

A PROGRAM OF BRIDGE INVENTORY, INSPECTION AND RATING FOR A LOCAL ROAD SYSTEM

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This paper is an analytical description of the process developed by the State of Illinois, Department of Transportation, in cooperation with local highway authorities, to not only assure compliance with the Federal-Aid Highway Acts but to formulate a plan to collect accurate data on all bridges with a clear span of 20'-0" or more on local systems in order to demonstrate structural condition and needs. The program coordinates, computerizes and stores, with easy retrieval, the information from efforts of Local and State authorities with a common goal to clarify the highway and structure demand for modern transportation arteries. Positive identification and documentation of obsolescence and deterioration of local bridges has resulted in a monetary response from the legislature which is progressively making shorter and safer routes for today's traffic volume and weights.

Foreword

Under the terms of the Federal Aid Highway Act of 1968, Illinois, like the other 49 states, is charged with the responsibility of inventorying and rating all structures with spans more than 20' on its Federal-aid highway systems. The 1978 Surface Transportation Assistance Act expands this to include off-system bridges also.

In compliance with the requirements of the Acts, and with respect to the pending need for more detailed information on structures in the State of Illinois, the Illinois Department of Transportation undertook to prepare a program designed to inventory, inspect, and rate all structures in the State with spans of more than 20', regardless of the categorical designation of the system on which they were located. Illinois undertook the broader scoped program over and above that required by the earlier Federal legislation because of the obvious need in the State for more complete and up-to-date data on all its structures.

Illinois has approximately 25,000 structures on its highway systems, of which some 15,000 are located on the local highway systems and are under the jurisdiction of local highway authorities. Illinois has 102 counties, 1,269 municipalities, and 1,476 road districts, all of which have jurisdiction over some

roads and highways. Also, private concerns have jurisdiction over some structures.

Within the State organization, the Department of Transportation has jurisdiction over the structures on the State and Federal-aid primary, Federal-aid Interstate and some Federal-aid Urban highway systems. Other governmental agencies, such as the Department of Conservation, have jurisdiction over highways and structures located within conservation areas and State Parks.

Development of Inventory and Rating System

To make a program of this magnitude successful, it was necessary to effect a cooperative effort between all local and State highway authorities having jurisdiction over bridges within the state.

In view of the many agencies involved, it was obvious from the start of the program that success was dependent upon coordination. In an effort to achieve that coordination toward a common goal, the project was undertaken with cooperative planning between the state organizations and the various policy committees representing the local highway agencies. A task force was established within the Department of Transportation to establish recommended policies and procedures to implement the program. This task force was made up of representatives of several Department subdivisions and the Bureau of Planning, Maintenance, Design, and Local Roads.

The task force established the policies and procedures necessary to achieve the goals of the program and to evaluate the data currently available from existing road inventory records and documents. The task force also established what additional data was needed to determine the highway needs in the State of Illinois. Coordination was maintained with policy committees composed of County Superintendents of Highways, City Engineers, and Consulting Engineers, representing local highway agencies. This procedure was initiated to assure cooperation from the local highway agencies and to insure that the needs of the local agencies were met.

After initial study, the task force resolved that, since the two programs were parallel, all necessary forms and procedures should be compatible with both the Federal Bridge Inspection Program and the Transportation Needs Study. The Transportation Needs Study is the documentation used by the State Legis-

lature in drafting legislation to meet the highway needs of the State.

The task force was also charged with the responsibility of drafting a program which would provide comprehensive information for use by all state and local agencies in determining the needs and priorities for improvements to the entire highway system within the state. The following objectives were established by the task force:

1. The program should provide information on the statewide, regional, or local basis, detailing the needs and the improvements required on highway systems, and to estimate costs of such improvements for use in drafting possible legislation, and for budgeting purposes for state and local governmental agencies.

2. The program should provide a mechanism to handle the current needs and the projected needs on the various systems in the state, and a dual system for determining priorities for replacement based on existing revenues at all levels in government.

3. The program should provide the capacity to determine the priorities for the improvement or replacement of structures which are insufficient for safe highway travel.

4. The program should develop data which could be updated periodically to provide a "continuing needs" study for state and local governments.

