 3 Item 50 - Curb or Sidewalk Width



- 1 Item 51 - Bridge Roadway Width, Curb-to-Curb
- 2 Item 52 - Deck Width, Out-to-Out
- 3 Item 50 - Curb or Sidewalk Width

Item 51 - Bridge Roadway Width, Curb-to-Curb (XXX.X feet)**4 digits**

The information to be recorded is the most restrictive minimum distance between curbs or rails on the structure roadway. For structures with closed medians and usually for double decked structures, coded data will be the sum of the most restrictive minimum distances for all roadways carried by the structure*. The data recorded for this item must be compatible with other related route and bridge data (i.e., Items 28, 29, 32, etc). The measurement should be exclusive of flared areas for ramps. A 4-digit number should be used to represent the distance to the nearest tenth of a foot (with an assumed decimal point). See examples on pages 38 and 39.

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

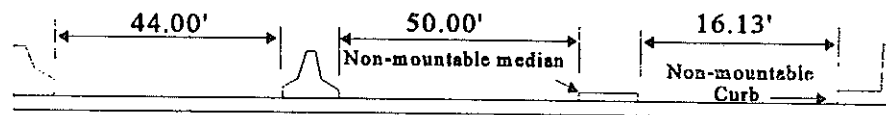
Where the roadway is on fill carried across a structure, and the headwalls or parapets do not affect the flow of traffic, code 0000. This is considered proper inasmuch as a filled section simply maintains the roadway cross-section.

* Raised or non-mountable medians, open medians, and barrier widths are to be excluded from the summation, along with barrier-protected bicycle and equestrian lanes.

EXAMPLES:**Code**

Bridge Roadway Width	36.00' wide	0360
	66.37' wide	0664
	110.13' wide	1101

The last example above would be the coded value for the deck section shown below.

**Items 47 and 51 Notes:**

1. If no bridge rail or no 9" + high curb exists, use full width of deck as the measurement for coding Items 47 and 51.
2. If bridge rail (only) or 9" + high curb (only) exists, then measurement should be made between these features.

3. Timber deck bridges with short curbing (less than 9") will be measured to the bridge rail, or, if no bridge rail, measured to the fascia of the deck.
4. No greater than out-to-out (Item 52).

There has been some confusion on the coding of Items 47 and 51, where:

Item 47 - Inventory route, total horizontal clearance

Item 51 - Bridge roadway width, curb to curb

Both items are measured between restrictive features such as non-mountable (9" +) curbs, rails, or sidewalks. For overpasses, the horizontal clearance may also be restricted between substructure units.

The main difference between the two is as follows:

Item 47 - is the maximum distance between restrictive features

Item 51 - is the summation of distances between restrictive features

The necessity of having both items is that on multi-opening structures, the total horizontal clearance (Item 47) has to be on inventory for the movement of wide loads, whereas the roadway width (Item 51) codes the width of deck used for all traffic.

The majority of Vermont bridges are not multi-opening, and as a result, the majority of our bridges have the items coded the same dimension.

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. However, in the case of a covered bridge with an independent superstructure, the out-to-out will be the actual out-to-out of deck. The measurement should be exclusive to flared areas for ramps. See examples on pages 37 and 38.

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.

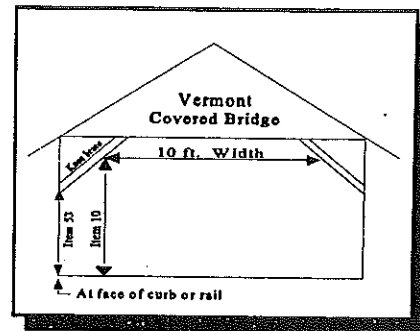
Where the roadway is on fill carried across a pipe or box culvert, and the culvert headwalls do not affect the flow of traffic, code 0000. This is considered proper inasmuch as a filled section over a culvert simply maintains the roadway cross-section.

Item 53 - Minimum Vertical Clearance Over Bridge Roadway**4 digits**

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. For double decked structures code the minimum, regardless whether it is pertaining to the top or bottom deck. 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:

Min. Vertical Clearance	Code
17'-3"	1703
75'-11"	7511
No restriction	9999
115'-6"	9912

Figure 53**Item 54 - Minimum Vertical Underclearance****5 digits**

Using a 1-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 Under Clearance	4 digits

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

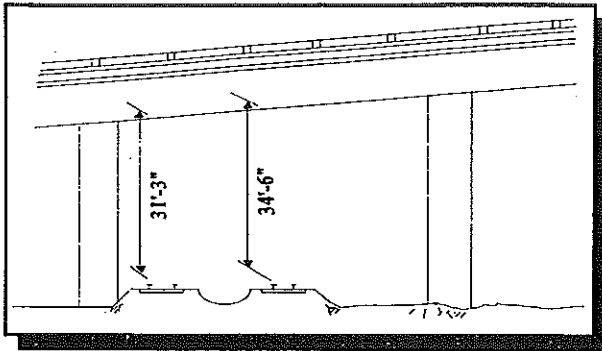
Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

In the next 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**

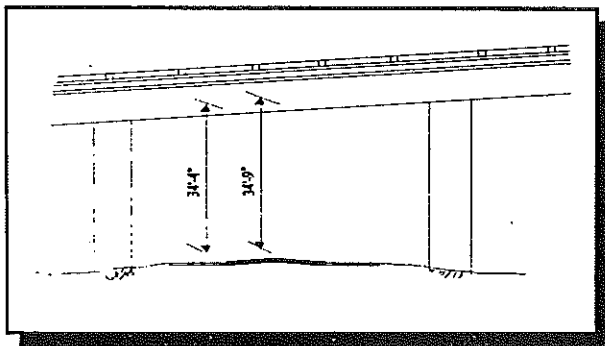
River beneath structure

N0000

Figure 54 A

Railroad 31'-3" beneath structure

R3103



Highway 34'-4" beneath structure

H3404

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

Using a 1-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 two. An explanation should be written as to what was recorded. If the feature beneath the structure is not a railroad or highway, code N000 to indicate not applicable.

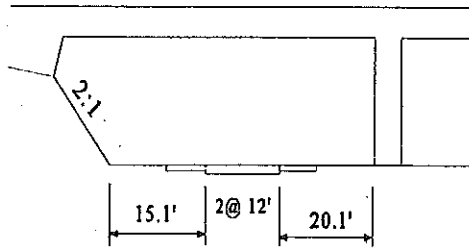
The presence of ramps is not considered in this item; therefore, the minimum lateral clearance on the right should be measured from the right edge of the through roadway.

EXAMPLES:

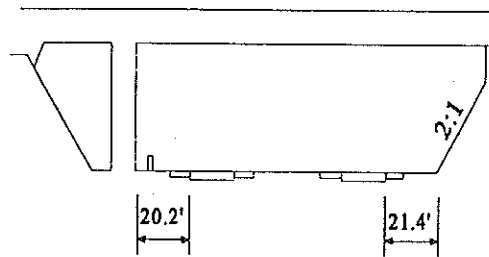
	Code
Railroad 20.4' centerline to pier	R204
Highway 20.2' edge of pavement to pier	H202
Creek beneath structure	N000

Item 55 - Minimum Later Underclearance on Right (Cont.)

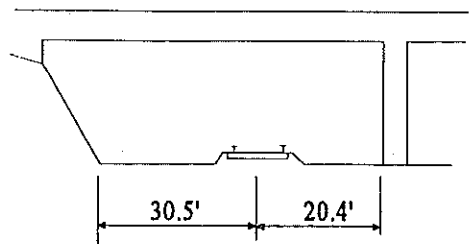
Examples:



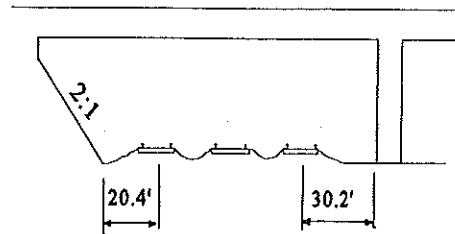
Lt. 15.1' Rt. For 2-way Traffic
15.1 Lt. 20.1' Rt. For 1-way Traffic



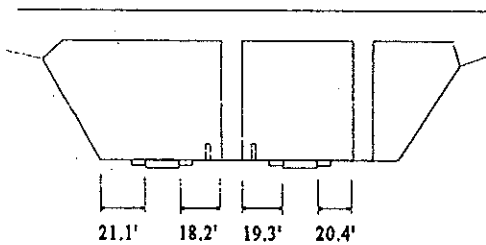
Open Lt. 20.2 Rt.



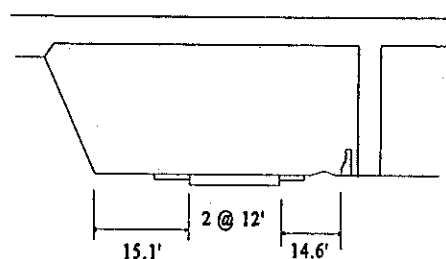
-- Lt. 20.4 Rt.



-- Lt. 20.4 Rt.



18.2' Lt. 20.4' Rt.



-- Lt. 14.6' Rt. For 2 way Traffic
15.1' Lt. 14.6' Rt. For 1 way Traffic

Item 56 - Minimal Lateral Underclearance on Left (XX.X feet)**3 digits**

For divided highways, 1-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 above 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.

However, in some cases, a deficiency will occur on a single element or in a single location. If that one deficiency reduces the load carrying capacity or serviceability of the component, then the element can be considered a "weak link" in the structure, and the rating of the component should be reduced accordingly.

The designed or as built 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.

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, with corrective action, may be put back in light service |
| 0 | FAILED CONDITION - out of service - beyond corrective action |

Item 58 - Decks

This item describes the overall conditions rating of the deck. Rate and code the condition in accordance with the above general condition ratings. Code N for all culverts, and other structures without decks e.g., filled arch bridge.

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.

The condition 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, deck girder or T-beam, voided slab, box girder, etc.). Similarly, the superstructure of an integral deck-type bridge will not influence the deck rating.

Category Classification	Rating	Condition Indicators (% deck area)			
		Spalls	Delaminations	Electrical Potential	Chloride Content #/CY
Category #3 Light Deterioration	9	none	none	0	0
	8	none	none	none >.35	none >1.0
	7	none	<2%	45% <0.35	none >2.0
Category #2 Moderate Deterioration	6	< 2% spalls or sum of all deteriorated and/or contaminated deck concrete <2.0.			
	5	<5% spalls or sum of all deteriorated and/or contaminated deck concrete 20% to 40%.			
Category #1 Extensive Deterioration	4	>5% spalls or sum of all deteriorated and/or contaminated deck concrete 40% to 60%.			
	3	>5% spalls or sum of all deterioration and/or contaminated deck concrete >60%.			
Structurally Inadequate Deck	2	Deck structural capacity grossly inadequate			
	1	Deck has failed completely. Repairable by replacement only.			
	0	Holes in deck - danger of other sections of deck failing.			

Note: This specialized table can be used as a guide for evaluating deck conditions using different

condition indicators.

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 all 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.

Covered bridges which act independent of steel beam superstructure and carry no live load should not influence the superstructure condition rating. However, condition of the timber shell should be inspected and documented, with any problems brought to the owner's attention.

Note: The following information should be used when coding for integral decks.

Slab Bridges - The slab is both deck and superstructure. Generally, the deck (Item 58) and the superstructure (Item 59) are coded the same. Item 59 must be coded in all cases.

T-Beam Bridges -

- A. Simple Spans - the slab condition is to be coded as Item 58 (deck) while the stem is coded in Item 59 (superstructure).
- B. Continuous Spans - the same rule applies, but the top of the slab is a critical area over the piers and the ratings should reflect this.

(Above taken from FHWA letter dated 9/18/90)

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

I 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 (channel).
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 amount of drift.
6	Bank protection is being eroded. River control devices and embankment protection have widespread minor damage. There is minor streambed movement evident. Debris is restricting

the waterway slightly.

- 5 Bank is beginning to slump. 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 channel.
- 3 Bank protection has failed. River control devices have been destroyed. Streambed aggradation, degradation or lateral movement has changed the channel to now threaten the bridge and/or approach roadway.
- 2 The channel has changed to the extent the bridge is near a state of collapse.
- 1 Bridge closed because of channel failure. Corrective action may put it 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-1P-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.
- 6 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.
 - 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.
 - 2 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 it back in light service.
 - 0 Bridge closed. Replacement necessary.

Item 63 - Method Used to Determine Operating Rating

1 digit

Use one of the codes below to indicate which load rating method was used to determine the Operating Rating coded in Item 64 for this structure.

<u>Code</u>	<u>Description</u>
1	Load Factor (LF)
2	Allowable Stress (AS)
3	Load and Resistance Factor (LRFR)

Covered bridges
 posted as per
 legal load of
 16,000 lbs
 64 } 208
 66 } coding

4	Load Testing
5	No rating analysis performed

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 NBI in an equivalent HS loading.

The required reporting of an equivalent HS loading may be phased in over a 5-year period. Therefore, all NBI 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:

Code Description

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

*Check
loading
62 - Rating
of "3"
let mention
of perf.
-H-*

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 NBI for the immediate future. However, State 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 NBI sometime in the 1990's.

If the bridge will not carry a minimum of 3 tons of live load, the operating rating shall be coded 00; and consistent with the direction of the AASHTO Manual, it shall be closed.

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. (i.e. baileys, etc. in place of or over existing will be coded 200.)

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.

Items 64 and 66 are not to be coded when Item 5A is 2 or an "A" through "Z".

MEMO TO: WARREN TRIPP
FROM: FHWA
DATE: 12/14/95

The attached November 22, 1995 memo from our Washington Office provides an explanation for rating/re-rating bridges in the National Bridge Inventory (NBI) according to the Load Factor (LF) method. While that memo was specifically written in response to the New York State's concerns about using the LF method, we believe you should know about the FHWA's position.

To summarize, Load Factor (LF) procedures should be used. Moreover, for clarification purposes this should include the following: 1) reporting the inventory and operating ratings for all bridges constructed, or rehabilitated after January 1, 1994; 2) Load rating that is undertaken as a result of any changes in the bridge condition or dead load; 3) concerted efforts to re-rate bridges on the NHS by the FY 1996 NBI update due April 1, 1996; and 4) re-rating all bridges in the NBI within a reasonable time frame.

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 - Method Used to Determine Inventory Rating

1 digit

Use one of the codes below to indicate which load rating method was used to determine the Inventory Rating coded in Item 66 for this structure.

<u>Code</u>	<u>Description</u>
1	Load Factor (LF)
2	Allowable Stress (AS)
3	Load and Resistance Factor (LRFR)
4	Load Testing
5	No rating analysis performed

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.

Note: Items 64, 66 & 70 - If the inspector has found severe problems with the bridge and asks the owner of the bridge to post it down in tonnage, which was not analyzed, this item should be coded as such (severe problems could pertain to any structural component of the bridge). For example, a timber deck bridge has a rotten deck, and Town asks to post for 3 tons until replaced:

Item 64 = 203

Item 66 = 203

Item 70 = 4

Items 67, 68, 69, 70, 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 1-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
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

The FHWA Edit/Update computer program calculates values for Items 67, 68, and 69 according to the tables provided in this manual. These tables and the table for Item 71 shall be used by all evaluators to rate 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 value 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. The code of N is not valid for use with Items 67 and 72.

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

This item is calculated by the Edit/Update Program based on Table 1, and need not be coded by the bridge inspector. 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
0	}
7	
8	

used ?

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)

Question: To evaluate Item 67, do you want the calculated HS load to be provided in Item 66 or the equivalent (converted HS load) when the other loading is the critical load, or do you want the equivalent for transition period only?

Answer: Through 1992 the State may submit the rating using any of the codes shown in Item 64 and the FHWA Edit/Update Program will convert the date using the factors shown in Item 67 (see also

answer to question above). The State may convert its own files, if it chooses to do so, using the factors in Item 67.

Beginning in 1993, the States must submit the inventory and operating ratings in the calculated HS rating or equivalent (converted) HS rating regardless of the type of load used to calculate the ratings.

Item 68 - Deck Geometry

1 digit

This item is calculated by the Edit/Update Program and need not be coded by the bridge inspector. 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.

For culverts which have Item 51 - Bridge Roadway Width coded 0000, the Deck Geometry code will be equal to N.

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

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

	TABLE 2 A						TABLE 2B	
	Bridge Roadway Width - 2 lanes, 2 way traffic						Bridge Roadway Width - 1 lane, 2 way traffic	
	ADT (Both Directions)						ADT (Both Directions)	
Deck Geometry Rating Code	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 2 B 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 an ADT of more than 100.

Tables 2C and 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 Multi-lane Divided Facilities		Ramps Only	
	2 Lanes	3> Lanes	2 Lanes	3> Lanes	1 Lane	2> 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	12N + 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 route in highly developed urban areas only when there is an alternative Interstate, freeway, or expressway facility with a minimum of 16'-0" clearance.

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

Question: A primary system road in an urban area has an ADT of 14,200 vehicles. The undivided roadway has 4 lanes of traffic, 2 in each direction, and is 56'-6" between curbs. What table is used and what is the code for this bridge.

Answer: The information provided, 3 or more lanes of undivided traffic, fits footnote 3 under Tables 2C and 2D. Therefore, Table 2C, Other Multi-lane Divided Facilities, will be used. The example of 56'-6" falls between the rating codes of 5 and 6 (i.e., $4 \times 12 + 12 = 60$ feet, for a rating code of 6, and $4 \times 11 + 10 = 54$ feet, for a rating code of 5). Therefore, the correct code for the example is 5. Note that the full width of the roadway is used, along with both shoulders (full curb-to-curb width).

COMPUTER GENERATED CODING FOR ITEMS 67, 68, 69**Item 67 - Structural Evaluation**

The following items are used to compute Item 67

- 5A Record Type "On" or "Under"
- 29 Average Daily Traffic
- 41 Structure Open, Posted, or Closed
- 43 Structure Type, Main
- 59 Superstructure Condition
- 60 Substructure Condition
- 62 Culvert - Overall Condition
- 66 Inventory Rating
- 75 Type of Work Proposed to Rehab/Replace Structure
- 104 Highway System of the Inventory Route

Item 68 - Deck Geometry

The following items are used to compute Item 68:

- 5A Record Type "On" or "Under"
- 6 Critical Facility Indicator
- 26 Functional Classification of Individual Route
- 28 Lanes on the Structure, and Under the Structure
- 29 Average Daily Traffic
- 33 Bridge Median
- 41 Structure Open, Posted, or Closed
- 42 Type of Service "On" and "Under" the Bridge
- 49 Structure Length
- 51 Width - Curb-to-Curb
- 53 Minimum Vertical Clearance over Bridge Roadway
- 75 Type of Work Proposed to Rehab/Replace Structure
- 102 Direction of Traffic - One Way or Two Way

Item 69 - Underclearance, Vertical and Horizontal

The following items are used to compute Item 69:

From the "Under" Record

- 5 Record Type, "On" or "Under"
- 26 Functional Classification of Inventory

From the "On" Record

- 41 Structure Open, Posted, or Closed
- 42 Type of Service "On" and "Under" Bridge
- 54 Minimum Vertical Underclearance
- 55 Minimum Lateral Underclearance on Right
- 56 Minimum Lateral Underclearance on Left
- 75 Type of Work Proposed to Rehab/Replace Structure
- 90 Inspection Date

Item 69 - Underclearances, Vertical and Horizontal**I digit**

This item is calculated by the Edit/Update Program and need not be coded by the bridge inspector. 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 exists, 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

MINIMUM LATERAL UNDERCLEARANCE							
FUNCTIONAL CLASS							
1-WAY TRAFFIC					2-WAY TRAFFIC		RAILROAD
Principal Arterials - Interstate, Freeways, or Expressways					Other Principal and Minor Arterials	Major and Minor Collectors and Locals	
Main Line		Ramp					
Under-clearance rating code	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.

Question: In some instances, an agreement has been reached with a railroad on a minimum tolerable clearance, and Item 69 is not coded now as deficient. A check with the tables for Item 69 in the 1988 Guide indicates that the underclearances will be deficient. How do we code this item - use the accepted agreement or the table?

Answer: All coding for this item will be in accordance with the tables provided, without exception. The tables shall also be used without exception for Item 67 - Structural Evaluation, and Item 68 - Deck Geometry. The Edit/Update Program will assign codes from 0 or 2 through 9 to these three items, based on the SI&A sheet data.

Item 70 - Bridge Posting

1 digit

The NBIS 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 for 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.

<u>Code</u>	<u>Description</u>
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:

Relationship of Operating Rating Stress to Legal Load Stress:

Code	
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

State of Vermont:

On state bridges, 3 axle straight \geq 30 tons - code 5, otherwise 4

On town bridges with timber decks, as follows:

Class II T.H. - H20 \geq 10 tons - code 5, otherwise 4

Class III T.H. - H20 \geq 8 tons - code 5, otherwise 4

On town bridges with other than timber decks, as follows:

Class II and III - H20 \geq 12 tons - code 5, otherwise 4

Note: Items 64, 66 & 70 - If the inspector has found severe problems with the bridge and asks the owner of the bridge to post it down in tonnage, which was not analyzed, this item should be coded as such (severe problems could pertain to any structural component of the bridge). For example, a timber deck bridge has a rotten deck, and Town asks to post for 3 tons until replaced:

Item 64 = 203

Item 66 = 203

Item 70 = 4

Question: Why are there no variations given in Item 70 for posting levels for functional class?