5. The program should provide the mechanisms for establishing safe load-carrying capacities and the posting of these capacities for the safety of the motoring public.

The task force undertook the preparation of a basic program to implement those objectives, beginning with the determination of information required in the Needs Study for inclusion in the Department of Transportation's computer data bank to satisfy both Federal requirements and that study.

A structure numbering system was established on the basis of the road inventory file data available. The system used a seven-digit number. The first three digits identified alphabetically the county in which the structure was located. Consequently, Adams County was assigned county number 001, and the last county in alphabetical order, Woodford County, was assigned county number 102. The remaining four digits of the structure number were utilized in groups to reflect maintenance responsibility of the structure. The four digit numbers from 0001 through 2999 reflected structures maintained by the state, the number series from 3000 through 5999 reflected structures maintained by the counties or townships, 6000 through 9899 reflected city maintenance responsibility, and structures numbered from 9900 through 9999 indicated maintenance responsibilities of other governmental or private agencies. Water Districts and Railroads, for instance, fell into this category. After the maintenance responsibility for the structures was ascertained, the structure numbers were assigned in conjunction with the route upon which they were located, and the log mile of the structure along the route. The numbers were then assigned in sequence in the ranges of numbers denoting proper maintenance responsibility beginning with the lowest number in each range. For example, if a Federal Aid Secondary route had 6 structures located on it and all were the maintenance responsibility of the county, the 6 structure numbers would be in sequence, with the lowest number being located along the lowest log mile (or mile post) on the route within that county. Each local agency having jurisdiction over structures then prepared a number map, accurately locating those structures under its jurisdiction.

Local agencies were given the option to assign bridge numbers, and some counties adopted unique structure numbering systems, adhering to the 3000 to 5999 rule. For example, several counties elected to assign numbers 3000 through 3299 to the structures on the county highway maintenance system. Then each road district within the county was assigned a block of numbers. The first road district could be assigned numbers 3,400 through 3,499. The second road district could be assigned numbers 3,500 through 3,599. This system could be continued to provide a group of numbers for each road district, thus permitting the local agency to identify county or road district maintenance responsibility from the structure number.

Municipalities were asked to establish numbering systems within the 6,000 to 9,899 numerical confines. To avoid duplication, a block of numbers was assigned to each municipality in each county. For example: One municipality could utilize the numbers 6,000 through 6,099 the second municipality could use 6,100 through 6,199, etc. Care was also taken to assign an ample block of numbers to each municipality to allow for future expansion of the system.

Municipalities identified their bridges by number on official city maps provided by the Department. These maps were incorporated into the program.

Other governmental agencies (for example, water districts) or private agencies having maintenance responsibility for structures were asked to assign numbers to their structures in the 9900 to 9999 series, to avoid duplication. These agencies were asked to indicate their structure numbers on a map. These annotated maps are available to local agencies and the general public upon request.

With the use of the structure-numbering system and structure-number maps, it is possible to locate every bridge in the State as defined by AASHTO (20' between spring lines). The assigned structure number will appear on all future name plates. In all cases, assigned numbers shall be painted in a conspicuous place on the bridge.

After establishing the procedure for numbering the structures, the task force began preparing the necessary inventory forms. As a base for the information, the task force started with Plate 14-1 (FHWA structure appraisal sheet, Figure 6) required by the Federal Bridge Inspection Program and supplemented the requirements of that document to cover the additional data needed for use in the Transportation Needs Study. To facilitate the efficient handling of the information to be collected, the task force elected to divide and document the data on two forms "Structure Inventory Sheet" (Figure 1) and "Structure Appraisal Sheet" (Figure 2). The Structure Inventory Sheet contains the first 57 items on Plate 14-1, plus the items added to the inventory to satisfy the Transportation Needs Study, such as items A, B, or C. A fundamental requirement in the designing of the form was that it be readily adaptable to the collection of the data in the field, as well as in a format acceptable for keypunching into the computer.

The Structure Inventory Sheet was designed to identify the structure by number and location; to indicate the variety of information to be collected by item number; description of the item; a new-data column for data collected in the field; and an old-data column showing data obtained from existing records. The description column is utilized by field personnel in the collection of the structure information. The new-data column permits coding of the data by field personnel and is used for keypunching the data into the data bank. The old-data column indicates information currently available. Field personnel are to code the information obtained in the field directly on the structure inventory sheet and

verify or correct the old-data information on the sheet to reflect current conditions.

Several of the supplemental items added to the Structure Inventory Sheet provide enough additional data to complete the overall inventory for the structure. For example, Item 36B, construction section, includes sufficient code space for entering the original construction section, thus supplying ready identification and reference to older filing systems.

Item 37 indicates the microfilm number identifying the microfilm roll upon which the original design plans for the structure are located. Other supplemental code items have been added to the form to provide a more complete and usable compilation of data for each structure. Two copies of the Structure Inventory Sheet were generated from the data available in the State's data bank for each structure and were forwarded to the agency responsible for the maintenance of the structure with the necessary instructions for the proper coding of the items.

The second form used to complete the appraisal portion of the bridge program, a "Structure Appraisal Sheet" (Figure 2), incorporated items 58 through 84 of Plate 14-1 (Figure 6) of the Federal Bridge Inspection Program for use by field personnel in making the necessary appraisal codings. The information from the completed form is adaptable to keypunching. An additional item was added to the structure appraisal form as item No. 85; the date of the inspection, to insure record continuity.

The Structure Appraisal Sheet heading indicates the computer number for use in the State's data bank, as well as the seven-digit structure number. The code items and numbers are consistent with Plate 14-1. The form provides a brief description of the item for use by field personnel, plus space to denote a brief written description of materials and conditions encountered in the field. The form also provides a coding bank for the various items for field coding and use in keypunching the data. Coding instruction sheets were prepared for each item included on the Structure Inventory Sheet and Structural Appraisal Sheet. A typical structure coding sheet is shown in (Figure 3). All coding instruction sheets contain complete coding instructions for each item.

In the illustrative typical coding form (Item 43) shown in (Figure 3), the coding sheets are divided into four major sections. The first section is the description of the item to be coded. The second portion in the coding sheet indicates the purpose for which the information is to be used. The third portion of the coding sheet indicates the procedure to be used in obtaining the information to be coded. The fourth portion of the coding sheet denotes the code numbers and their respective meanings.

These coding instruction sheets are also included as guides for use by field personnel in the proper coding of the respective items. The coding instruction sheets were developed from Plate 14-1 and supplemented by additional instructions and directions to incorporate the proper coding required for the Transportation Needs Study.

In order to assist the many agencies in maintaining adequate records of their structures, a Bridge Record Card (Figure 4) was developed for their use. The Card provides for a description of the structure, hydraulic data, posting and inspection data, and information regarding repairs made to the structure which permits the agency to maintain an up-to-date record.

Since the Federal Acts require a bi-annual inspection of all structures on the Federal-aid highway system, a Bridge Inspection Report Form (Figure 5) was developed by local agencies. The form is designed to cover the critical members of the various struc-

ture types, with space provided to denote condition and needed maintenance or repairs. The inspection report can be supplemented by drawings, pictures, etc., as the inspector deems necessary.

Rating for Load Carrying Capacity

Two basic procedures were established for determining the Operating and Inventory ratings and determining the safe load capacity of each structure. The AASHTO Manual of Maintenance Inspection of Bridges was the authority for determining the ratings for each structure. The local highway authority has the option of using either of the following procedures.

The first procedure provides for the use of private consulting engineering firms or the use of local agency staffs to compute the necessary ratings and make recommendations for posting the structures. Many local agencies in the State of Illinois have used Federal highway safety funds to aid in the financing of such ratings. Present statutory requirements in the State of Illinois permit only registered structural engineers to make ratings on structures and determine safe load capacities. Therefore, only consulting firms or local agencies that have qualified personnel on staff can follow this procedure.

Another statutory restriction in the State of Illinois is:

The Department upon request from any local authority shall, or upon its own initiative, may conduct an investigation of any bridge or other elevated structure constituting a part of a highway, and if it finds the substructure cannot with safety to itself withstand the weight of vehicles otherwise permitted under the Statutes, the Department shall determine and declare the maximum weight of the vehicle which the structure can withstand, and shall cause or permit suitable signs stating maximum weight to be erected and maintained before each end of such structure."