Answer: This was done to allow the States to code those bridges per their own criteria; e.g., legal load, inventory, operating, etc. This item evaluates the load capacity of a bridge in comparison to the State's legal load.

Question: Item 70 is based on the operating rating. What about the pressure from the trucking industry in those State using inventory rating for posting?

Answer: The trucking industry is fully aware of the differences between the inventory and operating ratings. The industry will probably continue to point out these differences to the State highway agencies.

Question: Should the States have to prove that a particular bridge needs posting?

Answer: It should be the other way around; i.e., it should be proved that it does not need posting.

Question: With the method we use for rating, we do not calculate a stress caused by the maximum legal load. In order to code this item precisely, we would be required to perform a separate calculation to determine comparison. We propose to estimate the comparison range to determine the proper code of 0 through 4.

Answer: Item 70 shall be coded as posting required only if the legal load of the State exceeds that permitted under the operating rating. Therefore, the legal load must be considered in evaluating this item.

If a bridge will not carry the legal load under the operating rating, then a code of 4 or less shall be used to indicate that posting is required. If a State chooses, it may use a code of 4 for all bridges requiring posting, regardless of the relationship of the operating rating stress to the legal load stress. The codes of 9 through 3 are optional and provided as a guide for those States that wish to show a variance in coding this item.

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	
CODE			DESCRIPTION
N	N	N	Bridge not over waterway.
9	9	9	Bridge deck and roadway approaches above flood water elevation (high water). Chance of overtopping remote.
8	8	8	Bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.
6	6	7	Slight chance of overtopping bridge deck and roadway approaches.
4	5	6	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with insignificant traffic delays.
3	4	5	Bridge deck above roadway approaches. Occasional overtopping of bridge deck and 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.

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.

Items 75, 76, 94, 95, 96, 97: Left blank after bid let or extensive rehabilitation. (If rehabilitation will bring it to an acceptable standard.)

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.

If there is a rating of 4 or less in the condition rating, this item must be coded or an error message will be created.

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 (HBRRP). 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.
- 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, including hydraulic replacements.

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

Code:**EXAMPLES**

- 311 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.
- 321 A bridge is to be replaced because the roadway must be straightened to eliminate a dangerous curve. The work will be done by contract.
- 331 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.
- 341 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.
- 352 A bridge superstructure and substructure are to be rehabilitated by State forces to increase the bridge's load capacity.
- 361 A bridge deck is to be rehabilitated by contract and a safety curb to be removed, which results in incidental widening of 2 feet.
- 371 A bridge deck is to be replaced by contract and the deck cantilever overhang extended 2', which is the maximum that can be done without adding another line of stringers or girders to the superstructure.
- 382 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.)

Question: How do you treat Item 75 in those cases where the proper treatment is not known until detailed field investigations prior to contract are conducted?

Answer: In order for FHWA to prepare the best estimate of bridge needs, this item should be coded by the States based on the best judgment for each bridge. There certainly are going to be changes prior to the replacement or rehabilitation; however, the best estimate is all we can ask.

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 HBRRP. It may be coded for other bridges at the option of the 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:

Length of Structure Improvement	Code
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.

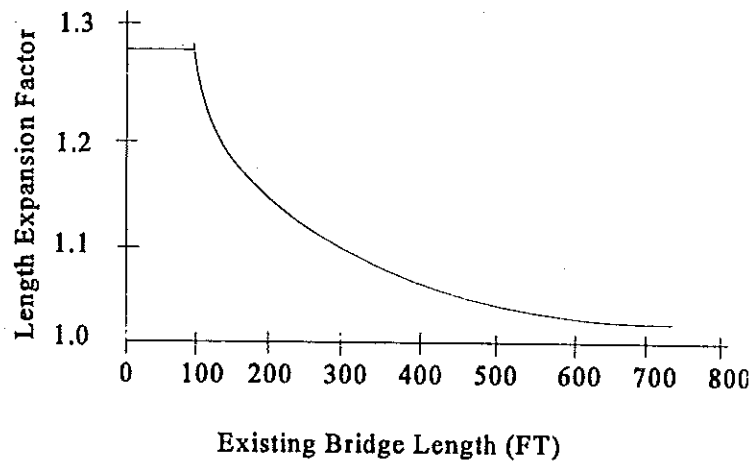
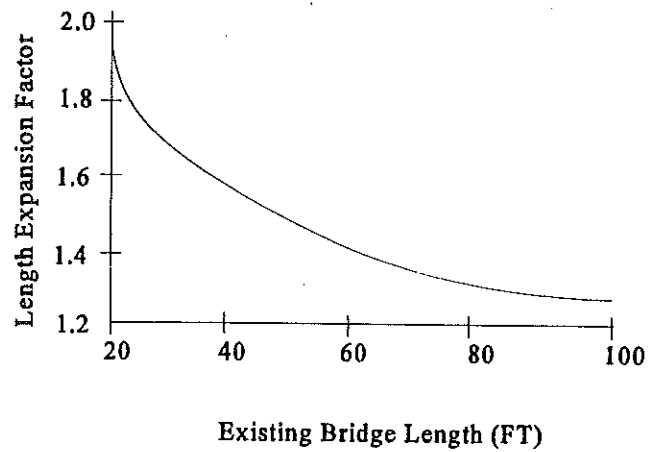
Typically, a replacement bridge is longer than the existing bridge. Nationwide averages for the increase in bridge length with replacement as a function of the existing length are given in the following figure. The length-expansion factors represent data for the years 1981 to 1985. Where site-specific date is lacking, these factors are suggested for estimating the length of replacement bridges. For exceedingly long bridges (i.e., 100 feet or more), the length-expansion factor approaches 1.0.

Question: If one bent of a structure is replaced, what length of improvement should be used - two spans, one span, or the width of the bent?

Answer: This is another example of several options in coding and where uniformity in the answer is desirable. Therefore, we encourage the length to be coded as 1/2 of the adjacent span lengths over the bent.

Increased Length of Replaced Bridges

Replaced Bridge Length = Existing Bridge Length x Length Expansion Factor



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, under strength 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 on 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 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 (feature) 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.

Current guidelines for the maximum allowable interval between inspections can be summarized as follows:

Fracture Critical Details	24 months
Underwater Inspections	60 months
Other Special Inspections	24 months

EXAMPLES:

	Item	Code
A 2-girder system structure which is being inspected yearly and no other special inspections are required.	92A	Y12
	92B	N__
	92C	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	Y12
	92B	Y12
	92C	N__
A structure has been temporarily shored and is being inspection on a 6 month interval. Other special inspections are not required.	92A	N__
	92B	N__
	92C	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:

1. A structure has fracture critical members which were last inspected in March 1986. It does not require underwater or other special feature inspections.

Item:	Code:
92A	036
92B	(Blank)
92C	(Blank)

2. 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.

Item:	Code:
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 cost, 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 HBRRP. 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

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 estimated.

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 HBRRP. 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 HBRRP. 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**4 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 on. This date and the data provided for Items 94 through 96 must be current; that is, Item 97 shall be not more than 8 years old. Code the last 2 digits of the year so recorded.

EXAMPLES:**Code**

Year of Cost Estimate is 1988 costs 1988

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% 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 NBIS 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.

In the above example where Mexico (or a neighboring State) has 00% responsibility, and, if there is no NBI Structure Number in that State's inventory file, then the entire 15-digit field shall be coded zeroes.

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. The lateral distance between structures has no bearing on the coding of this item.

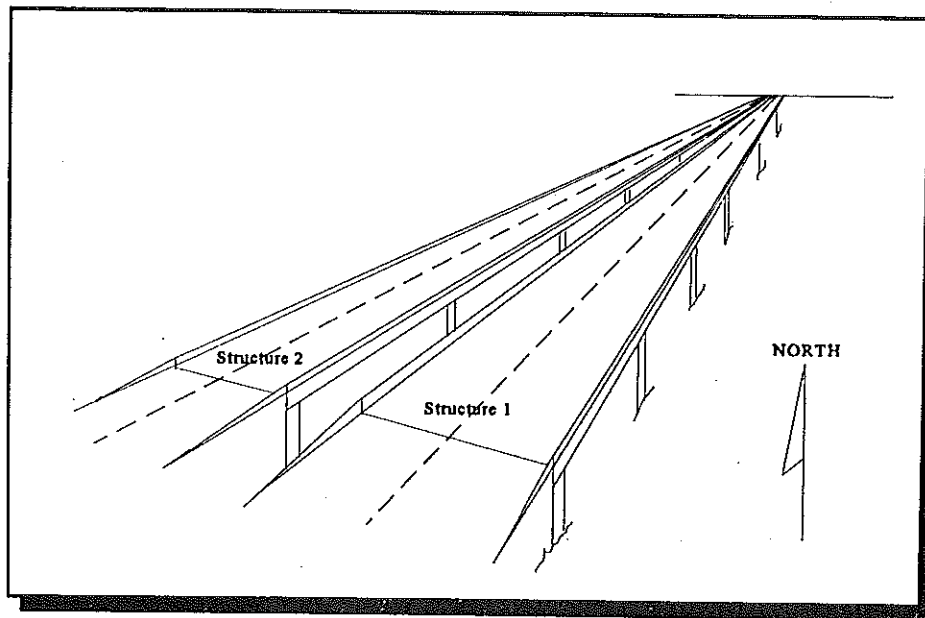
One of the following codes shall be used:

Code Description

- R The right structure of parallel bridges carrying the roadway in the direction of the inventory. (For a STRAHNET 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

Figure 101**Item 102 - Direction of Traffic****1 digit**

Code the direction of traffic as a 1-digit number. This item must be compatible with other traffic-related items such as Item 29 - Average Daily Traffic, Item 47 - Total Horizontal Clearance and Item 51 - Bridge Roadway Width, Curb-to-Curb.

Code Description

- | | |
|---|------------------------------------|
| 0 | Highway traffic not carried |
| 1 | 1-way traffic |
| 2 | 2-way traffic |
| 3 | One lane bridge for 2-way traffic. |

A one-lane bridge would be Item 51, less than 16 feet.

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
- 214-Year of Maintenance
- 215-Type Performed

Item 104 - Highway System of the Inventory Route**1 digit**

This item is to be coded for all records in the inventory. For the Inventory Route identified in Item 5, indicate whether the structure is on the NHS or not on that system. Initially, this code shall reflect an inventory route on the NHS "Interim System" description in Section 1006(a) of the 1991 ISTEA. Upon approval of the NHS by Congress, the coding is to reflect the approved NHS.

<u>Code</u>	<u>Description</u>
0	Structure <u>is not</u>
1	Structure <u>is</u>

Item 105 - Federal Lands Highways**1 digit**

Structures owned by State and local jurisdictions on roads which lead to and traverse through federal lands sometimes require special coded unique identification because they are eligible to receive funding from the Federal Lands Highway Program. One of the following codes shall be used:

<u>Code</u>	<u>Description</u>
0	Not applicable
1	Indian Reservation Road (IRR)
2	Forest Highway (FH)
3	Land Management Highway System (LMHS)
4	Both IRR and FH
5	Both IRR and LMHS
6	Both FH and LMHS
9	Combined IRR, FH and LMHS

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).

EXAMPLE: Reconstruction completed 1970

Code: 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. Leave blank for "Railroad Over" bridges. 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/Protection 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 three segments.

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

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

Code Description

- 1 Monolithic Concrete (concurrently placed with structural deck)
- 2 Integral Concrete (separate non-modified layer of concrete added to structural deck)
- 3 Latex Concrete or similar additive
- 4 Low Slump Concrete
- 5 Epoxy Overlay
- 6 Bituminous
- 7 Wood or Timber
- 8 Gravel
- 9 Other (example: open or filled steel grid)
- 0 None (no additional concrete thickness or wearing surface is included in the bridge deck.
- N Not Applicable (applies only to structures with no deck)

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

- 1 Built-up
- 2 Preformed Fabric (State of VT membrane)
- 3 Epoxy
- 8 Unknown
- 9 Other (Tar Emulsion)
- 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 (CCA/creosoted wood)
- 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 highways 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**

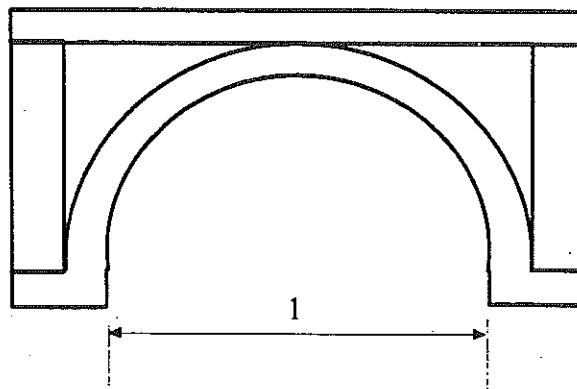
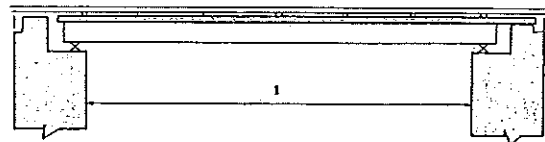
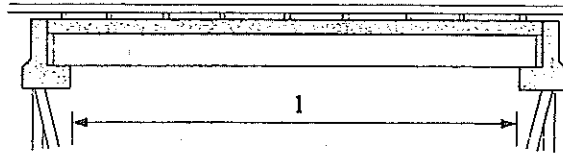
Does this structure meet or exceed the minimum length specified to be designated as a bridge for National Bridge Inspection Standards purposes? The following definition of a bridge is used by AASHTO and is given in the NBIS, 23CFR650.3:

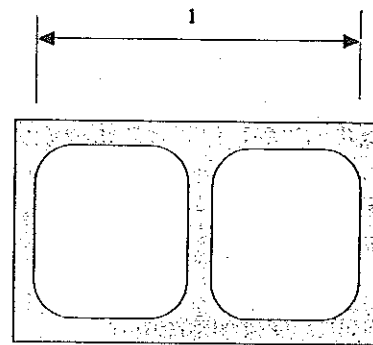
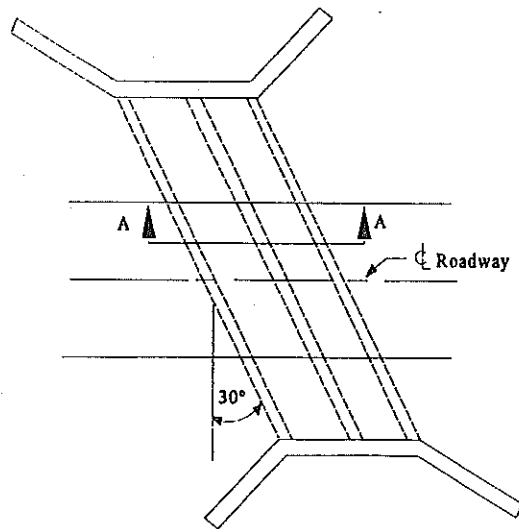
A structure, including supports erected over a depression or an obstruction such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20' between under-copings of abutments 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, and at least one of the barrels has a span of 6' or greater.

Code Description

Y	Yes
N	No

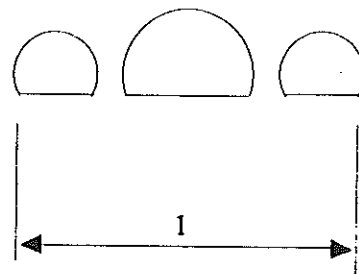
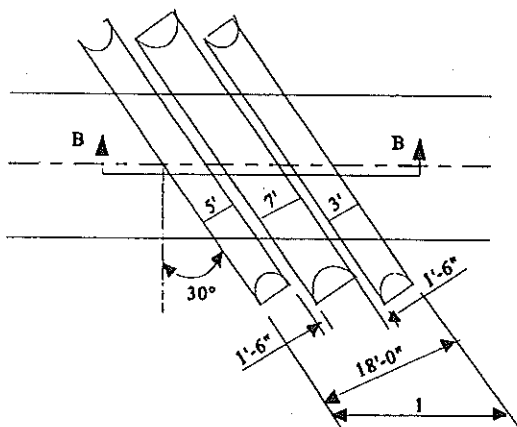
EXAMPLES 1 = ITEM 112 - NBIS BRIDGE LENGTH





SECTION A-A

1. Item 112 - NBIS Bridge Length



SECTION B-B

1. Item 112 - NBIS Bridge Length

$$1 = \frac{18'}{\cos 30^\circ} = 20.78 \text{ ft.}$$

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. Scour analyses shall be made by hydraulic/geotechnical/structural engineers. Details on conducting a scour analysis are included in the FHWA Technical Advisory 5140.23 titled, "Evaluating 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. A scour critical bridge is one with abutment or pier foundations which are rated as unstable due to (1) observed scour at the bridge side or (2) a scour potential as determined from a scour evaluation.

Code Description

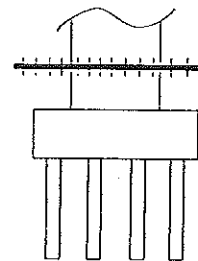
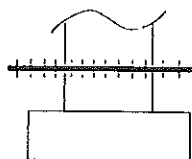
- N Bridge not over waterway.
- U Bridge with "unknown" foundation that has not been evaluated for scour. Since risk cannot be determined, flag for monitoring during flood events and, if appropriate, closure. (Vermont Item 812 coded A "2".)
- T Bridge over "tidal" waters that has not been evaluated for scour, but considered low risk. Bridge will be monitored with regular inspection cycle and with appropriate underwater inspections. ("Unknown" foundations in "tidal" waters should be coded U.)
- 9 Bridge foundations (including piles) on dry land well above flood water elevations.
- 8 Bridge foundations determined to be stable for assessed or 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 calculating scour conditions: - Scour within limits of footing or piles (example B).
- Scour below spread-footing base or pile tips (Example C).
- 2 Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations. Immediate action is required to provide scour countermeasures.
- 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

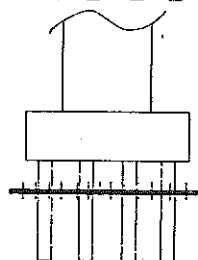
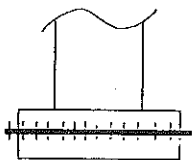
A. Above top of footing

No action needed - indicate rating of 8 for this item.



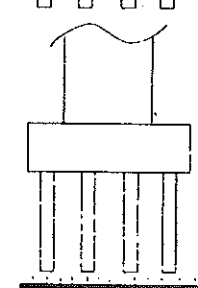
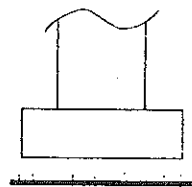
B. Within limits of footings or piles

Conduct foundation structural analysis



C. Below pile tips or spread footing base

Provide for monitoring and scour countermeasures as necessary.



_____ = Calculated Scour Depth

**Spread Footing
(not founded in
rock)**

Pile Footing

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 (not the total for the route).

EXAMPLES:**Code**

Future ADT	540	000540
	15,600	015600
	240,000	240000

(State of Vermont factors as per memo from Traffic Research dated 8/2/89)

20-Year Traffic Projection Factors:

Interstate Highways	= 1.61
Interstate Paralleled Highways	= 1.53
Primary & Secondary Highways	= 1.40
Urban Highways	= 1.32
Recreational Highways	= 1.47

Truck Traffic Based on ADT by Functional Class:

Rural	Interstate	12.6%
	Other Principal Arterial	10.2%
	Minor Arterial	8.7%
	Major Collector	5.5%
	Minor Collector	2.6%
	Local	2.0%
Urban	Interstate	7.6%
	Other Freeways & Expressways	6.4%
	Other Principal Arterial	6.7%
	Minor Arterial	11.2%

Item 115 - Year of Future Average Daily Traffic**4 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 2008

**Item 116 - Minimum Navigation Vertical Clearance Vertical Lift Bridge 3 digits
(XXX FEET)**

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 leave blank.

EXAMPLES:**Code**

Vertical Clearance	20.6	020
	24.2	024

State Item No. 200 - State System Code**2 digits (A)**

Code directly according to the following for the road classification of the inventory route. (Item 5).

Code	Description
01	State Highway - Rural
02	State Highway - Urban
03	State Aid Connecting Link - Rural
04	State Aid Connecting Link - Urban
05	State Aid - Rural
06	State Aid - Urban
07	Town Highway - Rural
08	Town Highway - Urban
09	Toll Road

State Item No. 201 - Single or Twin Bridge Indicator**1 digit (N)**

This item indicates whether the Structure is a single or twin bridge.

Code	Description
1	Single bridge
2	Twin bridge on NB (or EB) lane or under this lane
3	Twin bridge in SB (or WB) lane or under this lane

Note: For twin bridges, data must be coded for both bridges.

State Item No. 202 - Town or State Line Indicator**1 digit (N)**

This item indicates whether the bridge is over a town or state line.

Code	Description
0	None of the following
1	Bridge over Town Line (begin bridge)
2	Bridge over Town Line (end bridge)
3	Bridge over N.H. State Line
4	Bridge over N.Y. State Line
5	Bridge over Canadian Line

Note: For structures over a town line, code all data for both towns.

State Item No. 203 - Special Access Indicator

8 digits (N)

This item is used to inventory the structures which require special access to inspect adequately. Code the special access indicator as an 8-digit code composed of 5 segments. Duplicate reports need not be coded.

Segment	Description	Length	
203A	Indicator On/Off Switch	1 digit	
203B	Type of Access Required	1 digit	
203C	Access Frequency Required in Months	2 digits	
203D	Month of Last Access	2 digits	
203E	Year of Last Access	2 digits	code 99 for inspector's discretion

Segment 203A shall be coded as follows:

Code	Description
0	No Special Access Required
1	A Special Access Required

Segment 203B shall be coded as follows:

Code	Description of Access
1	Boat
2	State Servi-lift
3	Rental Servi-lift
4	Staging Contract
5	Ladder
6-9	Future Possibilities

If more than one is required on one structure, code the description which requires a contract to get the job done. In other words, staging or Servi-lift overrules boat or ladder. Leave blank if 203A is coded a "0".

Segments 203 C - E are self explanatory.

State Item No. 204 - Principal or Duplicate Report Indicator 1 digit (N)

This item indicates whether the record is a principal or duplicate report.

Code Description

- 0 Principal Report, no duplicate report exists
- 1 Principal Report, duplicate report exists
- 2 Duplicate Report, principal report exists
- 3 Duplicate report only (i.e. railroad or pedestrian overpasses)

State Item No. 205 ^{Program}~~Project~~ Indicator/Bid Let 11 digits

205A ^{Program}~~Project~~ Indicator 1 digit(A)

This item indicates whether the bridge is on the program for replacement or rehabilitation project.

Code Description

- N Not on program
- Y On program

For interstate structures, code only the interstate record regardless of whether it is a principal or duplicate.

Change back to N after bid let.

205B - Bid Let Date 10 digits (D)
mm/dd/yyyy Dec. 30, 1995 - 12/30/95

State Item 206 - Route Log Station No. 7 digits (A)

This is the station of the bridge as shown on the route log. Omit + signs. Right justify. Bridges beginning at town lines shall be coded 0000001.

For State highways, code directly as:

Examples:	Route Log	Code
	90+57	0009057

189+03

0018903

For Interstate highways, and Federal-Aid Secondary - State Aid, code as mile marker plus number of feet beyond mile:

Examples:	Route Log	Code
	164 feet beyond mile 4	0040164
	4976 feet beyond mile 198	1984976
	Town Highway if unknown	Leave blank

State Item 207 - Covered Bridge Inventory

6 digit (N)

This item is used to better track the special features on covered bridges. Code all blanks for not applicable.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
207a	Indicator	1 digit
207b	Truss Type	2 digit
207c	Type of Roof	1 digit
207d	Roof Condition Rating	1 digit
207e	Side Board Condition	1 digit

State Item 207A - Indicator

1 digit

Blank - Not Applicable
 1 - True Covered Bridge.
 2 - False Covered Bridge with Steel Beams.
 3 - Functions as Covered Bridge but Steel Beams also added.

State Item 207B - Truss Type

2 digits

	01 - Lattice work truss.
	02 - Queen Post truss.
	03 - King Post truss.
	04 - Multiple King Post truss
	05 - Thru arch truss.
	06 - Tied Arch - Arch bolted to vertical ends of arch rest on bottom chords.
	07 - Burr Arch - Arch bolted to verticals ends of arch rest on abutments.
Irasburg	08 - Paddleford - Crossed bracing between verticals.
Stowe	09 - Howe - Crossed bracing between chords.
Taftsville	10 - Combination - Situation where more than one configuration was used.

State Item 207C - Roof Condition Rating - Type of Material 1 digit

- 1 - Metal
- 2 - Slate
- 3 - Wood Shingles
- 4 - Asphalt Shingles

State Item 207D - Roof Condition Rating 1 digit

- 1 - Good - No holes or signs of leaking, metal roof has no rust and rafters are sound.
- 2 - Fair - One or more small holes, areas of surface rust, pieces or small sections broken off or partially unattached, rafters cracked or small rotten sections and possible insect damage.
- 3 - Poor - Holes with signs of leaking, leaks have caused advanced deterioration of truss members, metal roof completely rusted and near failure, rafters broken or large areas of rot or insect damage (which seriously affects strength).

State Item 207E - Side Board Condition 1 digit

- 1 - Good - All boarding intact with no signs of rot and only minor collision damage.
- 2 - Fair - A few boards missing or broken (including ends from ice damage). Small areas of rot.
- 3 - Poor - Numerous boards missing or broken resulting in rot of truss members. Large areas of rot on boards with subsequent damage to bearing and chord members.

State Item 208 - Last Project No. 20 digits (A)

Enter the project number when the structure was first built, or last project number of major reconstruction, if plans are available. Reconstruction is defined as work which materially changes the width of the superstructure, complete replacement of superstructure or otherwise generally changing the character of the structure. Resurfacing, repair, replacement or altering of curb/rail/etc. is not considered reconstruction. Left-justify the coding of this item, leave unused positions blank. (Code only for projects which have been completed.)

Examples:

BRZ 1449(17)

Bridge and Culvert

District Forces

Town Project

State Item 209 - Last Project Name

36 digits (A)

Enter the project name associated with the project coded in Item 208.

State Item 210 - Weight of Structural Steel

5 digits (A)

Code directly the weight in tons of structural steel, to the nearest ton. Right-justify. Code "ENCAS" for steel beams encased in concrete. Code "00000" if not applicable.

Examples:	Weight	Code
	962 tons	00962
	11432 tons	11432
	Concrete encased I-beam	ENCAS
	Not Calculated*	99999

*Note: If bridge is never going to be painted (example: old worthless bridge to be eliminated), code 99999 for weight which will indicate we won't spend time calculating it.

State Item No. 211 - Rating of Paint

1 digit (A)

This item indicates the rating of paint, code as follows:

Code Description

8	Paint is in good condition
7	Spot painting or complete painting with minor cleaning required
6	Complete painting with general cleaning required
5	Complete painting w/ extensive cleaning required
N	Any structure w/ a non-paintable superstructure, such as: concrete slabs and T-beams; culverts; A-588 steel; etc.

Note: Covered bridges will be rated "N" unless they have been shored with structural steel stringers. If shored with steel stringers, rate the paint as described above.

State Item 212 - Bridge Paint

8 digits (A)

212A - Year Structure Last Painted

4 digits

Code the year in which the structure was last painted. If the structure is a type that cannot be painted, code zeros. Code A-588 weathering steel as "A588". Leave blank if unknown.

212B - Paint Color**2 digits**

Color	Code
Green	GN
Brown	BN
Black	BK
Blue	BE
Silver	SR
Red	RD
Orange	OE
Primer	PR
Gray Grey	GY
A588 or non-paintable	(blank)
Other	OR

Any color may be designated by coding the first and last letter of the name of the color.

212C - Is structural steel grease coated?**1 digit**

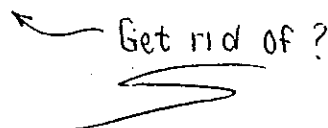
	Code
Yes	Y
No	N
A588 or non-paintable	(blank)

212D - Was lead paint completely removed from structural steel before non-lead paint was applied?**1 digit**

	Code
Yes	Y
No	N
Unknown	U

Lead paint was never used
on structural steel

B

Get rid of ?


Not applicable as lead paint
is still primary paint system L

A588 or non-paintable (blank)

State Item No. 213 - Number of Utilities

1 digit (N)

This item indicates the number of utilities that are carried on the structure. Record only the number of utilities that exist for other reasons than service to the bridge itself.

State Item No. 214, 214-1, 214-2-Year of Last Maintenance Activity 4digits(A)

Code the year of last maintenance activity performed on the bridge. See Item 215 (series) for a list of maintenance types. Leave blank if none.

**State Item No. 215, 215-1, 215-2 - Type of Maintenance Performed 8 digits(A)
(Left justified)**

Code the general type of Maintenance activity which took place in the year shown in Item 214 series. Item is segmented into (4) 2 digit parts (A, B, C, and D) to allow up to four activities. Choose the code from the following list that most closely describes the maintenance performed. Leave blank if Item 214 is blank.

If the maintenance activity for a bridge fits in more than four categories, select the activities which you feel most affects the integrity of the structure being inspected.

Code Description

- 01 Deck Replacement
- 02 Deck Rehabilitation (should bring it up to standards)
- 03 Deck Repair (patching mostly - concrete, planks, asphalt, etc.- does not meet standards)
- 04 Deck Widening - one or both sides
- 05 Deck Runner Planks (repaired, replaced, or installed)
- 06 Deck Paved with Membrane
- 07 Deck Paved (full or partial without membrane)
- 08 Deck Curb(s) (repair or replacement)
- 09 Deck Fascia(s) (repair or replacement)
- 10 Approach Guiderails (repaired, replaced, or installed but substandard)
- 11 Bridge Guiderails (repaired or installed, but substandard)
- 12 Approach and Bridge Guiderails (repaired or installed, but substandard)
- 13 Approach and/or Bridge Guiderails (repaired or installed - meets standards)

- 14 Covered Bridge Repairs (non-structural) (includes roof, kneebraces, boarding, roof and wall supports, etc.)
 - 15 Covered Bridge Repairs (structural) (includes bearings, lattice members, chords, end posts, etc.)
 - 16 Superstructure Repaired (other than covered bridges)
 - 17 Superstructure Replaced (full or partial)
 - 18 Diaphragms Installed
 - 19 Bearings Rehab. or Replaced
 - 20 Abutment Repair (stem only)
 - 21 Abutment Replacement
 - 22 Abutment or Pier Bridge Seat Repaired/Replaced (seat is separate unit from stem)
 - 23 Wing(s) Repair *cap*
 - 24 Wing(s) Replacement
 - 25 Footing/Kneewall Repair or Installed
 - 26 Undermining Repair
 - 27 Debris Removal from Channel
 - 28 Temporary Repair (shoring of superstructure)
 - 29 Temporary Repair (bailey, mabey, etc.)
 - 30 Channel Repair (riprap, stone fill, beaver dam removal, etc.)
 - 31 Culvert Barrel Repair
 - 32 Headwall Repair or Installed
 - 33 Partial Painting
 - 34 Bridge Closed
 - 35 Pier Stem Repair
 - 36 Sidewalk Repair
 - 37 Joint Repair
 - 38 Clearance Alterations
 - 39 Backwall Repairs
 - 40 Open for future coding
- ← Maint or Recon?*

State Item No. 216 - Hydraulic Structure (Y/N)?**1 digit (A)**

This item indicates whether or not the structure crosses or is in the flood plain of a river or stream or otherwise involves hydraulic considerations. Code Y if so, and N if not. If a Y is entered, then State Items 217 and 218 will be coded accordingly.

State Item No. 217 - Hydraulic Report Available?**1 digit (A)**

If Item 216 is coded Y: Code on basis of information furnished by the Hydraulics Engineer. Enter Y if available, and N if not. If not applicable, leave blank.

State Item No. 218 - Year of Hydraulic Report**4 digits (A)**

If Item 217 is coded Y: Enter the year in which the Hydraulic Reports were prepared. If not applicable, leave blank.

State Item No. 219 - Scour Susceptibility**1 digit (A)**

This item indicates the field inspector's best judgment as to the vulnerability of the structure to scour. If the foundations of the structure sits on ledge or piling, the coding should probably be 3 or 4. If the foundation is unknown, or scour problems are obvious at the bridge site, this item should probably be coded 1 or 2. The coding of this item is based primarily on the inspector's personal assessment of each bridge site. All bridges that do not involve a waterway shall be coded 4.

Code Description

0	None
1	High
2	Moderate
3	Low

State Item No. 220 - Alignment of Bridge Deck and Superstructure **1 digit (N)**

This item indicates the bridge deck and superstructure alignments, and is coded as follows:

Code Description

1	Bridge deck and Superstructure is straight
2	Bridge Deck is curved, Superstructure is straight
3	Bridge Deck and Superstructure are both curved
0	Structure does not have a separate Superstructure; i.e., box culvert, arch, or a slab bridge

State Item No. 221 - Type of Bridge Rail**6 digits (A)**

Record the description on the inspection form, and indicate the type of bridge rail on the structure with a 6-digit code composed of 4 segments.

Segment	Description	Length
221A	Material/Design of Posts	2 digits
221B	Post Protective System	1 digit

221C	Material/Design of Rail	2 digits
221D	Rail Protective System	1 digit

The first two digits indicate the kind of material and/or design of post, and shall be coded using one of the following codes:

Code Description

00	No Rail Posts Exist
01	Concrete (No Offset Blocks)
02	Concrete (With Offset Blocks)
03	Steel WF (Pedestal Mounted/Driven - No Offset Blocks)
04	Steel WF (Pedestal Mounted/Driven - w/Offset Blocks)
05	Steel WF (Fascia Mounted - No Offset Blocks)
06	Steel WF (Fascia Mounted - W/Offset Blocks)
07	Steel Tubing Post (Pedestal Mounted)
08	Cast Steel Post (Pedestal Mounted)
09	Miscellaneous Steel Shapes (Angle Irons, Channels, or Other Structural Shapes)
10	Cast Aluminum
11	Aluminum (W-section - Mounted/Driven)
12	Aluminum Extruded
13	Timber (Heavy Duty - No Offset Blocks)
14	Timber (Heavy Duty - W/Offset Blocks)
15	Timber posts (Misc. Shapes, Light Duty)
16	Truss Members (No Offset Blocks)
17	Truss Members (W/Offset Blocks)
18	Combination Concrete and Aluminum Post
19	Other
NN	Not Applicable (R.R. Bridges, Culverts)

The third digit indicates the protective system on the post, and shall be coded using one of the following codes:

Code Description

0	No Rail Posts Exist
1	No Protective System
2	Galvanized
3	A-588
4	Pressure Treated
5	Creosote Treated

- 6 Painted
 7 Other
 N Not Applicable (R.R. Bridges, etc)

← "Anodized"
 new coding

The fourth and fifth digits indicate the kind of material and/or design of rail, and shall be coded using one of the following codes:

Code	Description
00	No Rail Exists
01	Steel Beam (Single)
02	Steel Beam (Double)
03	Steel beam W/Box Beam Hand Rail
04	Steel Beam Stiffened W/ Box Beam
05	Box Beam (Single)
→ 06	Box Beam (Double)
07	Box Beam (Triple)
08	2-Rail Clear View Box Beam
09	3-Rail Clear View Box Beam
10	3-Pipe Steel Continuous
11	Steel Pipe W/Spindles
12	Miscellaneous Steel Shapes (Angle Irons, Channels, or Other Structural Shapes)
13	Single Cable
14	Double Cable
15	Triple Cable
16	1-Tube Aluminum Simple Span (with or without spindles)
17	2-Tube Aluminum Simple Span (with or without spindles)
18	3-Tube Aluminum Simple Span (with or without spindles)
19	2-Rail Aluminum (Tear Drop)
20	3-Rail Aluminum (Tear Drop)
21	3-Rail Aluminum (Tear Drop W/Spindle)
22	4-Rail Aluminum (Tear Drop)
23	Concrete Rail (With or Without Spindles) ← <i>Turn Rail</i>
24	Concrete Wall or Jersey Barrier
25	Jersey Barrier With Single Box Beam
26	Timber (Heavy Duty)
27	Timber Rail (Light Duty)
28	Other
NN	Not Applicable (R.R. Bridge, Culverts)

59 - NEW 6/1/14
 60 - NEW 4/1/14

The sixth digit indicates the protective system on the rail, and shall be coded using one of the

codes listed for Segment (B).

State Item No. 222 - Type of Approach Railing

6 digits (A)

Record the description on the inspection form and indicate the type of approach rail at the structure with a 6-digit code composed of the same 4 segments outlined in State Item 221.

State Item No. 223 - Type of Expansion Joint

2 digits (A)

Code the type of deck expansion joint used for each bridge. Select the code which most closely represents the type of expansion joint existing on the bridge being inspected. If more than one type of expansion joint occurs at one bridge, code the type of joint which occurs the most.

Code Description (See Appendix N for examples)

00	No Expansion Joint Exists
01	Cork Expansion Joint
02	Closed-Cell Material Expansion Joint (Saw Cut)
03	Finger Plate Expansion Joint w/o Drain Trough
04	Finger Plate Expansion Joint w/ Drain Trough
05	Open Expansion Joint without a Trough
06	Open Expansion Joint with a Trough
07	Vertical Plate Joint without a Drain Trough
08	Vertical Plate Joint with a Drain Trough
09	Sliding Metal Plates without a Drain Trough
10	Sliding Metal Plates with a Drain Trough
11	Compression Seal
12	Steel Plates with Fabric Seal (Vermont Joint)
13	Elastomeric Expansion Joint (Single Seal)
14	Elastomeric Expansion Joint (Double Seal)
15	Elastomeric Expansion Joint (Three Seal)
16	Elastomeric Expansion Joint (Four Seal)
17	Strip seal/sheet seal
18	Other
19	Wide Band Joint (Plug Joint)
99	Unknown

*Modular
Elastom.
Single or
Multi
Seal?
Combine!*

XJS joint?

State Item No. 224 - Type of Expansion Bearing Device

2 digits (A)

This item indicates the type of expansion bearing device used. Select the code which most closely represents the expansion bearings on the bridge.

Code	Description
00	No Expansion Bearings Exist
01	Sliding Bronze Plates
02	Elastomeric Pad
03	Pot Type Bearing
04	Pedestal Type Rockers
05	Pinned Rockers
06	Nested Rockers
07	Single roller Type
08	Nested Roller Type
09	Sliding Steel Plates
10	Link and Pin Type
11	Timber Blocks
12	Bond Breaker such as Tar Paper, Cork, Etc.
13	Beams Built into Concrete or Masonry Backwall
14	Fabric Pad
15	Other
16	Unknown

State Item No. 225 - Type of Foundation

14 digits (A)

This item indicates the supporting material that the bridge abutments and piers are built on. Select the code which most closely represents the type of foundation support existing at the bridge. If more than one foundation condition exists, select the type which occurs the most.

Code Description

01	Ledge
02	Boulders
03	Large Cut-Stone Blocks
04	Timber Piling
05	Log Mats
06	Spread Footing
07	H-Piles (Steel)
08	Cast-in-Place Concrete Piles
09	Unknown
10	Granular Material (pipes, boxes, etc.)
	For multi-barrel structures, code only once.
	Floating abutments on cantilevered systems

Blank Does not apply (no piers, etc.)

11 Drilled shaft into ledge

This item indicates the supporting material that the bridge abutments and up to 5 piers are built on.

Item 225A (1st and 2nd digits) will represent the type of foundation support for Abutment No. 1.

Item 225B (3rd and 4th digits) will represent the type of foundation support for Abutment No. 2.

Item 225C, D, E, F, & G (5th through 14th digits) will represent the type of foundation that piers 1, 2, 3, 4, and 5 are on.

If a bridge has only one pier, it will be coded in 225C (5th and 6th digits), and all other spaces left blank, etc. If a bridge has more than 5 piers, code the types which most apply and make note of the rest.

A pipe arch with two footings will be coded the same as Abutments 1 and 2. The foundations for a closed bottom culvert (round pipe, squash pipe, etc.) will be coded in the first two digits only, regardless of how many there are.

State Item No. 226 - Vertical Clearance Under Bridge (Highway) 4 digits(A)

Code the minimum vertical clearance from the roadway beneath the structure to the underside of the superstructure (with an assumed decimal point). This item should be coded for all duplicate reports, as well as the principal report.

State Item No. 227 - Vertical Clearance Under Bridge (Railroad) 4 digits (A)

Code the minimum vertical clearance from the railroad track beneath the structure to the underside of the superstructure (with an assumed decimal point).

State Item No. 228 - Vertical Clearance Under Bridge (Waterway) 4 digits (A)

Code the average vertical clearance from stream bed of the waterway beneath the structure to the underside of the superstructure (with an assumed decimal point).

Items 229 through 235, all truck capacities shown in tons.

State Item No. 229 - Two Part Item which tracks
H Truck at 67% YP (Posted Capacity) and Load Rating Method 2 digits (N)

229A	Single Alpha Character:	Working Stress Analysis	Code W
		Load Factor Analysis	L
		Not Rated or Poor	(blank)

229B	2 digits	H truck at 67% YP (posted capacity)	2 digits
		Poor Condition or Temporary Condition	PR
		No rating done	NR

State Item No. 230 - 3 Axle Straight Truck
(N) at 67% YP (Posted Capacity) 2 digits

State Item No. 231 - 4 Axle Straight Truck
(N)
at 67% YP (Posted Capacity) 2 digits

State Item No. 232 - 3S2 Truck at 67% YP (Posted Capacity) 2 digits (N)

State Item No. 233 - 3S2 Truck at 75%
Yield Point (Max. Operating Rating) 2 digits (N)

State Item No. 234 - 5 Axle Semi-Trailer Truck
(SHT. W.B.) (Posted Capacity) at 67% YP 2 digits (N)

State Item No. 235 - 6 Axle Semi-Trailer Truck at 75% YP
(Max. Operating Rating) 3 digits (N)

NOTE: Items 230 through 235 left blank if Item 229B coded NR or PR.