The statute also provides penalties for violation of such load restrictions. Based on the above statutory restriction, a registered structural engineer working in the private sector who performs ratings and safe load capacity determinations of any structure on the highway system must obtain concurrence from the Department prior to posting such load restrictions on the structure.

The second procedure provides for the Department to determine the Operating and Inventory ratings and to determine the safe load capacity of the structures when requested to do so by the local agencies. This procedure was established because many local agencies have limited funds available for the repair and maintenance of their structures. Therefore, to provide for a cooperative effort between local agency personnel and Department personnel in obtaining the necessary field and plan data for calculating the rating of the structures and making recommendations for posting, Department assistance was deemed necessary.

Specifically:

1. The local highway authority initiates a request for the Department to perform the necessary ratings and provide the posting recommendations for structures.
2. The local highway authority is responsible for obtaining copies of the original "as built" plans for the structures, if they are available. If "as built" plans are not available for a structure, the local agency is responsible for obtaining the field measurements necessary for determination of the structural rating by the Department. Photographs are also requested.
3. When the "as built" plans or the necessary

field measurements have been obtained by the local highway authority, the Department will schedule a member of its field inspection team to inspect the local structures with the local agency representative. The field inspector may also take supplementary photographs of the structure showing damage to deteriorated areas or any unique area of the structure which he feels should be clarified to assist the rater in calculating the ratings for the structure. The Department's field inspector will make appropriate notations or recommendations in the field on the "as built" plans or drawings to reflect the current condition of the structure.

4. After the field inspection is completed by the Department's inspector, the plans and related information are used by the Department to determine the ratings and posting recommendations for each structure.

5. The completed ratings, based on the operating rating, (which is 75 percent of the yield strength in accordance with the AASHTO Manual for Maintenance Inspection of Bridges) and the Inventory Rating (which is based on 55 percent of yield strength of the material) are forwarded to the local highway authority with the Department's recommendation for posting of the structure if the structure will not carry maximum legal loads. If it is determined that the structure is capable of carrying maximum legal loads, the Department will recommend to the local agency that no restriction be placed on the structure.

It became apparent from the beginning of the program that many of the structures on our local highway systems were built in the late 1800's or the early 1900's, and "as built" plans were not available. In order to facilitate collection of field data for rating and for use in providing uniform data to the rater, the Department devised a series of standard drawings for the various types of bridges commonly found on our local highway systems. The drawings include examples of truss type structures, single span I-beam structures, continuous I-beam structures, and timber structures, together with standards depicting the various types of substructures commonly found. A sample of the standard drawing used for continuous I-beam structures is shown (Figure 7).

The drawings are designed for a fill-in-the-blank type collection of data for simplicity in obtaining the field measurements. Using the standard drawings, the inspector in the field is able to review the drawings when he has completed his measurement of a structure and fill in any blanks to complete the report.

The standard drawings, with required entries, should also be supplemented with notes on the drawings and/or photographs showing any special problem areas, such as damage from vehicular traffic, areas of deterioration, etc. The dimensions on the standard drawings, plus the supplemental information on the condition of the structure will aid the rater in calculating the operating and inventory ratings for the structure as well as the recommendation for posting. Supplemental sketches or drawings can be attached to the standard drawings to show any unique design which may differ from the standard drawings.

Figure 8 shows a drawing of a substructure. The substructure drawings are used to provide more complete information to the rater. These drawings show the various common types of substructures, such as pilings, and dimensions of the various substructure members such as pile sizes, pile spacing, or dimensional factors of a solid concrete type substructure element. These drawings are to be supplemented with notations indicating the condition of the various elements by the field inspector to the rater.

Local agencies are asked to prepare a small sketch of the structure for which more than one type of superstructure or substructure element has been used to help the rater to relate the element to its proper function. The overall sketch also is to show the back-to-back length of the structure which can be used to confirm measurements for the individual spans. The local agency inspector is responsible for completing the forms and documenting basic measurements of a structure prior to the field inspection of the structure by the Department. When the Department has completed the rating and has forwarded the rating and recommendation for posting to the local agency, the standard drawings and photographs taken during the field inspection are returned to the local agency for its records and future use.