State Item No. 236 - Load Posting Signs 5 digits (A)

Code the type of load posting that exists at the bridge site, the vehicle type on the posting sign, and the tonnage allowed on the bridge for the loading designated. Digits 1 & 2 indicate the type of load posting, digit 3 indicates the vehicle type, digits 4 & 5 indicate the tonnage allowed for the loading designated. If more than one vehicle is shown on the load posting sign, list the first vehicle listed for digit 5. If not posted, leave digits 3 through 5 blank.

Digits 1 & 2 - Load Posting**Code Description**

- 01 No Load Posting signs exist near bridge
- 02 Bridge is legally load posted at both ends
- 03 Bridge is legally load posted at one end only
- 04 Posted with homemade signs at one end of bridge
- 05 Posted with homemade signs at both ends of bridge
- 06 Bridge closed to all traffic
- 07 End of road is posted within sight of bridge (but no signs at bridge)
- 08 Sign legibility very poor, but does exist at one end of bridge
- 09 Sign legibility very poor, but they do exist at each end
- 10 No load posting signs are needed (See Item 70)

Digit 3 - Vehicle Type

- 1 2 axle straight truck
- 2 HS loading (3 axle semi-trailer truck)
- 3 3S2 Semi (5 axle semi-trailer truck)
- 4 3 axle straight truck (10 wheeler)
- 5 4 axle straight truck
- 6 Gross load only
- 7 No trucks

Digits 4 & 5 - Actual Tonnage

Code the tonnage allowed on the bridge for the loading designated.

Examples: Posted for 3 tons 03
 Bridge Closed 00
 Posted for 12 tons 12

State Item No. 237 - Federal Sufficiency Rating

5 digits (A)

Computer Updated

This item contains the Sufficiency Rating of the bridge as shown on the tape submitted to FHWA. The data in this field will be computer updated yearly when the FHWA submittal is made.

State Item No. 238 - State Sufficiency Rating 5 digits (A)

Computer Updated

This item contains the Sufficiency Rating of the bridge. The value is automatically computed using the Federal formulas each time the record is updated.

State Item No. 239 - Deficiency Status of Structure 2 digits (A)

This item indicates the deficiency status of the structure as indicated by the Federal edit program. This information is obtained by running the Federal edit program and is then entered into the Bridge Inventory File.

State Item No. 240 - Route Log Bridge No. 5 digits (A)

This item indicates the Bridge Number of the structure, as indicated on the route logs.

State Item No. 241 - Bridge Plans on File 1 digit (A)

This item indicates whether Bridge plans are on file for the structure.

Code	Description
------	-------------

blank	Unknown
0	No plans available
1	Plans are available

State Item No. 242 - Source of ADT 1 digit (A)

This item indicates where the ADT was obtained from.

Code	Description
------	-------------

blank	Unknown
1	ADT Estimated by Inspector During Field Inspt. (see Appendix H)
2	ADT Obtained from Planning Division

State Item No. 243 - Cross Reference Route Number 15 digits (A)

This item is used when a duplicate record is required. (See Item 5A for definition of structures)

needing duplicate reports.) If you are working with the principal report, the route number which is coded here should be the route passing under the bridge. If you are working with the duplicate report, the route coded here should be the route passing over the bridge. This item should be blank when no duplicate is required.

State Item No. 244 - Cross Reference Bridge No.**5 digits (A)**

This item is also used when a duplicate record is required. (See Item 5A for definition of structures needing duplicate reports.) If you are working with the principal report, the bridge number coded here should be the "route log bridge number" for the route passing under the bridge. If you are working with the duplicate report, the bridge number here coded here should be the "route log bridge number" for the route passing over the bridge.

State Item No. 245 - Finance and Maintenance Agreement**1 digit (A)**

Does a signed Finance and Maintenance Agreement exist for this bridge?

Code	Description
Y	Yes
N	No
Blank	Non applicable

State Item 246 - Type of Curb**1 digit (N)**

Code	Description
0	No Curb
1	Granite Faced Curb
2	Plain Concrete
3	Silica Fume Concrete
4	Galvanized Steel Faced Curb
5	Steel
6	Timber
7	Other

State Item 247 - Milepoint (XXX.XXX miles)**6 digits (N)**

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. (Vermont route logs are to the middle of bridge).

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.

State Item No. 400 - Record Number**5 digits (N)**

This item indicates the unique record number assigned to each record in the file. This field is used to select records for data entry, inquiry and reporting.

State Item No. 401 - Town Name**14 digits (A)**

This item indicates name of the Town in which the bridge is located. The name is obtained by decoding town/county codes located in Item 8.

State Item No. 402 - Last Updated Date**8 digits (D)****Computer Updated**

This item indicates the date on which on-line updating or batch updating last occurred. This date will be computer updated each time an update is performed. Together with Item No. 403, this provides an audit trail of when the record was last updated.

State Item No. 403 - Last Updated Time**8 digits (A)****Computer Updated**

This item indicates the time of day at which on-line updating or batch updating last occurred. (See Item 402 above.)

State Item No. 404 - Record Audit Status**1 digit (A)****Computer Updated**

This item is updated each time maintenance is performed. It will contain a letter representing the most severe audit results found. The codes are listed below, in order, from most severe to least severe.

'U' = UNEDITED; Projects loaded from the mainframe system and not yet maintained on the DEC2060.

'E' = ERROR; One or more fields failed as a result of a batch edit.

State Item No. 405 - Route Name**15 digits (A)**

This item indicates the name of the route on which the structure is located. This item must be entered when a record is added.

State Item No. 406 - Structural Adequacy and Safety**6 digits (N)****Computer Updated**

This item is one of the four factors calculated and combined to determine the sufficiency rating. The overall sufficiency is equivalent to the sum of Items 406, 407, and 408, minus Item 409. This particular item has a maximum value of 55.0.

- 'F' = ERROR; One or more fields failed as a result of an on-line edit which the operator could not correct at that time.
'W' = WARNING; One or more warnings occurred as a result of a batch edit.
'A' = ACCEPTED; One or more warnings occurred as a result of an on-line edit, and these were all accepted as valid by the operator.
Blank = No errors, warnings or accepteds exist for this record.

Note: General inquiry access will be controlled by the audit status field. Users outside of Structures will not be able to look at a record unless the status field contains a "blank" or "A" (i.e., unless the information has been verified as being correct).

State Item No. 407 - Serviceability & Functional Obsolescence**6 digits (N)****Computer Updated**

This item is one of the four factors used in the calculation of the sufficiency rating. This item has a maximum value of 30.0. See Item 406 for more details.

State Item No. 408 - Essentiality for Public Use**6 digits (N)****Computer Updated**

This item is one of the four factors used in the calculation of the sufficiency rating. This item has a maximum value of 15.0. See Item 406 for more detail.

State Item No. 409 - Special Reductions**6 digits (N)****Computer Updated**

This item is one of the four factors used in the calculation of the sufficiency rating. This item has a maximum value of 13.0. See Item 406 for more detail.

State Item No. 800 - Bridge Type**20 digits (A)**

For bridges which have fracture critical details or special inspection details (see items 92A & 92B). Code the type of bridge structure.

Example: If the structure is a 2-span continuous welded 2-girder system, code:

2 sp cont 2 weld gir

State Item No. 801 - Fracture Critical Member (FCM) Detail 40 digits (A)

Code the fracture critical detail or details on all structures which are coded "Y" in item 92A.

Example: If the structure is a steel thru-truss, code:

lower chord

State Item No. 802 - FCM Inspection**20 digits (A)**

For most fracture critical structures, this item will be coded "hands on".

State Item No. 803 - FCM Equipment**20 digits (A)**

Code the type of equipment needed to perform a proper FCM inspection.

Example: If the structure requires a servi-lift and has a pin & link system, code:

servi-lift/ultrasonic

State Item No. 804 - FCM Comment**252 digits (A)**

Item is open for any comments pertaining to fracture critical details on the structure.

State Item No. 805 - Special Detail**40 digits (A)**

Code the special detail or details on all structures which are coded "Y" in item 92C.

Example: If the structure is a multi-plate pipe arch, code:

bolting pattern

State Item No. 806 - Special Inspection**20 digits (A)**

For bridges with special inspection features, code the type of inspection required.

THE FOLLOWING IS A LIST OF EXAMPLES ON HOW TO CODE ITEM 800 - BRIDGE TYPE WHEN ITEM 43 IS CODED THE RESPECTIVE NUMBERS. THESE SHOULD BE CODED AS CLOSE AS POSSIBLE TO WHAT IS SHOWN, BUT OBVIOUSLY SOME UNIQUENESS IS REQUIRED ON CERTAIN BRIDGES.

- | | |
|--|--|
| 000 - FLOATING BRIDGE | 302 - STEEL BEAM Or GIRDER
WELDED GIRDER
ROLLED BEAM
RIVETED GIRDER
RR CAR FRAMES
STEEL BM W TIMBER DK
CONC ENCASED ST BM
STEEL BEAM COV BR |
| 101 - CONCRETE SLAB
SLAB WIDE W STEEL BM
SLAB WIDE W T-BEAM | 303 - STEEL GIRDER/FLBEAM
WELDED THRU GIRDER
RIVETED THRU GIRDER
WELDED TWO GIRDER
RIVETED TWO GIRDER |
| 103 - CONCRETE GIR/FLBEAM | 307 - STEEL RIGID FRAME |
| 104 - CONCRETE T-BEAM
TBEAM WIDE W STL BM
TBEAM WIDE W SLAB | 309 - STEEL DECK TRUSS |
| 107 - CONCRETE FRAME | 310 - STEEL TRUSS
STEEL THRU TRUSS
STEEL PONY TRUSS |
| 111 - CONCRETE ARCH | 316 - MOVABLE - BASCULE |
| 119 - CONCRETE CULVERT
RCBOX
CONC ARCH CULVERT | 319 - STEEL CULVERT
MULTI PLATE PIPE ARCH
MULTI PLATE PIPE
MULTI PLATE ARCH |
| 201 - CONT CONC SLAB | 402 - CONT. STEEL BM/GIRDER
CONT. WELDED GIRDER
CONT. ROLLED BEAM
CONT. RIVETED GIRDER |
| 501 - PRESTRESS CONC. SLAB
PRESTRESS CONC. TBM
PRESTRESS CBEAM | 403 - CONT. 2 GIRDER |
| 502 - PRESTRESS MULTI BEAM | 407 - CONT. ST RIGID FRAME |
| 506 - PRESTRESS BOX BEAM | 801 - MASONRY SLAB |
| 701 - TIMBER SLAB | 811 - MASONRY ARCH |
| 702 - TIMBER BEAM | |
| 710 - COVERED BRIDGE
TIMBER PONY TRUSS
TOWN LATTICE COV BR | |
| 712 - TIMBER ARCH COV BR
ARCH/KINGPST COV BR | |

State Item No. 807 - Special Equipment 40 digits (A)

Same as State Item 803, except for special feature bridges.

State Item No. 808 - Special Feature Bridges 252 digits (A)

Same as State Item 804, except for special feature bridges.

State Item No. 809 - Underwater Procedure 50 digits (A)

Code the underwater inspection procedure or procedures on all structures which are coded "Y" in item 92B. Most procedures are described by the state dive team.

State Item No. 810 - Underwater Equipment 50 digits (A)

Similar to Item 809.

State Item No. 811 (A, B, C, D, E, F & G)-Underwater Remarks 6 digits each(A)

Item/items open for any comments pertaining to underwater inspection of the structure.

State Item No. 812 - Scour Screening Results 1 digit (N)

0 - low risk

1 - scour susceptible

2 - unknown foundations

3 - original screened as unknown foundation, plans found,
Leave blank for no results, or dry crossings. coded low risk

State Item No. 813 - Engineering Scour Study Results 1 digit (N)

Item is for bridges coded 1 in item 812.

- 0 bridge has been assigned to experts for analysis. Study is not complete.
- 1 bridge has been studied by experts and found to be low risk. Bridge is coded low risk in item 812.
- 2 bridge found to be scour susceptible. Countermeasures have been designed but not implemented.
- 3 bridge found to be scour susceptible. Countermeasures have been designed and installed, or special warning sent to owner. Bridge is coded low risk in item 812.

4 scour study completed during design process. Item 812 coded low risk.

5 bridge found to be scour susceptible. Monitoring planned.

6 Bridge found to be scour susceptible. Letter
Leave blank for no assignment, or dry crossings. sent to Town.

State Item No. 814 - Engineering Foundation Analysis

1 digit (N)

Item is for bridges with unknown foundations: i.e., coded 2 in item 812.

0 bridge assigned to experts for foundation analysis (analysis not completed).

1 bridge has been studied by experts and is analyzed as low risk. (Bridge is coded to low risk category in item 812).

2 bridge has been studied by experts and is analyzed to be scour susceptible. Counter measures have been designed by not implemented.

3 bridge foundation has been studied by experts and found to be scour susceptible. Counter measures have been installed and bridge is coded low risk in item 812.

Leave blank for no assignment, or dry crossings.

State Item No. 815 - Low Risk Foundations

1 digit (N)

Item is for bridges coded 0 in item 812.

0 bridges found to have spread footings on rock or piling of sufficient length during pre-screening. Also, foundations well above flood stage or protected by counter measures, or analyzed by experts to be stable.

1 other bridges assessed as low risk during screening process.

2 culverts assessed to low risk during scour screening process.

Leave blank for no results, or dry crossings, or scour susceptible.

State Item No. 817 - Scour Problems

1 digit (N)

Item codes bridges which have scour problems outlined in a critical maintenance request. Code as follows:

1 no scour problems in request.

-
- 2 scour problems in request, repair pending.
 - 3 scour problems have existed in past, but have been repaired.

Leave blank if not applicable.

SUFFICIENCY RATING FORMULA AND EXAMPLE

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.

This is not to be confused with VAOT Structures Division's deficiency rating as set up by Warren Tripp for the Town Highway Bridge Program.

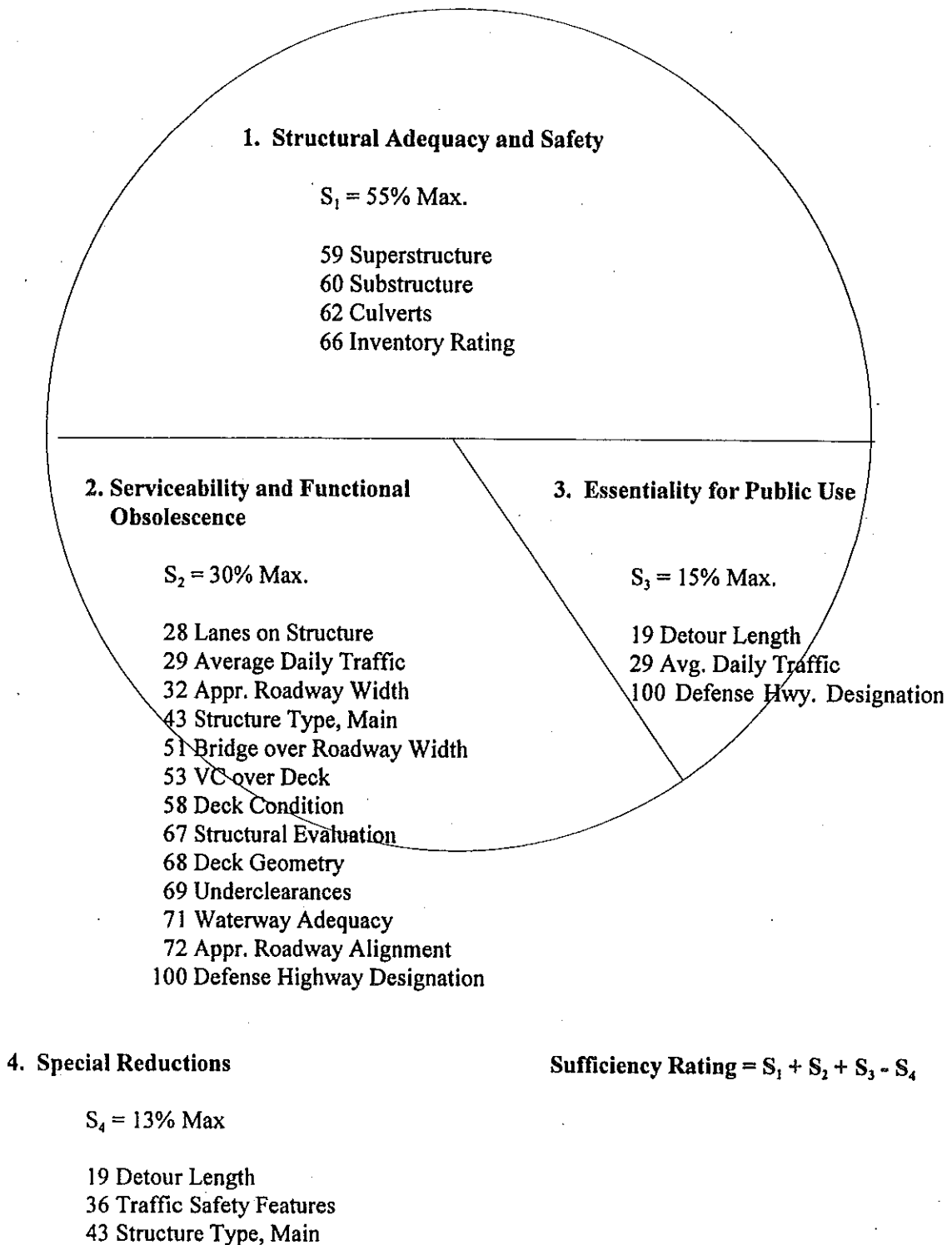
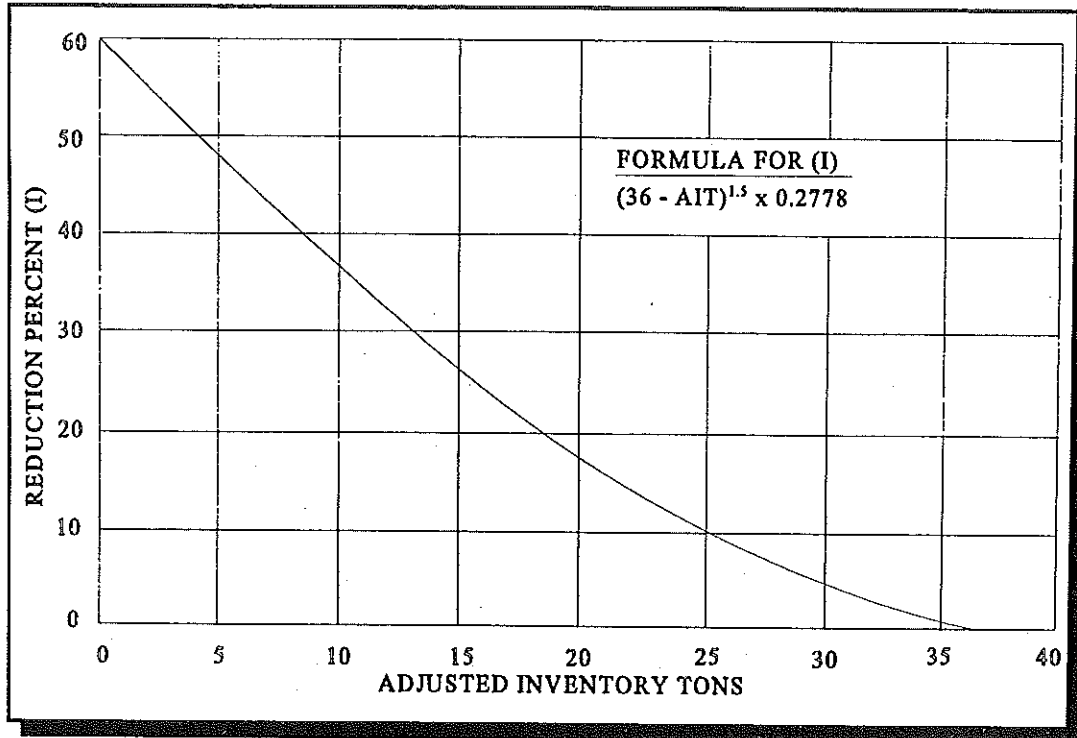


FIGURE 1. SUMMARY OF SUFFICIENCY RATING FACTORS

APPENDIX B - FIGURE 3



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 then B = 40%

= 4 then C = 25%

= 5 then D = 10%

If #59 and #60 = N and

#62 (Culvert Rating) is < 2 then E = 55%

= 3 then F = 40%

= 4 then G = 25%

= 5 then 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:

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

If $(36 - \text{AIT}) \leq 0$, 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%.

a. Rating Reductions (13% Maximum)

If #72 (Approach Road Alignment) is

≤ 3	then F = 4%
= 4	F = 2%
= 5	F = 1%

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

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:

$X \text{ (ADT/lane)} = \#29 \text{ (ADT)} / (\text{first 2 digits of } \#28 \text{ (Lanes)})$

$Y \text{ (Width/lane)} = \#51 \text{ (Bridge Rdwy. Width)} / (\text{1st 2 digits of } \#28)$

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

If $(\#51 + 2 \text{ ft.}) < \#32 \text{ (Approach Rdwy Width)}$ $G = 5\%$

- (2) For 1-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	$H = 15\%$
$Y \geq 14 < 18$		$H = 15 * (18 - Y) / 4 \%$
$Y \geq 18$		$H = 0\%$