To aid local highway authorities in determining the cost of the proposed improvements or replacement of structures, cost graphs reflecting the latest figures available to the Department are prepared. These cost graphs are updated annually. The graphs are guides for estimating structure costs only and do not include any earthwork, excavation, removal of existing structure, etc., since these items vary considerably from location to location. The graphs are compiled for several types of structures such as precast concrete, prestressed concrete, wide flange structures with concrete decks, etc. Each graph also has a weight average cost of various structures which can be used if the type of structure is undecided at the time the estimating data is needed. A similar graph is also provided for estimating the square foot cost for widening an existing structure. A list of standard pay items of the various types of work and the most recent unit cost of these items, compiled from repair work done on the State system, is also provided. For example, concrete removal in small quantities from zero to 10 cu. yds. is estimated for what can be expected as a unit bid price per cu. yd. These costs cover items encountered in repair or rehabilitation of structures.

The responsibility of each of the agencies involved in completing the structure inventory and the rating of the structure was established. In general, the collection of field data on the structures is the responsibility of the local highway authority. Guidance and assistance in the field collection of data is provided by Department personnel. When the field data has been collected on the appropriate structure inventory and appraisal forms, the information is forwarded to the Department for inclusion in the structure data bank.

After the inventory and appraisal data have been included in the structure data bank, the computer generates a printout of the complete information on the structure. Two copies of this print-out are returned to the local highway authority for its files. For future updates in the structure data bank the necessary revisions are made on the two copies of the computer printout. One copy is forwarded to the Department and the second copy is retained in the agency files. The data bank information is then updated and new printouts are generated. Two copies of the corrected printouts are returned to the local agency. This system, if properly implemented, will keep the structure data bank and local files current.

If a local agency replaces a structure, it is necessary to complete a new Structure Inventory Sheet and a Structural Appraisal Sheet, with the pertinent information on the new structure, and to assign a new number to the structure.

The new forms are submitted to the Department of Transportation, along with a copy of the old form for the replaced structure, including the notation that the structure has been removed and replaced by

the new structure and indicating the new bridge number that will replace the old. The Department enters the new structure information into the data bank and deletes all reference to the old bridge. This method assures currency in the structure data bank.

It should be noted, however, that the only time a new structure number is assigned is when the bridge is completely new. If alterations or repairs to an existing structure are made, the old structure number is retained, and the items are updated on the old structure inventory to reflect the current structure condition.

Summary

The Department is very gratified by the acceptance of the overall program by the local agencies and their cooperative participation in the program, which has made it a substantial success. A plan of this nature can be successful only with the complete cooperation of all agencies involved. Since this program was undertaken, continuing interest is being shown by local agencies. This, we feel, is the result of planning to meet the needs not only of the Federal Highway Bridge Inspection Program and the Needs Study for the Legislature, but also the needs of the local agencies in their complex planning and budgeting processes.

Benefits have already been derived from the program. For example, the local highway authorities have recognized the inadequacy of the design requirements presently existing for bridges on local agency highway systems. As a result, the County Superintendents of Highways Policy Committee has adopted a new policy calling for all new structures to be designed for a minimum HS20 loading in lieu of the original HS15 loading used on many minor roads.

The information obtained in the bridge inspection program and the ever increasing loads carried over the local structures by farm-to-market and other heavy vehicles have made the need for higher design criteria obvious. Another benefit which has already been derived from the program is a suggested priority listing for repair and replacement of all structures on the local agency highway system for use by those agencies in planning and budgeting their highway needs and improvements. This advice is available to all local highway authorities who have completed and forwarded the inventory and appraisal of all structures on their respective systems.

Conclusion

Since the conception of this program, the local highway officials have become deeply concerned about the condition of their highway structures. As a result, the State has witnessed a large increase in the number of structure replacements and repair projects. Many local highway authorities have re-adjusted their priorities for expenditures of highway funds and allotted greater portions of those funds for repair and replacement of structures, yet providing that routine maintenance which is vital to road systems.

It is estimated that it will take from 4 to 5 years to incorporate all of the structures in Illinois into the program. However, as more and more structure inventories and appraisals are completed, the need for more highway dollars is increasingly evident. By continually updating the data bank with new information when repairs or replacements are accomplished, the Department can provide ample docu-

mentation to the State Legislature to justify legislation to meet the higher costs and urgent needs of the local highway system.