- (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 $Y \geq 16$, then $H = 0\%$

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

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

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

- (4) For all except 1-lane bridges, use Figure 3 or the following:

If $Y < 9$ and $X > 50$, then $H = 15\%$

If $Y < 9$ and $X \leq 50$, then $H = 7.5\%$

If $Y \geq 9$ and $X \leq 50$, then $H = 0\%$

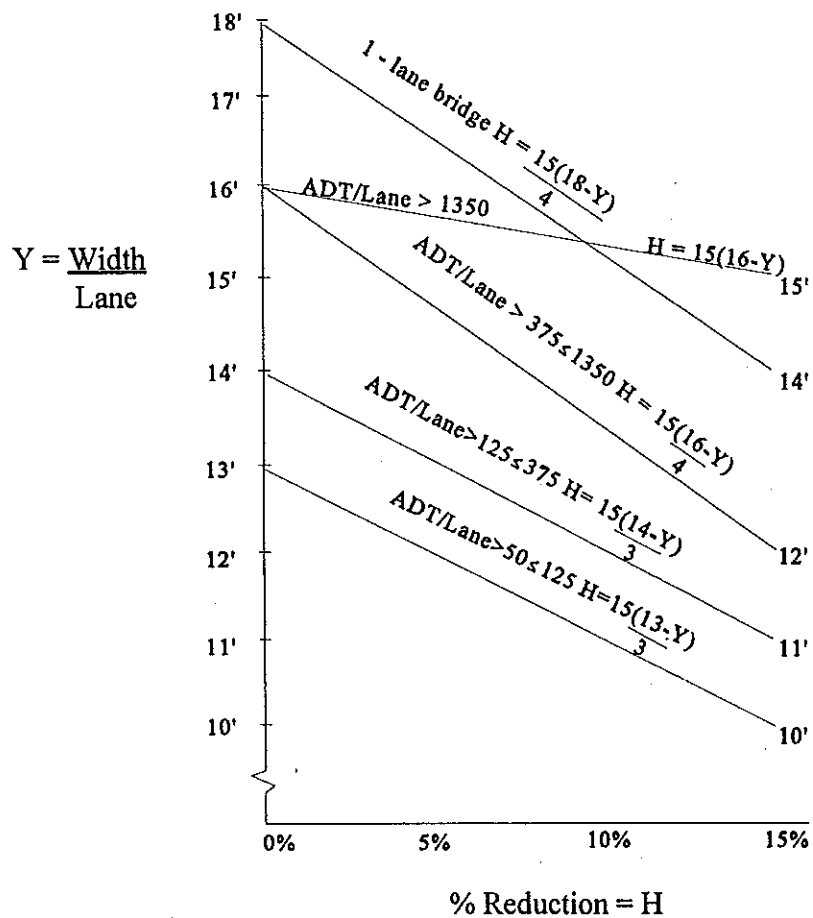
If $X > 50$ but ≤ 125 and

$Y < 10$	then	$H = 15\%$
$Y \geq 10 < 13$	then	$H = 15 * (13 - Y) / 3\%$
$Y \geq 13$	then	$H = 0\%$

If $X > 125$ but ≤ 375 and

$Y < 11$	then $H = 15\%$
$Y \geq 11 < 14$	then $H = 15 \cdot (14 - Y) / 3\%$
$Y \geq 14$	then $H = 0\%$

Figure 3. Width of Roadway Sufficiency



If $X > 375$ but ≤ 1350 and

$Y < 12$	then $H = 15\%$
$Y \geq 12 < 16$	then $H = 15 \cdot (16 - Y) / 4\%$
$Y \geq 16$	then $H = 0\%$

If $X > 1350$ and

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

$G + H$ 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	then $I = 2\%$

If #100 = 0 and

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

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

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:

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

"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, then C = 1%
 If 3 digits of #36 = 0, then C = 2%
 If 4 digits of #36 = 0, then C = 3%

$$S_4 = A + B + C$$

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

$$\text{Sufficiency Rating} = S_1 + S_2 + S_3 - S_4$$

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%

$$I = [36 - (1.00 * 22)]^{1.5} * 0.2778 = 14.6$$

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

2. Serviceability and Functional Obsolescence

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

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

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

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

(2) Not Applicable

(3) Not Applicable

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

$$G + H = 5 + 15 = 20 \text{ (however, maximum allowable = 15)}$$

$$I = 0$$

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

3. Essentiality For Public Use

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

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

$$B = 0$$

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

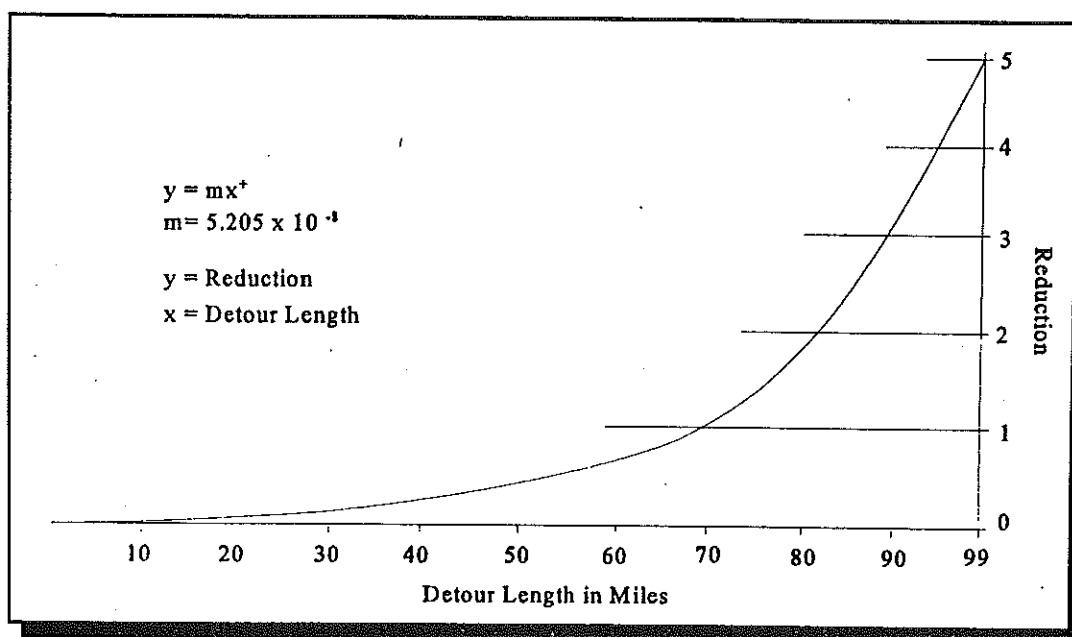
4. Special Reductions

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

$$S_4 = \text{NA}$$

$$\text{SUFFICIENCY RATING} = 30.4 + 7.0 + 0.0 = 37.4$$

Appendix B - Figure 2



***** IDENTIFICATION *****

(1) STATE NAME - VERMONT	CODE 501
(8) STRUCTURE NUMBER -	#075000090502544
(5) INVENTORY ROUTE (ON/UNDER) - ON	= 131000440
(2) STATE HIGHWAY DEPARTMENT DISTRICT	03
(3) COUNTY CODE 075	(4) PLACE CODE 59676
(6) FEATURES INTERSECTED -	SR 772, ROARINGBROOK
(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.	#ABC003790244009

***** STRUCTURE TYPE AND MATERIAL *****

(43) STRUCTURE TYPE MAIN: MATERIAL -	STEEL
TYPE -	DECKTRUSS
CODE	309
(44) STRUCTURE TYPE APPR: MATERIAL -	STEEL
TYPE -	GIRDER & FLOOR BEAM 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

APPENDIX A

A-14

(50) CURB OR SIDEWALK: LEFT 00.0	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

- B14 - ***** 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

APPENDIX A

A-15

(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 - DESCRIPTION - POSTED FOR LOAD	P

***** 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 BRIDGE	8

***** PROPOSED IMPROVEMENTS *****

CODE

(75) TYPE OF WORK - REPLACE FOR DEFICIENCY	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) CFIDATE
A) FRACTURE CRIT DETAIL - YES - 06 MO	A) 09/88
B) UNDERWATER INSP - NO - ___ MO	B) ___/___
C) OTHER SPECIAL INSP - NO - ___ MO	C) ___/___

Note: Data in this example lists items prior to 1997 when metric guide was adopted.

NATIONAL BRIDGE INSPECTION STANDARDS

AS ACCEPTED BY THE STATE OF VERMONT

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

Subsection 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 under-copings 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.

Subsection 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 provisions of the AASHTO Manual* and the Standards contained herein.
- B. Bridge inspectors shall meet the minimum qualifications stated in Subsection 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.1 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.

Subsection 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.
- 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 inspection 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 2-year interval, the State shall submit a detailed proposal and supporting data to the Federal Highway Administrator for approval.

Subsection 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.***
- 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)**** is an alternative acceptable means for establishing that a bridge inspection team leader is qualified.

Subsection 650.308 - 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.

Subsection 650.308 - 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 the 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 190 days after the change in status of the structure for all other bridges on public roads within the state.
- * 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 Administration, 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
- ** The "Bridge Inspector's Training Manual" may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
- *** 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.
- **** For information on NICET program certification, contact: National Institute for Certification in Engineering Technologies, 1420 King Street, Alexandria, VA 22314. Attention: John D. Antrim, P.E., Phone (703)684-2835.

QUALITY CONTROL INSPECTION PROCEDURES

1. Consult with inspectors to establish which areas of the State, and which bridges in those areas, have recently been inspected.
2. Compile a log of specific bridges for quality control inspection by using both random selection and a planned choice of various bridges to give an overall cross section of types and conditions.
3. Schedule times to perform the physical inspection, allowing for equipment, transportation, and supporting personnel.
4. Perform inspection using standard forms for written report. After completing inspection, compare with previous inspection and dictaphone report while at the bridge site. Note any substantial differences, and compare any quality control comments with those of inspectors.
5. Prepare Critical Maintenance Reports or bad letters, if necessary, and equate results to the context of previous reports or letters if written. Send these documents to the appropriate parties, if not already done.
6. Make random spot checks of inventory item codes for the subject bridge. (Example: deck width, clearance, rail system standard or substandard, etc.)
7. Schedule meetings with the bridge inspectors to discuss the quality control inspection results of each bridge and any necessary additions to the report.
8. Keep a file of the inspection reports and any additional data obtained in this process.
9. Prior to March update of NBIS system, check for any bridges which have been overlooked in that two year cycle. Also, look for any of the previous year's inspections that have not been properly dated.
10. Select random bridges in the listing of completed structures for spot checks of the inventory items.
11. Report findings on a yearly basis to the Chief Bridge Inspector and Structures Division Engineer.

Qualifications for this positions shall be as defined in the Manual for Condition Evaluation of Bridges, Section 3.4.

VAOT FIELD INSPECTION SHEETS

2 - State Long

1 - Culverts

ROUTE _____ BRIDGE _____ DIST _____ DATE _____
 TOWN _____ FEATURE CROSSED _____
 BRIDGE TYPE _____ INSPECTOR _____

ITEM 58 - DECK:

***Problem Areas**

****Critical Areas**

1. Wearing Surface:	
2. Structural Condition:	
3. Curbs:	
4. Sidewalks:	
5. Railing:	
6. Drains:	
7. Joint Leakage:	
8. Expansion Device:	
Inspector's Condition Rating:	

ITEM 59 - SUPERSTRUCTURE:

***Problem Areas**

****Critical Areas**

1. Bearing Devices:	
2. Girders/Beams:	
3. Trusses:	
4. Cover Plates:	
5. Portals, Bracing, Etc.:	
6. Floor Beams:	
7. Stringers:	
8. Paint:	
9. Rust:	
10. Rivets, Bolts, Welds:	
11. Collision Damage:	
12. Alignment of Members:	
13. Vibrations, Def. under Load:	
14. FCM Yes _____ No _____ Comment:	
Inspector's Condition Rating:	

ITEM 60 - SUBSTRUCTURE I. Abutments

***Problem Areas**

****Critical Areas**

1. Stem:	
2. Backwalls:	
3. Bridge Seats:	
4. Wings:	
5. Footings:	
6. Piles:	
7. Erosion:	
8. Settlement:	

ITEM 60 - SUBSTRUCTURE II. Piers

9. Caps:	
10. Columns:	
11. Footings:	
12. Scour:	
13. Settlement:	
14. Piles:	
Inspector's Condition Rating:	

ITEM 61 - CHANNEL:

*Problem Areas

****Critical Areas**

Problem Areas		Critical Areas
1. Channel Scour:		
2. Embankment Erosion:		
3. Drift/Vegetation:		
4. Alignment:		
5. Riprap:		
6. Waterway Opening:		
Inspector's Condition Rating:		

ITEM 72 - APPROACH ALIGNMENT

*Problem Areas

****Critical Areas**

	Problem Areas	Critical Areas
1. Alignment:		
2. Approaches:		
3. Guardrail:		
4. Embankment:		
Inspector's Condition Rating:		

Load Posting Signs in Place? ☐ Yes ☐ No ☐ Missing Posted Loading _____ Distance from Br. _____

Object Markers? Yes No Missing

Posted Vertical Clearance: _____ • Measured Vertical Clearance: _____ • _____ • _____
Lt. Shoulder Centerline Rt. Shoulder

ITEM 10 - FOR 10 FOOT WIDTH: _____

NEEDED: Underwater Inspection Boat Inspection Servi-lift, Staging, or Sign Truck

COMMENTS:

[illegible]

TOWN BRIDGE INSPECTION REPORT

TOWN _____ BR. NO. _____
STR. OVER/UNDER _____ CL. RD. _____ T.H. _____
DATE INSPECTED _____ INSP. BY _____

APPROACHES:

RAILS: _____
ALIGNMENTS: _____
SETTLEMENT - ABUT. 1 END: _____
SETTLEMENT - ABUT. 2 END: _____
EMBANKMENTS: _____
REMARKS: _____

DECK:

RUNNERS: _____
SURFACE: _____
CURBS: _____
DRAIN OPENINGS: _____
GUIDE RAILS: _____
JOINTS: _____
SIDEWALKS: _____
PARAPETS: _____
WINDSLOTS: _____
FASCIA: _____
SCUPPERS: _____
UNDERSIDE: _____
VIBRATION: _____
REMARKS: _____

SUPERSTRUCTURE:

STRINGERS: _____
BEARINGS: _____
COVER PLATES: _____
DIAPHRAGMS: _____
T-BEAMS _____
FLOOR BEAMS _____
PLATE GIRDERS _____
SIDE GIRDERS _____
TRUSS _____

MEMBER ALIGNMENT _____
CAMBER _____
PAINT _____
RUST _____
REMARKS _____

SUBSTRUCTURE:

ABUTMENTS: _____
WINGS: _____
CONC. CAPS: _____
BACKWALLS: _____
UNDERMINING: _____
SPALLING: _____
SETTLEMENT: _____
PILES: _____
PIER(S): _____
FOOTING: _____
ON LEDGE: ABUT. 1 _____ ABUT. 2 _____ PIER(S) _____
REMARKS: _____

CHANNEL:

SCOUR: _____
EMBANKMENTS: _____
HYDRAULIC ADEQUACY: _____
GRAVEL BARS: _____
DEBRIS: _____
RIPRAP: _____
REMARKS: _____

PIPES:

DEBRIS: _____
BARREL: _____
CAMBER: _____
FOOTING/ABUTMENTS: _____
COVER: _____
WINGS: _____
HEADWALLS: _____
GUIDERAILS: _____
REMARKS: _____

LADDER INSPECTION: _____
BOAT INSPECTION: _____
SERVI-LIFT INSP: _____

DIVER INSP: _____
WADERS INSP: _____

POSTING SIGNS:

LOAD: _____
CLEARANCE: _____
OTHER: _____

OVERALL COMMENTS: _____

VERMONT CULVERT INSPECTION REPORT

ROUTE: _____
 BRIDGE: _____
 TOWN: _____
 DISTRICT: _____

CULVERT TYPE: _____
 FEATURE CROSSED: _____
 INSPECTOR: _____
 INSPECTION DATE: _____

ITEM 61 - RATING OF CHANNEL

RATING

1. Channel Scour:	
2. Embankment Erosion:	
3. Drift/Vegetation:	
4. Alignment:	
5. Riprap:	
6. Waterway Opening:	
GENERAL RATING:	

ITEM 62 - CULVERT - RATING OF BARREL

RATING

1. Barrel:	
2. Shape:	
3. Settlement:	
4. Adequacy of Cover:	
5. Bolt Line Cracking:	
GENERAL RATING:	

PONTIS (ROUTE 3) - RATING OF WINGS, WALL, APRON

RATING

1. Wings:	
2. Headwalls:	
3. Aprons:	
GENERAL RATING:	

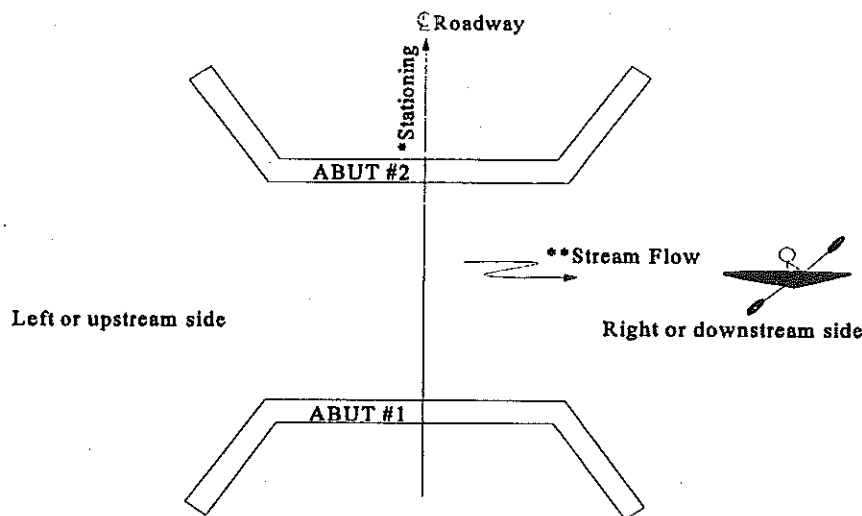
ITEM 72 - APPROACH ALIGNMENT

RATING

1. Alignment:	
2. Shoulders:	
3. Embankment:	
4. Pavement:	
5. Guardrail:	
GENERAL RATING:	

COMMENTS AND/OR SKETCHES:

ABUTMENT AND BEAM NUMBERING



- * Interstate, US, and Vermont routes have abutments and piers number relative to route log stationing. On the interstate, the north/south or east/west structures are numbered identically. (i.e. Bridges 9 N + S on I-91 have abutment No. 1 at their southern ends.
- ** FAS, FAU, and Town Highway bridges have abutments numbered in relationship to the stream flow. When looking downstream through bridge opening, abutment #1 is on the right side of channel and abutment #2 is on the left side. If there is no stream, the abutments numbering should be described in the report, or east/west, north/south labels should be used.

Beam numbering: Individual beams or stringers shall be numbered left to right, looking in direction of station (i.e. on town system, upstream beam is beam #1).

Standard inspection photos: During each routine inspection, 5 standard photographs are to be taken on bridges. Two will be from the approaches, one behind each abutment looking across the bridge (It is important to include posting signs where possible). Two will be along the channel, one from each direction looking through the bridge opening. The 5th photo will be from below looking up at the superstructure and underside of deck.

On newer bridges, it may be decided to take pictures every other routine inspection. However, even in these cases, at least two photos shall be taken. One should be from the approach showing bridge rail, approach rail, and any signs. The other should be along the channel.

On culverts (shorts) only one approach photo is needed, taken in the direction of stationing. An inlet and outlet picture are needed as well.

Additional photos may be warranted at problem areas on either type of structure.

BRIDGE INSPECTOR'S PROCEDURE
FOR IMMEDIATE CLOSURE OF BRIDGE

If a bridge is found in very critical condition and must be closed immediately, the inspector should:

1. Block off the bridge with inspection vehicle and traffic cones. Use orange flags to stop traffic and explain situation to motorists.
2. Call "Capitol" on inspection vehicle radio. Talk with Ray Burke (Capitol) and have him call the appropriate District and ask for help at the bridge site. Also ask Ray to call Warren Tripp, Dave Lathrop, or Don Perkins in the Structures Division.
3. Ask Ray (Capitol) to have the District call the town (if a Town-owned structure) and have them come to the site.
4. The inspectors will explain why they feel the bridge must be closed by showing the Town or District representative(s) the area(s) of concern. As soon as this is done, and the Town or District takes over the blockade and/or the detour is set up, the inspectors can then go on to their next inspection assignment.

FIELD DATA FOR LOAD RATING CAPACITY

1. Span length c-c bearing
2. Horizontal clearance
3. Out to out of deck
4. Deck thickness and material
5. Beam dimensions and spacings
6. Description of lateral bracing for beams
7. Number of beams
8. Grade of structural steel if applicable
9. Wearing surface description and thickness
10. If runner planks present, thickness and layout
11. Composite? Haunches?
12. Draw a typical section of bridge
13. Document section loss of structural elements
14. Distance between top and bottom chords on trusses

DYE PENETRANT EXAMINATION PROCEDURE**BACKGROUND**

Occasionally bridge inspectors have the need to perform crack inspection on metal bridge members beyond what can be determined by simple visual inspection of painted or corroded metal surfaces. Dye penetrant inspection is an additional inspection method which can be performed by bridge inspectors to more accurately determine the existence of cracks on metal member surfaces.