Illinois, like many other states, in past years did not have the mechanism to identify the overall needs on the local or State highway systems. The bridge inspection inventory and rating program will provide a continually updated survey of all structures and the current needs can be ascertained at any time. A program similar to the Structure Inventory, Appraisal and Rating Program for structures in Illinois has been established as a Road Inventory System in the State to provide a continually updated inventory of the road system. The two programs will clarify the overall automobile and truck transportation needs in the State.

Figure 1.

FORM DB-500 STRUCTURE INVENTORY SHEET

STRUCTURE NUMBER _____

DATE OF DATA _____

FILE CARD										COMP. NUMB.			INV. CO.			KEY ROUTE ON STRUCTURE										KEY ROUTE UNDER STRUCTURE																																																																							
DATA																TYP. NUMBER					SUF. SPUR APPURT. NUMB.					STATION					TYP. NUMBER					SUF. SPUR APPURT. NUMB.					STATION																																																								
COL.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46																																																			
ITEM	DESCRIPTION																																														DATA	COL.	ITEM	DESCRIPTION																																														DATA	COL.
1.	FILE/CARD NUMBER																																														0301	1-4	1.	FILE/CARD NUMBER																																														0304	1-4
2.	HIGHWAY DISTRICT																																															5-9	2.	COMPUTER NUMBER																																															5-9
3.	STRUCTURE COUNTY																																															10	3.	29A. AVG. DAILY TRAFFIC ON																																															10-15
4.	MUNICIPALITY																																															11-13	4.	30A. YEAR OF AVG. DAILY TRAFFIC ON																																															16-17
5A.	LOG ROUTE ON																																															14-17	5.	31. DESIGN LOAD																																															18-19
	KIND/DESIG. NUMBER/DIR.																																															18-19	6.	32. APPROACH ROADWAY WIDTH																																															20-22
5B.	LOG ROUTE UNDER																																															20-24	7.	33. BRIDGE MEDIAN WIDTH/TYPE																																															23-25
	KIND/DESIG. NUMBER/DIR.																																															25-26	8.	34. SKEW DIRECTION/ANGLE																																															26-28
5C.	PRINCIPAL ROUTE ON OR UNDER																																															27-31	9.	35. STRUCTURE FLARED																																															29
6.	FEATURE CROSSED																																															32	10.	36A. CONSTRUCTION ROUTE																																															30-36
																																																33-52	11.	36B. CONSTRUCTION SECTION																																															37-61
7.	FACILITY CARRIED																																															53-72	12.	36C. CONSTRUCTION STATION																																															62-71
																																																73-76	13.	38. NAVIGATION CONTROL																																															72
6A.	STRUCTURE NUMBER																																																14.	39. NAVIGATION VERTICAL CLEARANCE																																															73-75
	FILE/CARD NUMBER																																														0302	1-4	15.	40. NAVIGATION HORIZONTAL CLEARANCE																																															76-79
	COMPUTER NUMBER																																															5-9	16.	FILE/CARD NUMBER																																														0305	1-4
6B.	OVERHEAD STRUCTURE NUMBER																																															10-13	17.	COMPUTER NUMBER																																															5-9
9.	LOCATION																																															14-33	18.	37. MICROFILM NUMBER																																															10-18
10.	NAME OF BRIDGE																																															34-53	19.	42. TYPE OF SERVICE ON/UNDER																																															19-20
	ROUTE ON - ITEMS 11A - 15A																																															54-58	20.	43. MAIN STRUCTURE MATERIAL/TYPE																																															21-23
11A.	MILEPOINT																																															59-63	21.	44A. NEAR APPROACH MATERIAL/TYPE																																															24-26
12A.	DOD ROAD SECTION NUMBER																																															64-65	22.	44B. FAR APPROACH MATERIAL/TYPE																																															27-29
13A.	DOD BRIDGE LETTER																																															66-69	23.	45. NUMBER OF SPANS - MAIN STRUCTURE																																															30-33
14A.	DOD MILEPOINT																																															70-72	24.	46. NUMBER OF SPANS - APPROACHES																																															34-37
15A.	DOD SECTION LENGTH																																																25.	48. LENGTH OF LONGEST SPAN																																															38-41
	ROUTE UNDER - ITEMS 11B - 15B																																																26.	49. STRUCTURE LENGTH																																															42-46
																																																	27.	50A. SIDEWALK WIDTH - RIGHT SIDE																																															47-49
																																																	28.	50B. SIDEWALKS UNDER STRUCTURE																																															50-52
																																																	29.	50C. GRADRAILS ON STRUCTURE RIGHT/LEFT																																															53
																																																	30.	51. BRIDGE ROADWAY WIDTH - TOTAL																																															54-55
																																																	31.	52A. HORIZONTAL CLEAR. RT-ONLY RDWY																																															56-59
																																																	32.	52B. HORIZONTAL CLEAR. LT RDWY																																															60-63
																																																	33.	53A. MIN. VERT. CLEAR. OVER RT-ONLY RDWY																																															64-67
																																																	34.	53B. MIN. VERT. CLEAR. OVER LT RDWY																																															68-70
																																																	35.	53C. 10 FT. VERT. CLEAR. OVER RT-ONLY RDWY																																															71-73
																																																	36.	53D. 10 FT. VERT. CLEAR. OVER LT RDWY																																															74-76
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																																																	40.	54A. VERTICAL UNDERCLEAR. RT-ONLY RDWY																																															10-12
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																																																	42.	54C. 10 FT. VERT. UNDERCLEAR. RT-ONLY RDWY																																															16-18
																																																	43.	54D. 10 FT. VERT. UNDERCLEAR. LT RDWY																																															19-21
																																																	44.	54E. HORIZ. UNDERCLEAR. RT-ONLY RDWY																																															22-25
																																																	45.	54F. HORIZ. UNDERCLEAR. LT RDWY																																															26-29
																																																	46.	55. LATERAL UNDERCLEAR. RIGHT EDGE																																															30-32
																																																	47.	56. LATERAL UNDERCLEAR. LEFT EDGE																																															33-35
																																																	48.	57A. WEARING SURFACE ON																																															36
																																																	49.	57B. WEARING SURFACE THICKNESS ON																																															37-38
																																																	50.	19B. BYPASS LENGTH UNDER																																															39-40
																																																	51.	24B. FED. AID SYSTEM UNDER																																															41-42
																																																	52.	26B. FUNCTIONAL CLASSIFICATION UNDER																																															43-44
																																																	53.	29B. AVERAGE DAILY TRAFFIC UNDER																																															45-50
																																																	54.	30B. YEAR OF AVG. DAILY TRAFFIC UNDER																																															51-52

(Rev. 1/76)

Figure 2.

STRUCTURE APPRAISAL SHEET

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

File Number 013
Card Number 018
Computer No. 00000000
Structure 00000000

CONDITION		Material	Condition Analysis	Rating (9-0)
58	Deck			" "
59	Superstructure			" "
60	Substructure			" "
61	Channel & Channel Protection			" "
62	Culvert & Retaining Walls			" "
63	Estimated Remaining Life			" "
64	Operating Rating			" "
65	Approach Roadway Alignment			" "
66	Inventory Rating			" "

APPRAISAL		Deficiencies	Rating (9-0)
67	Structural Condition		" "
68	Deck Geometry		" "
69	Underclearances-Vertical & Lateral		" "
70	Safe Load Capacity		" "
71	Waterway Adequacy		" "
72	Approach Roadway Alignment		" "

PROPOSED IMPROVEMENTS

73 Year Needed _____ Completed _____ Describe (Item 75) _____ " "

74 Type of Service _____ " "

75 Type of Work _____ " "

76 Improvement Length _____ ft. _____ " "

77 Design Loading _____ " "

78 Roadway Width _____ ft. _____ " "

79 Number of Lanes _____ " "

80 ADT _____ " "

81 Year _____ " "

82 Proposed Rdwy. Improvement - Year _____ " "

83 - Type _____ " "

COST OF IMPROVEMENTS

84 \$ _____,000. _____ " "

85 Date of Inspection _____ " "

Remarks _____

Form DS-501 (Rev. 7/72)

Figure 3.