This appendix explains the proper procedure to be followed in performing Dye Penetrant Tests.

DYE PENETRANT EXAMINATION PROCEDURE**Surface Preparation:**

1. Remove all paint, rust, dirt, etc. from the area to be tested, plus 3"± beyond in all directions. This may be accomplished by using small power tools equipped with wire brush, grinding bits, sanding discs, and/or hand tools (paint scraper and wire brush).
2. After surface preparation, the area to be tested shall be visually inspected. Fillet and butt weld profiles shall have a smooth contour and transition with the base metal. If any locally unacceptable weld profiles exist that will interfere with the evaluation of the dye penetrant test results, the localized area should be ground to provide a smooth contour or transition for testing.

Cleaning:

1. After surface preparation, the area shall be cleaned with solvent cleaner. It may be either sprayed on and dried with lint-free rags, or cleaned with lint-free rags sprayed with solvent cleaner.
2. After cleaning, the area shall be allowed to air dry prior to the application of the penetrant.

Application:

1. The penetrant shall be sprayed on the examination area. Excessive penetrant may be removed from outside the examination area.
2. The penetrant shall remain on the area for approximately five (5) to fifteen (15) minutes (dwell time).

Removal:

1. After the dwell time, the penetrant shall be removed by spraying the solvent cleaner on lint-free rags and wiping the area. This should be continued until all penetrant has been removed. This has been accomplished when the area is wiped with a clean solvent rag and the rag remains clean.
2. After the removal, the area shall be allowed to air dry prior to the application of developer.

Application:

1. Shake the can of developer as described on the can and spray the area with a thin, even coat of developer.

Note: It is recommended that the spraying start and stop outside the examination area.

2. The maximum dwell time for the developer is five (5) to fifteen (15) minutes.

Inspection:

1. The area shall be monitored for a maximum of seven (7) minutes after application of developer. If no indications appear, the area is acceptable.
2. All indications shall be cleaned and visually inspected. Cracks or lack of fusion will appear as linear indications. Porosity will appear as spherical indications or large bleeds.
3. At minimum, documentation shall consist of locating the crack in a sketch, dimensioning its apparent size, and showing orientation relative to the primary stress in the member. Also, all indications shall be photographed both with the developer on and again after cleaning.
4. Touch-up painting of the affected area is recommended after the test is complete.

Equipment Required:

Power Source	High Speed Die Grinder or Disc Grinder
Paint Scraper	Wire Brushes
Flashlight	Magnifying Glass
Face Shield	Gloves
Camera	Lint-free Rags
Power Sander	Penetrant Kit (Solvent Cleaner, Penetrant, and Developer)
Sanding Discs	Assorted Bits for Grinder (Wire Brush, Circular and Triangular Cutter, etc.)
Touch Up Paint	

INSPECTION VEHICLES

Inspection vehicles are provided by Central Garage, phone # 828-2564, Barre Montpelier Rd., Berlin, VT. During the inspection season when these vehicles are used, the following forms are required to be filled out and returned on a weekly basis to Central Garage.

1. STARS Garage Rental Report
2. Daily and Weekly Equipment Operator

All service, maintenance, repairs, etc. on vehicle are also recorded in the Green Book which is kept with the vehicle.

A sticker on the windshield of the vehicle will record the mileage when an oil change/service is due. It is the responsibility of the operator to schedule the required maintenance with Central Garage Personnel.

Each vehicle is equipped with a 2-way radio. The operator can talk with other state vehicles, district offices, and Ray Burke at the Central Garage.

When a state-owned vehicle used for bridge inspection is kept at the home residence of the Inspector or the Assistant Inspector, written permission from the Director of Administration must be obtained, as follows:

TO: Don Perkins, Chief Bridge Inspector via Warren Tripp and Dave Lathrop

FROM: William H. Conway, Director of Administration

DATE: April 6, 1994

SUBJECT: Garaging of State Vehicles

In accordance with the Vermont Agency of Transportation Policy and Procedures Manual, I authorize the garaging of State owned vehicles used for Bridge Inspection at the residence of the Inspector or the Assistant Inspector as follows:

T-020	Richard Tetreault or Matt Joy
T-021	Richard Knowlton or Doane Freedom
T-022	Arlan Elwood or Jeff Clark

It is understood that this garaging at a home residence is to be done in those instances where such garaging is to the direct benefit of the State.

WHC:WBT:mr
cc: Dir. of Eng.
Files

VERMONT COUNTY TOWN CODES

Addison 001

0101 Addison
0102 Bridport
0103 Bristol
0104 Cornwall
0105 Ferrisburg
0106 Goshen
0107 Granville
0108 Hancock
0109 Leicester
0110 Lincoln
0111 Middlebury
0112 Monkton
0113 New Haven
0114 Orwell
0115 Panton
0116 Ripton
0117 Salisbury
0118 Shoreham
0119 Starksboro
0120 Vergennes
0121 Waltham
0122 Weybridge
0123 Whiting

Bennington 003

0201 Arlington
0202 Bennington
0203 Dorset
0204 Glastenbury
0205 Landgrove
0206 Manchester
0207 Peru
0208 Pownal
0209 Readsboro
0210 Rupert
0211 Sandgate
0212 Searsburg
0213 Shaftsbury
0214 Stamford
0215 Sunderland
0216 Winhall
0217 Woodford

Caledonia 005

0301 Barnet
0302 Burke
0303 Danville
0304 Groton
0305 Hardwick
0306 Kirby
0307 Lyndon
0308 Newark
0309 Peacham
0310 Ryegate
0311 St Johnsbury
0312 Sheffield
0313 Stannard
0314 Sutton
0315 Walden
0316 Waterford
0317 Wheelock

Chittenden 007

0401 Bolton
0402 Buel's Gore
0403 Burlington
0404 Charlotte
0405 Colchester
0406 Essex
0407 Hinesburg
0408 Huntington
0409 Jericho
0410 Milton
0411 Richmond
0412 St. George
0413 Shelburne
0414 S. Burlington
0415 Underhill
0416 Westford
0417 Williston
0418 Winooski

Essex 009

0501 Averill
0502 A very's
Gore
0503 Bloomfield
0504 Brighton
(Island Pond)
0505 Brunswick
0506 Canaan
0507 Concord
0508 East Haven
0509 Ferdinand
0510 Granby
0511 Guildhall
0512 Lemington
0513 Lewis
0514 Lunenburg
0515 Maidstone
0516 Norton
0517 Victory
0518 Warners
Grant
0519 Warren's
Gore

Franklin 011

0601 Bakersfield
0602 Berkshire
0603 Enosburg
0604 Fairfax
0605 Fairfield
0606 Fletcher
0607 Franklin
0608 Georgia
0609 Highgate
0610 Montgomery
0611 Richford
0612 St. Alban's
City
0613 St. Alban's
Town
0614 Sheldon
0615 Swanton

Grand Isle 013

0701 Alburg
0702 Grand Isle
0703 Isle LaMotte
0704 North Hero
0705 South Hero

Lamoille 015

0801 Belvidere
0802 Cambridge
0803 Eden
0804 Elmore
0805 Hyde Park
0806 Johnson
0807 Morristown
Morrisville
0808 Stowe
0809 Waterv
0810 Wolcott

Orange 017

0901 Bradford
0902 Braintree
0903 Brookfield
0904 Chelsea
0905 Corinth
0906 Fairlee
0907 Newbury
0908 Orange
0909 Randolph
0910 Strafford
0911 Thetford
0912 Topsham
0913 Tunbridge
0914 Vershire
0915 Washington
0916 West Fairlee
0917 Williamstown

Orleans 019	1125 Wallingford	1320 Westminster
1001 Albany	1126 Wells	1321 Whitingham
1002 Barton	1127 West Haven	1322 Wilmington
(Orleans Village)	1128 West Rutland	1323 Windham
1003 Brownington	Washington 023	Windsor 025 027
1004 Charleston	1201 Barre City	1401 Andover
1005 Coventry	1202 Barre Town	1402 Baltimore
1006 Craftsbury	1203 Berlin	1403 Barnard
1007 Derby	1204 Cabot	1404 Bethel
1008 Glover	1205 Calais	1405 Bridgewater
1009 Greensboro	1206 Duxbury	1406 Cavendish
1010 Holland	1207 E. Montpelier	1407 Chester
1011 Irasburg	1208 Fayston	1408 Hartford
1012 Jay	1209 Marshfield	(White River Junction)
1013 Lowell	1210 Middlesex	1409 Hartland
1014 Morgan	1211 Montpelier	1410 Ludlow
1015 Newport City	1212 Moretown	1411 Norwich
1016 Newport Town	1213 Northfield	1412 Plymouth
1017 Troy	1214 Plainfield	1413 Pomfret
1018 Westfield	1215 Roxbury	1414 Reading
1019 Westmore	1216 Waitsfield	1415 Rochester
Rutland 021 021	1217 Warren	1416 Royalton
1101 Benson	1218 Waterbury	1417 Sharon
1102 Brandon	1219 Woodbury	1418 Springfield
1103 Castleton	1220 Worcester	1419 Stockbridge
1104 Chittenden	Windham 025 025	1420 Weathersfield
1105 Clarendon	1301 Athens	1421 Weston
1106 Danby	1302 Brattleboro	1422 West Windsor
1107 Fair Haven	1303 Brookline	1423 Windsor
1108 Hubbardton	1304 Dover	1424 Woodstock
1109 Ira	1305 Dummerston	
1110 Mendon	1306 Grafton	
1111 Middletown	1307 Guilford	
Springs	1308 Halifax	
1112 Mount Holly	1309 Jamaica	
1113 Mount Tabor	1310 Londonderry	
1114 Pawlet	1311 Marlboro	
1115 Pittsfield	1312 Newfane	
1116 Pittsford	1313 Putney	
1117 Poultney	1314 Rockingham	
1118 Proctor	Saxton's River	
1119 Rutland City	Bellow's Falls	
1120 Rutland Town	1315 Somerset	
1121 Sherburne	1316 Stratton	
1122 Shrewsbury	1317 Townshend	
1123 Sudbury	1318 Vernon	
1124 Tinmouth	1319 Wardsboro	

ALPHABETIC LIST OF MCD NAMES

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	001	005	0010	Addison town	00325	03				
50	049	005	0020	Albany town	00475	03				
50	019	005	0030	Albany village	00400	01				
50	013	005	0040	Alburg town	00700	04				
50	013	005	0050	Alburg village	00625	02				
50	027	005	0060	Andover town	01300	02				
50	003	005	0080	Arlington town	01450	06				
50	003	005	0069	Arlington (CDP)	01375	04				
50	025	005	0090	Athens town	01900	02				
50	009	005	0093	Averill town	02050	01				
50	009	010	0097	Avery's gore	02162	01				
50	011	010	0100	Bakersfield town	02500	03				
50	027	011	0110	Baltimore town	02575	01				
50	027	015	0120	Barnard town	02725	03				
50	005	005	0130	Barnet town	02875	04				
50		005	0140	Barre city	03175	08				B
50		010	0150	Barre town	03250	08				
50	023	010	1010	Graniteville-E. Barre (CDP)	29425	06				
50	023	010	2418	South Barre (CDP)	66025	04				
50	019	010	0160	Barton town	03550	07				
50	019	010	0170	Barton village	03475	04				
50	019	010	1850	Orleans village	53575	03				
50	015	005	0190	Belvidere town	04375	02				
50	003	010	0200	Bennington town	04825	09				

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	003	010	0198	Bennington (CDP)	04750	08				
50	003	010	1750	N. Bennington Village	49075	05				
50	003	010	1830	Old Bennington Village	53125	02				
50	021	005	0220	Benson town	05200	03				
50	011	015	0230	Berkshire town	05425	04				
50	023	015	0240	Berlin town	05650	06				
50	027	020	0260	Bethel town	05800	05				
50	027	020	0258	Bethel (CDP)	05725	04				
50	009	015	0270	Bloomfield town	06325	01				
50	007	005	0280	Bolton town	06550	03			T	
50	017	005	0290	Bradford town	07375	06				
0	017	005	0300	Bradford village	07225	03				
50	017	010	0310	Braintree town	07600	04				
50	021	010	0330	Brandon town	07750	07				
50	021	010	0319	Brandon (CDP)	07675	05				
50	025	010	0350	Brattleboro town	07900	09				
50	025	010	0338	Brattleboro (CDP)	07975	08				
50	025	010	2875	West Brattleboro (CDP)	78850	07				
50	027	025	0360	Bridgewater town	08275	03				
50	001	010	0370	Bridport town	08575	03				
50	009	020	1230	Island Pond (CDP)	35725	04				
50	009	020	0380	Brighton town	08725	05				
50	001	015	0390	Bristol town	09025	07				
50	001	015	0400	Bristol Village	08950	05				
50	017	015	0410	Brookfield town	09325	03				
50	025	015	0420	Brookline town	09475	02				

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Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	019	015	0430	Brownington town	09850	03				
50	009	025	0440	Brunswick town	10075	01				
50	007	010	0445	Buels gore	10300	01			T	
50	005	010	0450	Burke town	10450	04				
50	005	010	2880	West Burke village	79150	02				
50	007	015	0460	Burlington City	10675	11	1305	1305	T	B
50	023	020	0470	Cabot town	11125	03				
50	023	020	0480	Cabot village	11050	02				
50	023	025	0490	Calais town	11350	04				
50	015	010	0500	Cambridge town	11500	06				
50	015	010	0510	Cambridge village	11425	02				
50	0015	0010	1280	Jeffersonville village	36475	02				
50	009	030	0520	Canaan town	11800	04				
50	021	015	0530	Castleton town	11950	07				
50	027	030	0540	Cavendish town	12250	04				
50	027	030	2020	Proctorsville village	57400	02				
50	019	020	0550	Charleston town	13150	03				
50	007	020	0560	Charlotte town	13300	07	1305		T	
50	017	020	0570	Chelsea town	13525	04				
50	027	035	0590	Chester town	13675	07				
50	027	035	0592	Chester-Chester Depot (CDP)	13600	04				
50	021	020	0600	Chittenden town	14350	03				
50	021	025	0610	Clarendon town	14500	06				
50	007	025	0620	Colchester town	14875	09	1305	Part	T	P
50	009	035	0630	Concord town	15250	04				
50	017	025	0650	Corinth town	15700	03				

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	001	020	0660	Cornwall town	16000	03				
50	019	025	0670	Coventry town	16150	03				
50	019	030	0680	Craftsbury town	16300	03				
50	021	030	0690	Danby town	16825	03				
50	005	015	0700	Danville town	17125	05				
50	019	035	0730	Derby town	17350	07				
50	019	035	0710	Derby Center village	17425	03				
50	019	035	0720	Derby Line village	17500	03				
50	003	015	0470	Dorset town	17725	05				
50	025	020	0750	Dover town	17875	03				
50	025	025	0760	Dummerston town	18325	05				
50	023	030	0770	Duxbury town	18550	03				
50	009	040	0780	East Haven town	21250	02				
50	023	035	0790	East Montpelier town	21925	06				
50	015	015	0800	Eden town	23500	03				
50	015	020	0810	Elmore town	23725	02				
50	011	020	0830	Enosburg town	23875	06				
50	011	020	0820	Enosburg Falls village	24025	04				
50	007	030	0850	Essex town	24175	09	1305	Part	T	P
50	007	030	0840	Essex Junction village	24400	08	1305	1305	T	B
50	011	025	0860	Fairfax town	24925	05				
50	011	030	0870	Fairfield town	25225	04				
50	021	035	0880	Fair Haven town	25375	07				
50	021	035	0877	Fair Haven (CDP)	25450	06				
50	017	030	0890	Fairlee town	25675	03				
50	023	040	0900	Fayston town	25825	03				

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A-41

Geographic Codes				Name	Descriptive Code					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	009	045	0905	Ferdinand town	25975	01				
50	001	025	0910	Ferrisburg town	26275	06				
50	011	035	0920	Fletcher town	26500	03				
50	011	040	0930	Franklin town	27100	04				
50	011	045	0940	Georgia town	27700	07	1305			
50	003	018	0945	Glastenbury town	27962	01				
50	019	040	0950	Glover town	28075	03				
50	001	030	0970	Goshen town	28600	01				
50	025	030	0980	Grafton town	28900	03				
50	009	050	0990	Granby town	29125	01				
50	013	010	1000	Grand Isle town	29275	04				
50	001	035	1020	Granville town	29575	02				
50	019	045	1030	Greensboro town	30175	03				
50	005	020	1040	Groton town	30550	03				
50	009	055	1060	Guildhall town	30775	02				
50	025	035	1070	Guilford town	30925	05				
50	025	040	1080	Halifax town	31150	02				
50	001	040	1090	Hancock town	31525	02				
50	005	025	1100	Hardwick town	31825	07				
50	005	025	1110	Hardwick village	31750	04				
50	027	040	1120	Hartford town	32275	08				B
50	027	040	3030	White River Junction (CDP)	83575	07				B
50	027	040	3060	Wilder (CDP)	84025	04				B
50	027	045	1130	Hartland town	32425	06				
50	011	050	1140	Highgate town	33025	06				
50	007	035	1150	Hinesburg town	33475	07	1305		T	

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A-42

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	019	050	1160	Holland town	33775	02				
50	021	040	1170	Hubbardton town	34450	02			T	
50	007	040	1180	Huntington town	34600	04				
50	015	025	1190	Hyde Park town	35050	06				
50	015	025	1200	Hyde Park village	34975	02				
50	021	045	1203	Ira town	35425	02				
50	019	055	1205	Irasburg town	35575	03				
50	013	015	1240	Isle La Motte Town	35875	02				
50	025	045	1260	Jamaica town	36175	03				
50	019	060	1270	Jay town	36325	02				
50	007	045	1290	Jericho town	36700	07	1305		T	
50	007	045	1295	Jericho village	36625	04	1305		T	
50	015	030	1300	Johnson town	37075	07				
50	015	030	1310	Johnson village	37000	04				
50	005	030	1320	Kirby town	37900	02				
50	003	020	1330	Landgrove town	39025	01				
50	001	045	1340	Leicester town	39325	03				
50	009	060	1350	Lemington town	39700	01				
50	009	065	1355	Lewis town	39775	01				
50	001	050	1360	Lincoln town	40075	03				
50	025	050	1370	Londonderry town	40225	05				
50	019	065	1380	Lowell town	40525	03				
50	027	050	1390	Ludlow town	41275	06				
50	027	050	1400	Ludlow village	41200	04				
50	009	070	1410	Lunenburg town	41425	04				
50	005	035	1430	Lyndon town	41725	07				

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A-43

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	003	025	1480	Manchester town	42850	07				
50	003	025	1485	Manchester village	42700	03				
50	003	025	1486	Manchester Ctr. (DCP)	42925	05				
50	025	055	1490	Marlboro town	43375	03				
50	023	045	1500	Marshfield town	43600	04				
50	023	045	1510	Marshfield village	43525	02				
50	023	045	1960	Plainfield village	55750	03				
50	021	050	1520	Mendon town	44125	04				
50	001	055	1530	Middlebury town	44350	08				
50	001	055	1528	Middlebury (CDP)	44275	08				
50	023	050	1550	Middlesex town	44500	04				
50	021	055	1560	Middletown Springs town	44800	03				
50	007	050	1570	Milton town	45250	08	1305		T	
50	007	050	1580	Milton village	45175	04	1305		T	
50	001	060	1590	Monkton town	45550	04				
50	011	055	1600	Montgomery town	45850	03				
50	023	055	1610	Montpelier city	46000	08				
50	023	060	1620	Moretown town	46225	04				
50	019	070	1630	Morgan town	46450	02				
50	015	035	1640	Morristown town	46675	07				
50	015	035	1650	Morrisville village	46825	06				
50	021	060	1660	Mount Holly town	47200	03				
50	021	065	1670	Mount Tabor town	47425	02				
50	005	040	1680	Newark town	47725	02				
50	017	035	1690	Newbury town	48175	05				

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Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	017	035	1695	Newbury village	48100	02				
50	017	035	2840	Wells River village	78025	02				
50	025	060	1700	Newfane town	48400	04				
50	025	060	1705	Newfane village	48325	01				
50	001	065	1710	New Haven town	48700	04				
50	019	075	1730	Newport city	48850	07				
50	019	080	1740	Newport town	48925	04				
50	023	065	1760	Northfield town	50275	08				
50	023	065	1770	Northfield village	50200	06				
50	013	020	1780	North Hero town	50650	02				
50	009	080	1810	Norton town	52750	01				
50	027	055	1820	Norwich town	52900	06				
50	017	040	1840	Orange town	53425	03				
50	001	070	1860	Orwell town	53725	03				
50	001	075	1870	Panton town	53950	03				
50	021	070	1880	Pawlet town	54250	04				
50	005	045	1890	Peacham town	54400	03				
50	003	030	1910	Peru town	55000	02				
50	021	075	1920	Pittsfield town	55450	02				
50	021	080	1930	Pittsford town	55600	07				
50	021	080	1940	Pittsford village	55525	03				
50	023	070	1950	Plainfield town	55825	04				
50	023	070	1960	Plainfield village	55750	03				
50	027	060	1970	Plymouth town	56050	02				
50	027	065	1980	Pomfret town	56350	03				
50	021	085	1990	Poultney town	56875	07				

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A-45

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	021	085	2000	Poultney village	56800	05				
50	003	035	2010	Pownal town	57025	07				
50	021	090	2030	Proctor town	57250	05				
50	025	065	2050	Putney town	57700	05				
50	017	045	2060	Randolph town	58075	07				
50	017	045	2070	Randolph village	58000	06				
50	027	070	2080	Reading town	58375	03				
50	003	040	2090	Readsboro town	58600	03				
50	003	040	2100	Readsboro village	58525	02				
50	011	060	2110	Richford town	59125	06				
50	011	060	2120	Richford village	59050	04				
50	007	055	2130	Richmond town	59275	07	1305		T	
50	007	055	2140	Richmond village	59200	03	1305		T	
50	001	080	2150	Ripton town	59650	02				
50	027	075	2160	Rochester town	60100	04				
50	025	070	2170	Rockingham town	60250	08				
50	025	070	0180	Bellows Falls village	04225	07				
50	025	070	2310	Saxtons River village	62950	03				
50	023	075	2180	Roxbury town	60625	02				
50	027	080	2190	Royalton town	60850	06				
50	003	045	2200	Rupert town	61000	03				
50	021	095	2210	Rutland city	61225	09				B
50	021	100	2220	Rutland town	61300	07				
50	005	050	2230	Ryegate town	61525	04				
50	011	065	2240	St. Albans city	61675	08				
50	011	070	2250	St. Albans town	61750	07				

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A-46

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	007	060	2260	St. George town	62050	03	1305		T	
50	005	055	2270	St. Johnsbury town	62200	08				
50	005	055	2268	St. Johnsbury (CDP)	62125	08				
50	001	085	2290	Salisbury town	62575	03				
50	003	050	2300	Sandgate town	62875	02				
50	003	055	2320	Searsburg town	63175	01				
50	003	060	2330	Shaftsbury town	63550	07				
50	027	085	2340	Sharon town	63775	03				
50	005	060	2350	Sheffield town	64075	02				
50	007	065	2370	Shelburne town	64300	08	1305	Part	T	P
50	011	075	2380	Sheldon town	64600	05				
50	021	105	2390	Sherburne town	64825	03				
50	001	090	2400	Shoreham town	65050	03				
50	021	110	2410	Shrewsbury town	65275	03				
50	025	073	2415	Somerset town	65762	01				
50	007	070	2420	South Burlington City	66175	09	1305	1305	T	B
50	013	025	2430	South Hero town	67000	04	1305			
50	027	090	2450	Springfield town	69550	09				
50	027	090	2440	Springfield (CDP)	69475	08				
50	003	065	2460	Stamford town	69775	03				
50	005	065	2470	Stannard town	69925	01				
50	001	095	2490	Starksboro town	70075	04				
50	027	095	2490	Stockbridge town	70375	03				
50	015	040	2500	Stowe town	70525	07				
50	015	040	2510	Stowe village	70450	03				
50	017	050	2520	Strafford town	70675	03				

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A-47

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	025	075	2530	Stratton town	70750	01				
50	021	115	2540	Sudbury town	71050	02				
50	003	070	2550	Sunderland town	71425	03				
50	003	070	0069	Arlington (CDP)	01375	04				
50	005	070	2560	Sutton town	71575	03				
50	011	080	2570	Swanton town	71725	08				
50	011	080	2580	Swanton village	71650	07				
50	017	055	2590	Thetford town	72400	06				
50	021	120	2600	Tinmouth town	72925	02				
50	017	060	2610	Topsham town	73075	03				
50	025	080	2620	Townshend town	73300	03				
50	019	085	2640	Troy town	73525	04				
50	019	085	1790	North Troy village	52075	03				
50	017	065	2650	Tunbridge town	73675	03				
50	007	075	2660	Underhill town	73975	06			T	
50	001	100	2670	Vergennes City	74650	06				
50	025	085	2680	Vernon town	74800	04				
50	017	070	2690	Vershire town	74950	02				
50	009	085	2700	Victory town	75175	01				
50	023	080	2710	Waitsfield town	75325	04				
50	005	075	2720	Walden town	75700	03				
50	021	125	2740	Wallingford town	75925	05				
50	021	125	2738	Wallingford (CDP)	75850	04				
50	001	105	2750	Waltham town	76075	02				
50	025	090	2760	Wardsboro town	76225	03				
50	009	090	2765	Warner's grant	76337	01				

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Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	023	085	2770	Warren town	76525	03				
50	009	095	2775	Warren's gore	76562	01				
50	017	075	2780	Washington town	76750	03				
50	023	090	2790	Waterbury town	76975	07				
50	023	090	2800	Waterbury village	76900	05				
50	005	080	2810	Waterford town	77125	03				
50	015	045	2820	Waterville town	77425	02				
50	027	100	2830	Weathersfield town	77500	07				
50	027	100	1900	Perkinsville village	54850	01				
50	021	130	2850	Wells town	77950	03				
50	017	080	2890	West Fairlee town	79975	02				
0	019	090	2900	Westfield town	80200	02				
50	007	080	2910	Westford town	80350	04			T	
50	021	135	2930	West Haven town	80875	02				
50	025	095	2940	Westminster town	81400	06				
50	025	095	1800	N. Westminster village	52375	02				
50	025	095	2950	Westminster village	81325	02				
50	019	095	2960	Westmore town	81700	02				
50	027	105	2970	Weston town	82000	03				
50	021	140	2990	West Rutland town	82300	06				
50	021	140	2978	West Rutland (CDP)	82375	06				
50	027	110	3000	West Windsor town	83050	03				
50	001	110	3010	Weybridge town	83275	03				
50	005	085	3020	Wheelock town	83500	03				
50	001	115	3045	Whiting town	83800	02				
50	025	100	3050	Whitingham town	83950	04				

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A-49

Geographic Codes				Name	Descriptive Codes					
FIPS State	FIPS County	Census MCD	Census MCSQ		FIPS Place	Size	SMSA	Urbanized Area	Tracted	Blocked
50	025	100	1250	Jacksonville village	36025	02				
50	017	085	3070	Williamstown town	84175	06				
50	007	085	3090	Williston town	84475	07	1305	Part	T	P
50	025	105	3100	Wilmington town	84700	05				
50	025	110	3120	Windham town	84850	02				
50	027	115	3130	Windsor town	84925	07				
50	003	075	3150	Winhall town	85075	02				
50	007	090	3160	Winooski City	85150	08	1305	1305	T	B
50	015	050	3170	Wolcott town	85375	03				
50	023	095	3180	Woodbury town	85525	03				
50	003	080	3190	Woodford town	85675	02				
50	027	120	3200	Woodstock town	85975	07				
50	027	120	3210	Woodstock village	85900	04				
50	023	100	3220	Worcester town	86125	03				

AGENCY OF TRANSPORTATION

STRUCTURES DIVISION

TO: Don Perkins, Chief Bridge Inspector via Dave Lathrop, Engineering Section Supervisor

FROM: Warren B. Tripp, Structures Engineer

DATE: September 6, 1994

SUBJECT: Town Letters

We recently discussed the problems relative to suggesting to the towns that they should paint certain structures, because of the environmental hazard of such painting. I brought this before the Paint Committee and we agreed that this is a serious problem and that we must be careful that we do not mislead the towns. It is suggested that in your letter to the towns, whenever we are asking for any welding to be done, that you include the following statement.

“Any welding patches in the areas of existing paint must be done in full conformance with the EPA and OSHA regulations concerning lead paint removal.”

If it is recommended by the inspectors that the bridge should be painted, then the following sentence should be included:

“Painting is advisable, but must be done in full conformance with EPA and OSHA regulations and is therefore expensive.”

Feel free to modify these phrases or add to them if you so desire, but I believe as long as we call attention to the regulations, it is then appropriate to recommend painting and patching.

WBT:mrd
cc: files

ADT FOR TOWN HIGHWAY STRUCTURES

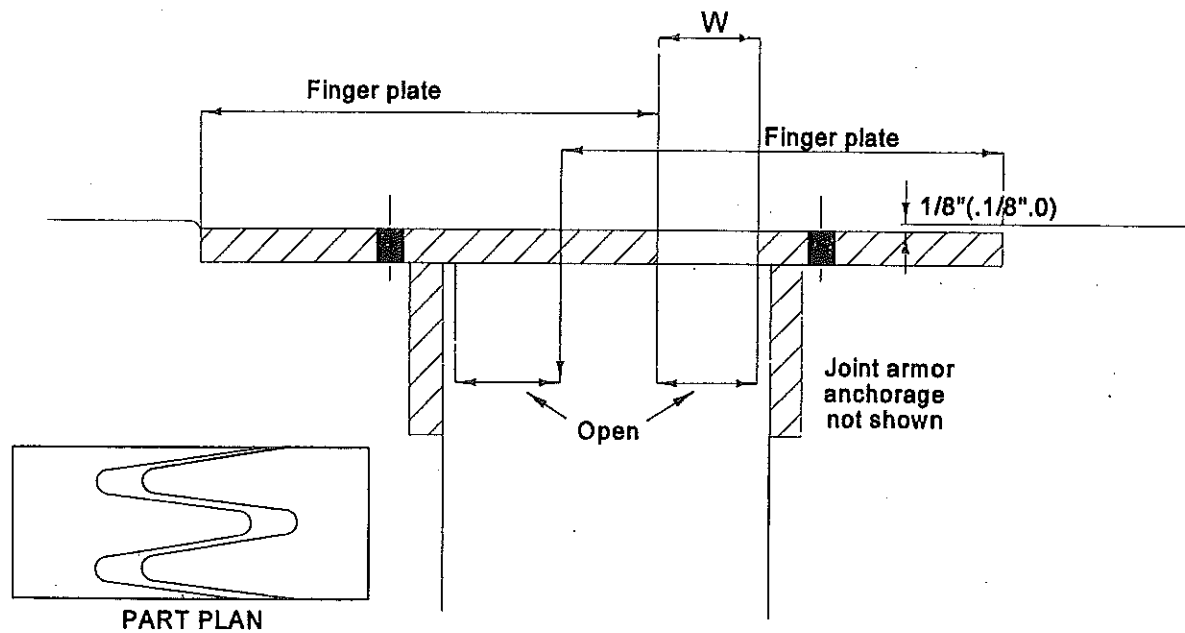
The average daily traffic for a town bridge should be reviewed, and upgraded if necessary, during annual or biennial inspections. If an inspector is unfamiliar with the area, they should drive a portion of the adjacent roadway(s) and note special cultural features such as golf courses, gravel pits, housing developments, industrial parks, ski areas, etc. Some of these features may be seasonal and appropriate adjustments should be made.

Other methods which can be used are as follows:

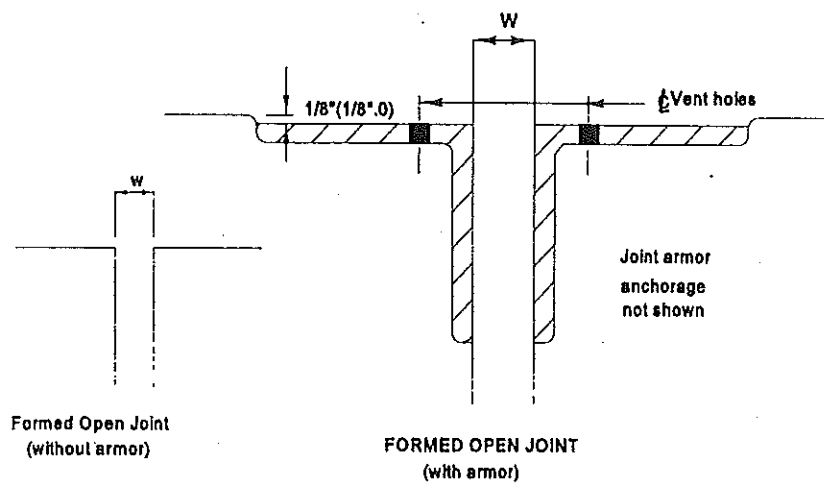
1. The figures can be taken from new bridge plans.
2. The rule of thumb is that one house generates ten (10) cars per day. This rule works especially well on dead end roads where simple mathematics can be used.
3. The inspector can do a running count of vehicles using the structure and calculate a weighted average (factoring in rush hour traffic morning and night) per hour. This figure can then be multiplied by the number of hours he feels the traffic will be sustained (usually 10 to 12 hours per day).

Note: Varying the month and time of day (hard to do) for each visit to the bridge site will also improve your weighted average determination. The best approximation of ADT for each structure is still one the best methods available to us and continued perseverance can only improve what should be considered an inexact science.

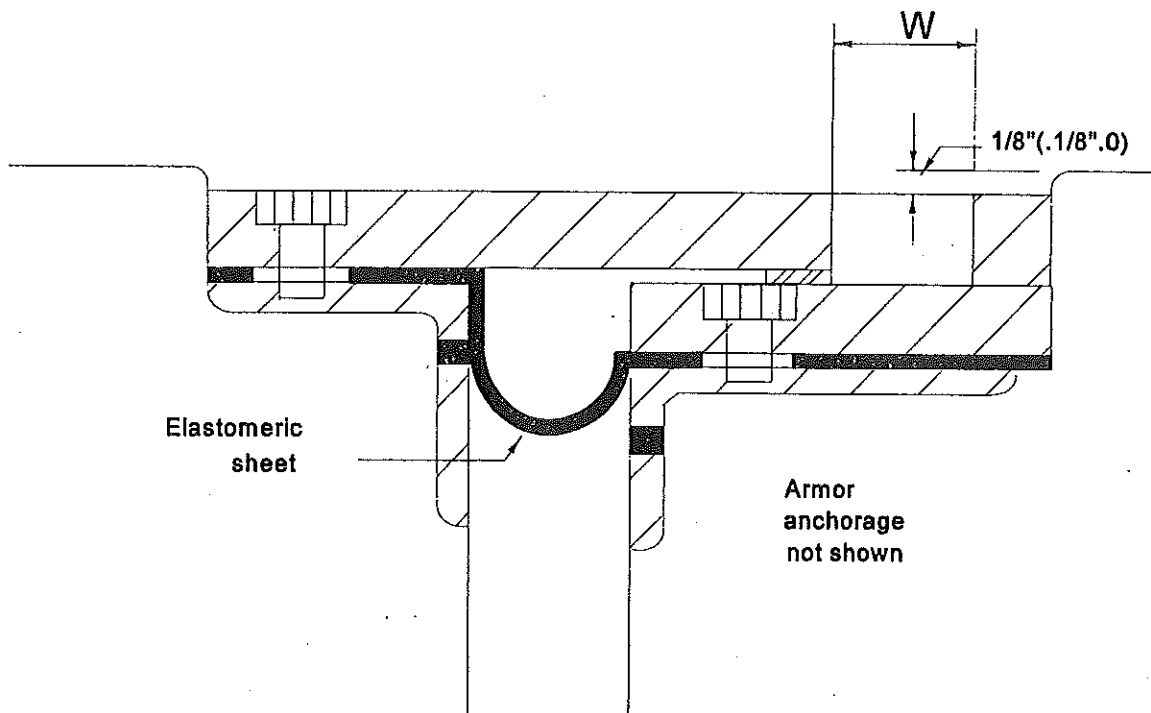
EXAMPLES FOR STATE ITEM NO. 223

**CANTILEVER FINGER PLATE JOINT**

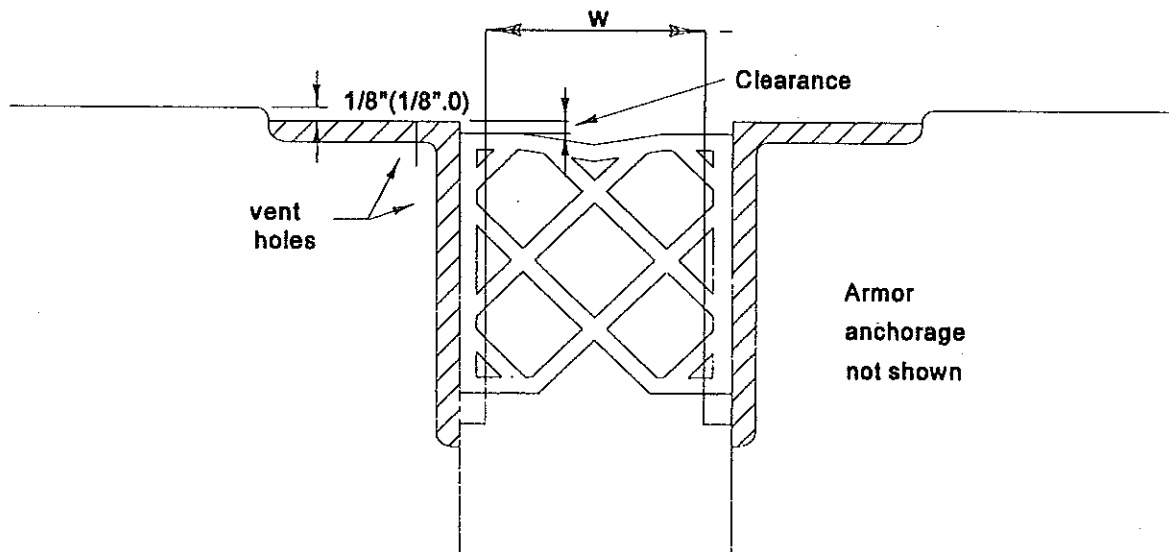
Code Item 223: 03 or 04

**Formed Open Joints**

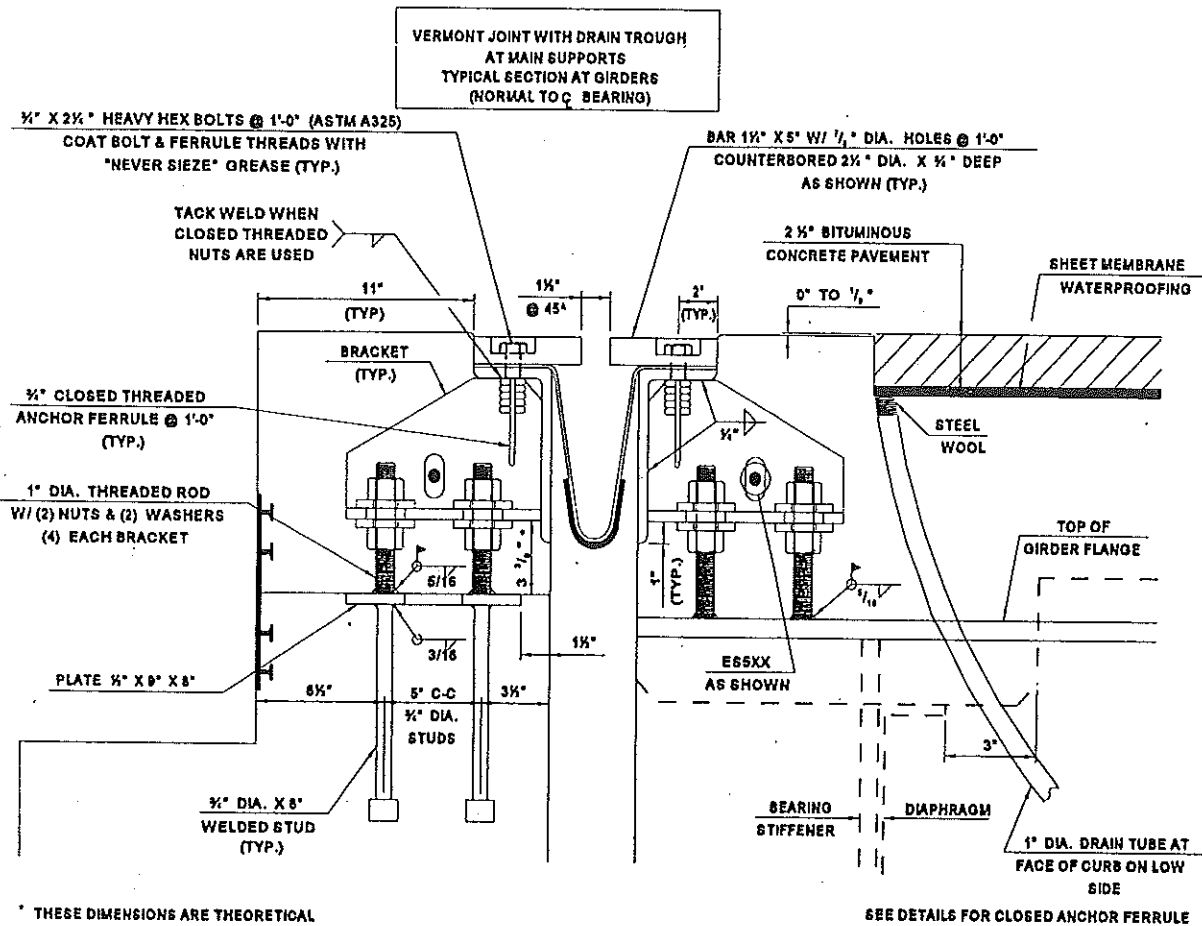
Code Item 223: 05 or 06

**SLIDING PLATE JOINT**

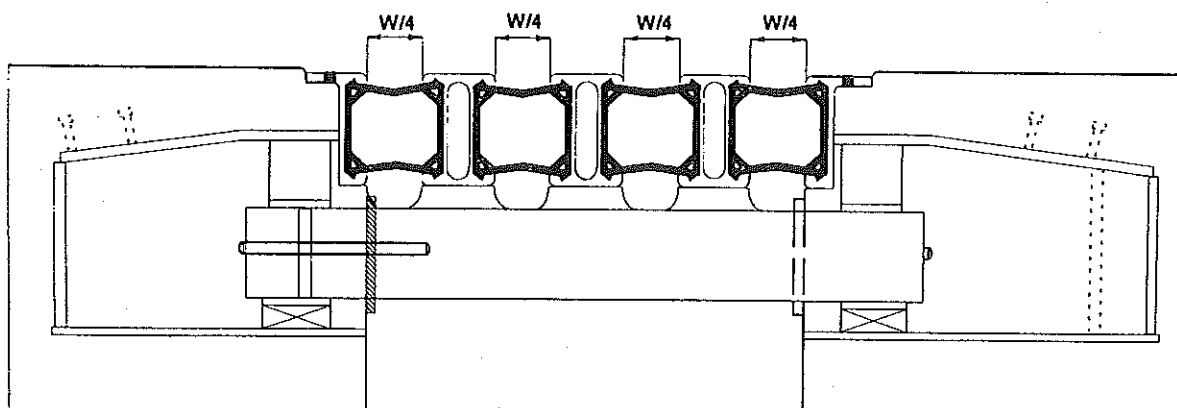
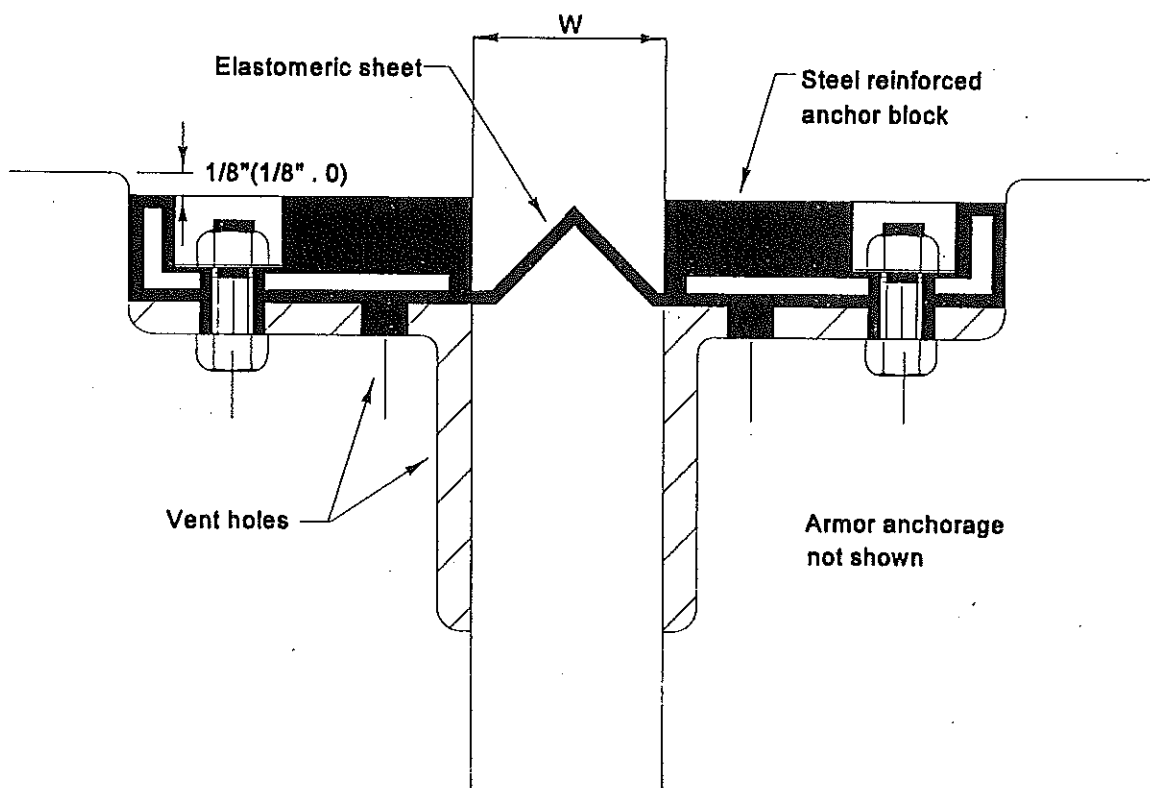
Code Item 223: 09 or 10

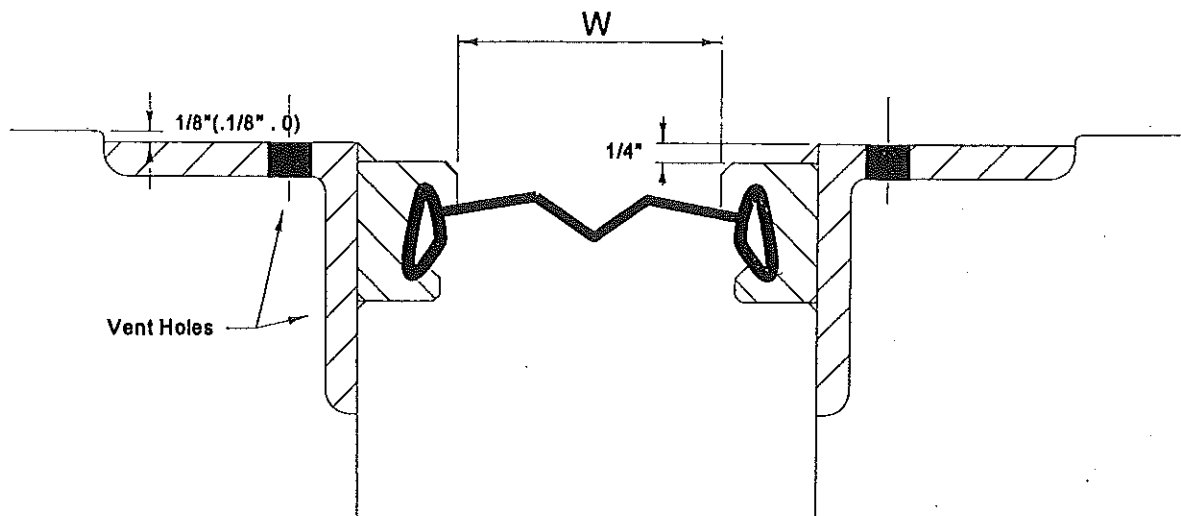
**ARMORED COMPRESSION SEAL**

Code Item 223: 11

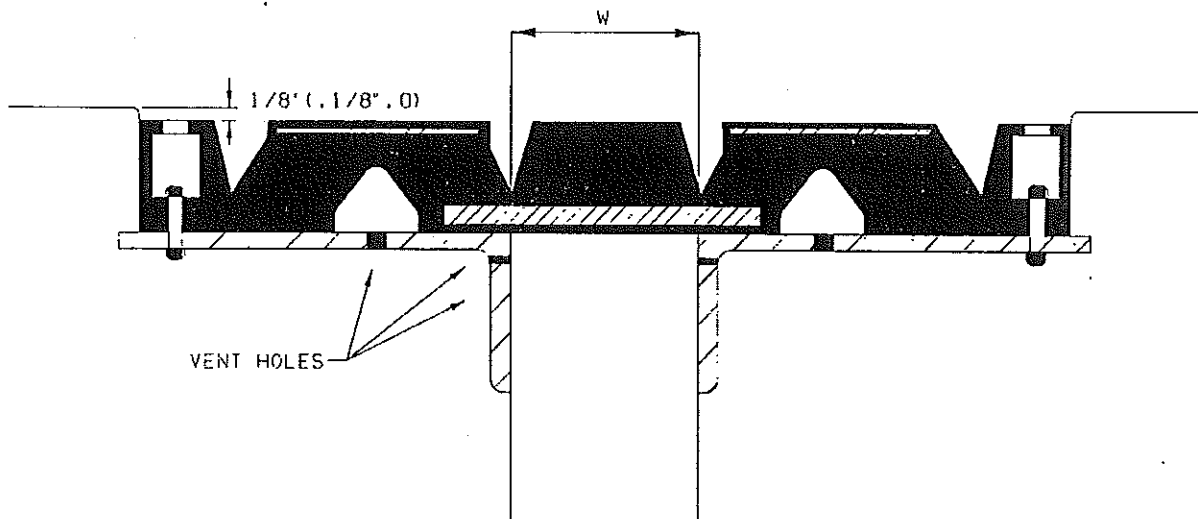


Code Item 223: 12

**Modular Elastomeric Seal (4 Seal)****Code Item 223: 13, 14, 15, or 16****Sheet seal****Code Item 223: 17**

**STRIP SEAL**

Code Item 223: 17

**PLANK (TIRE) SEAL**

Code Item 223: 18

CLASSIFICATION OF DEFICIENT BRIDGESGeneral Qualifications:

In order to be considered for either the structurally deficient or functionally obsolete classification, the first digit of Item 5 must be coded "1" and Item 49 must be coded numeric and >000020.

Structurally Deficient -

1. A condition rating of 4 or less for
Item 58 - Deck; or
Item 59 - Superstructures; or
Item 60 - Substructures; or
Item 62 - Culvert and Retaining Walls.
- or 2. An appraisal rating of 2 or less for
Item 67 - Structural Condition; or
Item 71 - Waterway Adequacy.

Functionally Obsolete -

1. An appraisal rating of 3 or less for
Item 68 - Deck Geometry; or
Item 69 - Underclearances; 3 or
Item 72 - Approach Roadway Alignment.
- or 2. An appraisal rating of 3 for
Item 67 - Structural Condition; or
Item 71 - Waterway Adequacy.

Any bridge classified as structurally deficient is excluded from the functionally obsolete category

1. Item 62 applies only if the last two digits of Item 43 are coded 07 or 19.
2. Item 71 applies only if the last digit of Item 42 is coded 0, 5, 6, 7, 8 or 9.
3. Item 69 applies only if the last digit of Item 42 is coded 0, 1, 2, 4, 6, 7 or 8.

OBSERVATION OF OVERWEIGHT VEHICLES

If during the performance of a routine bridge inspection, a bridge inspection team observes a vehicle or numerous vehicles using a bridge which appear to be in excess of a bridge's load limit, this fact shall be documented in writing in the inspection report. Likewise, if during an inspection, a local resident or concerned citizen states to a bridge inspection team that they believe vehicles in excess of a bridge's load limit use the bridge, this fact shall also be documented in the inspection report.

The above procedure shall be followed for inspections performed by both State employee bridge inspection teams and Contract Engineer bridge inspection teams. In the case of Contract Engineers, the Contract Engineer shall transmit a copy of each report documenting apparent load limit violations to the appropriate Regional Structures Engineer by a transmittal letter unique to this purpose. In the case of State employee inspection teams, reports including statements documenting apparent load limit violations shall be specifically highlighted to the Regional Structures Engineer by the inspection Team Leader when the report is turned in. On receipt of reports noting apparent posting limit violations, the Regional Structures Engineer shall quickly transmit a copy of the report to the party (ies) responsible for the bridge by a letter specially prepared to express concern over the situation. The letter shall make special reference to the portion of the attached inspection report explaining the field observations. The Regional structures Engineer shall also prepare a letter to the law enforcement agency that has jurisdiction over the bridge in question. The letter shall indicate the apparent violations and request enforcement.

A copy of all correspondence resulting from activities associated with this T. A. shall be sent to the Inspection Unit in the Structures Division and a copy shall be retained in the Regional BIN file.

Commentaries

1997 Commentary

C-1

INTRODUCTION

- Minor editorial changes and reference revisions have been made to bring the text up to date.

Definition of Terms

- Terms added or modified:
- Strategic Highway Corridor Network (STRAHNET)
- STRAHNET Connector
- Indian Reservation Road (IRR)
- Land Management Highway System (LMHS)
- Forest Highway (FH)
- Forest Service Development Road

Item 2 - Highway Agency District

- Name of item changed to reflect inclusion of federal bridges..
- Newport changed to Derby.

Item 5A - Record Type

- Clarification has been made for the case of 2 or more routes passing under a structure.
- Items 30, 109, and 204 have been added to the list of items required to be coded for "under" records..

Item 6 - Features Intersected

- Item coding requirements have been clarified for "under" records.
- References to defense highway and FHPM 6-10-2 have been eliminated.
- Critical facilities are now STRAHNET and STRAHNET Connectors.

Commentaries

1997 Commentary

C-2

Item 7 - Facility Carried by Structure

- Item coding requirements have been clarified for "under" records.
- Temporary use of this item for coding IRR has been changed to Item 105.

Item 8 - Structure Number

- Closed median has been described.
- Additional emphasis has been given to the need to have all 15 digits filled.

Item 11 - Kilometerpoint - (Was Milepoint- now Item 247)

- Units of measurement and the description of the item have been converted to metric.
- Seven digits will be coded instead of six.

Item 16 - Latitude

- Number of digits have been expanded to 8 and 9 digits, respectively.
- The format of the item allows an increased precision of measurement (not mandatory) to accommodate the use of the Global Positioning System (GPS). Current measuring methods and level of precision may continue to be used.
- Reference to defense highways changed to STRAHNET.
- Location where measurement is taken must be compatible with the LRS.

Item 20 - Toll

- Reference to Secretarial Agreement updated.

Item 21 - Maintenance Responsibility

- Several federal agencies have been added.

Commentaries

1997 Commentary

C-3

Item 22 - Owner

- Several federal agencies have been added.

Item 26 - Functional Classification of Inventory Route

- This item is no longer compatible with Item 104 and appropriate revisions have been made.

Item 28 - Lanes On and Under the Structure

- Text clarified for "under" records.
- Text has been added advising that any "1-lane" bridge 16 feet or greater in curb-to-curb width is evaluated as 2 lanes or more in Item 68 - Deck Geometry.

Item 29 - Average Daily Traffic

- Text has been added explaining that if the bridge is closed, the coding is to be the actual ADT from the period before the closure occurred.

Item 30 - Year of average Daily Traffic

- Field expanded to four digits to allow coding of complete year.

Item 36 - Traffic Safety Features

- Add and update reference publications.
- Segment A has been updated to include the latest FHWA policy on crash testing and other recommended barrier specifications.
- Note on national set of standards updated.

Item 38 - Navigation Control

- Term bridge permit clarified.

Commentaries

1997 Commentary

C-4

Item 41 - Structure Open, Posted or Closed to Traffic

- Code B has been clarified concerning signs not correctly implemented. An example of "not correctly implemented: is existing posting signs not changed to indicate a lower load posting calculated for more recent inspection conditions.
- Code P expanded to include temporary bridges which are load posted.
- Code R expands to include vertical clearance.

Item 43 - Structure Type, Main

- Segment B Code 07 has been noted that frame culverts are excluded. Code 19 has been noted that frame culverts are included.

Item 47 - Inventory Route, Total Horizontal Clearance

- FHPM reference has been eliminated.
- In addition to the metric changes and editorial clarifications, the definition for clearance has been modified.

Item 49 - Structure Length

- Explanation has been added concerning the measuring and coding of the tunnels

Item 53 - Minimum Vertical Clearance Over Bridge Roadway

- Clarification has been added for recording the minimum vertical clearance for double decked structures.

Item 55 - Minimum Lateral Underclearance on Right

- If the feature beneath the structure is not a railroad or highway, the code 000 in the numeric value for Segment b is to indicate that the item is not applicable. This replaces the previous code of 999 to indicate that the item is not applicable.

Commentaries

1997 Commentary

C-5

Item 58 - Deck

- Clarification has been added for "structures without decks".

Item 59 - Superstructure

- Same as Item 58.

Item 61 - Channel and Channel Protection

- The word "channel" is now consistently used in this item.

Item 63 - Method Used to Determine Operating Rating

- New item added for use with Operating Rating.

Item 65 - Method Used to Determine Inventory Rating

- New item added for use with Inventory Rating.

Item 66 - Inventory Rating

- Added comment pertaining to severe problems with any structural component of the bridge.

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

- Information has been provided advising that the Edit/Update computer calculates the codes for Items 67, 68 and 69, based on the Coding Guide tables for these items. Values entered by bridge owners or inspectors are not used.
- Because the level of service concept is no longer being considered, all reference to level of service has been eliminated.

Commentaries

1997 Commentary

C-6

Item 67 - Structural Evaluation

- This item is calculated by the Edit/Update program and need not be coded in the field. The reference to how the item was to be coded by bridge inspectors has been eliminated. Editorial changes have also been made to indicate the specifications on which the Edit/Update program is based.

Item 68 - Deck Geometry

- This item is calculated by the Edit/Update program and need not be coded in the field. Editorial changes have also been made to indicate the specifications on which the Edit/Update program is based.
- A statement has been added to advise that culverts coded 0000 for roadway width will be given the coding of N or this item.

Item 69 - Underclearances, Vertical Horizontal

- This item is calculated by the Edit/Update program and need not be coded in the field. Editorial changes have also been made to indicate the specifications on which the Edit/Update program is based.

Item 75 - Type of Work

- Segment A code "38" has been expanded to include hydraulic replacements.

Item 92 - Critical Feature Inspection

- Text has been added to give the current guidelines on maximum allowable inspection intervals.

Item 97 - Year of Improvement Cost Estimate

- Field expanded to four digits to allow coding of complete year.

Item 99 - Border Bridge Structure Number

- Text has been added to clarify the coding.

Commentaries

1997 Commentary

C-7

Item 101 - Parallel Structure Designation

- Clarification of distance between structures coding.

Item 102 - Direction of Traffic

- Text has been added to clarify the coding.

Item 104 - Highway System of the Inventory Route

- With the passage of the 1991 ISTEA, the previous designation of highway systems has been eliminated. This item has been changed to identify structures that are on inventory routes that are on the National Highway System.

Item 105 - Federal Lands Highways

- New item used to indicate special federal lands highway.

Item 108 - Wearing Surface/Protective System

- Wearing surface type code 3 or latex concrete has been modified to include "similar types of additive enhanced concrete, i.e. silica fume.
- A note has been added to the code 0 description of Segment A to make it clear that code 0 is to be used if no additional concrete thickness or thickness of a wearing surface is included in the bridge deck.

Item 110 - Designated National Network

- Consistent with the changes caused by the 1991 ISTEA, the reference to the Primary System has been changed to Federal-aid highways.

Item 115 - Year of Future Average Daily Traffic

- Expanded to 4 digit field.

Commentaries

1997 Commentary

C-8

Item 205 - Project Indicator

- Changed to include old Item 821.

Item 207 - Code for Feature Crossed

- Changed to Covered Bridge Inventory.

Item 210 - Weights of Structural Steel

- Added "99999" to include not calculated.

Item 212B - Paint Color

- Added OE, PR, GY, and OR.

Item 215 - Type of Maintenance Performed

- Added codes of 34 thru 40.

Item 221C - Rail Material/Design

- Added "with or without spindles" in description for codes 16 thru 18.

Item 225 - Type of Foundation

- Added text "Floating Abuts" for code 10.

Item 229B - H Truck at 67% YP

- Delete line for coding 64 and 66 - 200.

Item 813 - Engineering Scour Study Results

- Added code of "5".
- Added text "or special warning sent to owner" for code of "3".

Commentaries

Items 816, 817, 819, 822, and 823

- Old Bad Letter Log items removed.

Item 821 - Bid Let Date

- Now part "B" of Item 205.

AGENCY OF TRANSPORTATION

STRUCTURES SECTION

TO: NBIS file for Berlin S.H. 903 Br. 1 via R.W.K.

FROM: Richard M. Tetreault, Chief of Bridge Inspection

DATE: August 19, 1997

SUBJECT: Silicoflex Strip Sealing System

Pam Thurber (BM Project Civil), Phil Carter (Lab), Silicoflex Representative, myself, and two other representative from the lab met at the subject bridge to evaluate and repair two failures in the subject joint which was installed on August 2, 1995.

The joint locking silicone was found to be debonded on in the left curb area and also for a seven inch long area 2 ft in from the right curb face on the backwall side. The area on the right side had the steel cleaned off with a grinding wheel and flushed with alcohol. Silicone Locking Sealant was then reapplied in a generous quantity and the top side brushed smooth with a flat stick. The curb area on the left was cleaned as best as possible considering to the poor access and again flushed with alcohol. A generous amount of sealant was applied. Some dirt was noted in the patch area during installation on the left curb side.

This joint is only 2 years old and other areas of debonding may be occurring in the not too distant future for it was noted that some active corrosion is taking place behind the top edge of silicone bead.

Apparently the New York Thru Way Authority has installed 3000 linear feet of this product over the last few years, some of it on concrete joint openings.

As far as I can tell, there are not too many bridge joints in Vermont where this type of system is even a possibility. We do not have too many open joints remaining without troughs or with the minimum opening required. ← 1 3/8" min.

We will continue to monitor the performance of this system.

cc:JBM,PMT

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