ILLINOIS STRUCTURE INVENTORY		Item No. 43 (Revised)	
Main Structure Material and Type		Effective 10 Sep 71	
Description			
A one-digit code and two-digit code used to identify the material and type of construction used. The main structure is all spans of most bridges (but the major unit only of atable structures), or a unit of the structure with a different design and/or material from the approach spans. The major unit is usually the portion that spans the obstruction being crossed over and may consist of multiple spans with only one design and material type. Refer to Figure 1.1 and Figures 2.01 - 2.12.			
Purpose			
To provide the data required by FHWA for national summaries and listings and to relate needs to the material and type of construction used.			
Procedures			
Code the type of material in the first digit and the type of construction in the next two digits.			
Coding			
Material (1st Digit)		* Type of Structure (2nd & 3rd Digits)	
Code	Material	Code	Type
1	Concrete	01	Slab
2	Concrete continuous	02	Stringer/Multi-beam
3	Steel	03	Girder and Floorbeam
4	Steel continuous		System
5	Prestress concrete	04	Tee Beam
6	Prestress concrete continuous	05	Box beam or Girders-Multiple
7	Timber	06	Box Beam or Girders-Single or Spread
8	Masonry	07	Frame-Rigid & Other
9	Aluminum, wrought	08	Orthotropic
0	Iron or Cast Iron	09	Truss - Deck
	Other	10	Truss - Thru & Pony
		11	Arch - Deck, Filled Spandrel
		12	Arch - Thru
		13	Suspension
		14	Stayed Girder
		15	Movable - Lift
		16	Movable - Easculc
		17	Movable - Swing
		18	Tunnel
		19	Culvert
		20	Pipe Line
		21	Toll Plaza
		22	Tollway
		23	Restaurant (overhead)
		24	Pedestrian Overpass
		25	Thru Girder without Floor Beam System
		00	Arch-Deck, Open Spandrel Other

Figure 4.

COUNTY _____ STATE OF ILLINOIS BRIDGE NUMBER _____
 MUNICIPALITY _____ Bureau of Local Roads and Streets On Federal Aid Highway System? Yes No
 TOWNSHIP _____ BRIDGE RECORD
 SECTION _____

Station _____ Built as _____ Route _____ Marked Route _____ Year Built _____
 Name of Stream, Railroad or Other Route _____
 Total Length (Bk.-Bk. Abut.) _____ Roadway Width _____ Sidewalk Width _____ Handrail Type _____
 Type of Surface _____ Minimum Vertical Clearance _____ Skew Angle _____
 Weight of Structural Steel (tons) _____ Type of Bridge _____
 Abutment Type _____ Pier Type _____

Spans					
No.	Type	Length	No.	Type	Length

Drainage Area _____
 High Water Elevation _____
 Year of High Water _____
 Waterway Opening _____ Sq. Ft.
 Flood Frequency _____ Year

Design Loading _____

Maximum Load Limit					
Date	Amount	Date	Amount	Date	Amount

Date of Inspection _____

Location Sketch

Date of Inspection											

Form BLR M 1030 Rev.(8-72)

Figure 5.

STATE OF ILLINOIS
 Division of Highways
 Bureau of Local Roads and Streets

BRIDGE INSPECTION REPORT - County _____

Highway No. _____ Section No. _____ Bridge No. _____
 Location _____
 Design or Posted Loading _____
 Stream or Name _____

SUPERSTRUCTURE No. & Type of Spans _____

Truss:	Paint _____	Lower Chord _____
	Upper members _____	Stringers _____
	Floor Beams _____	Gussets _____
Steel Beam:	Floor _____	Drains _____
	Paint _____	Handrail _____
Timber:	Floor _____	Drains _____
	Stringers _____	Floor _____
Concrete:	Hubguard _____	Handrail _____
	Stringers _____	Floor _____
	Handrail _____	Drains _____

BEARINGS & EXPANSION DEVICES

In Expansion _____ In Contraction _____ Paint _____
 Bearing Seats _____
 Expansion Remaining _____

SUBSTRUCTURE

Abutment Type _____ Condition _____
 Pier Type _____ Condition _____
 Piling _____ Stream _____
 Slopewalls _____

APPROACHES

Riding quality _____
 Guardrail _____
 Expansion Joints _____

REMARKS

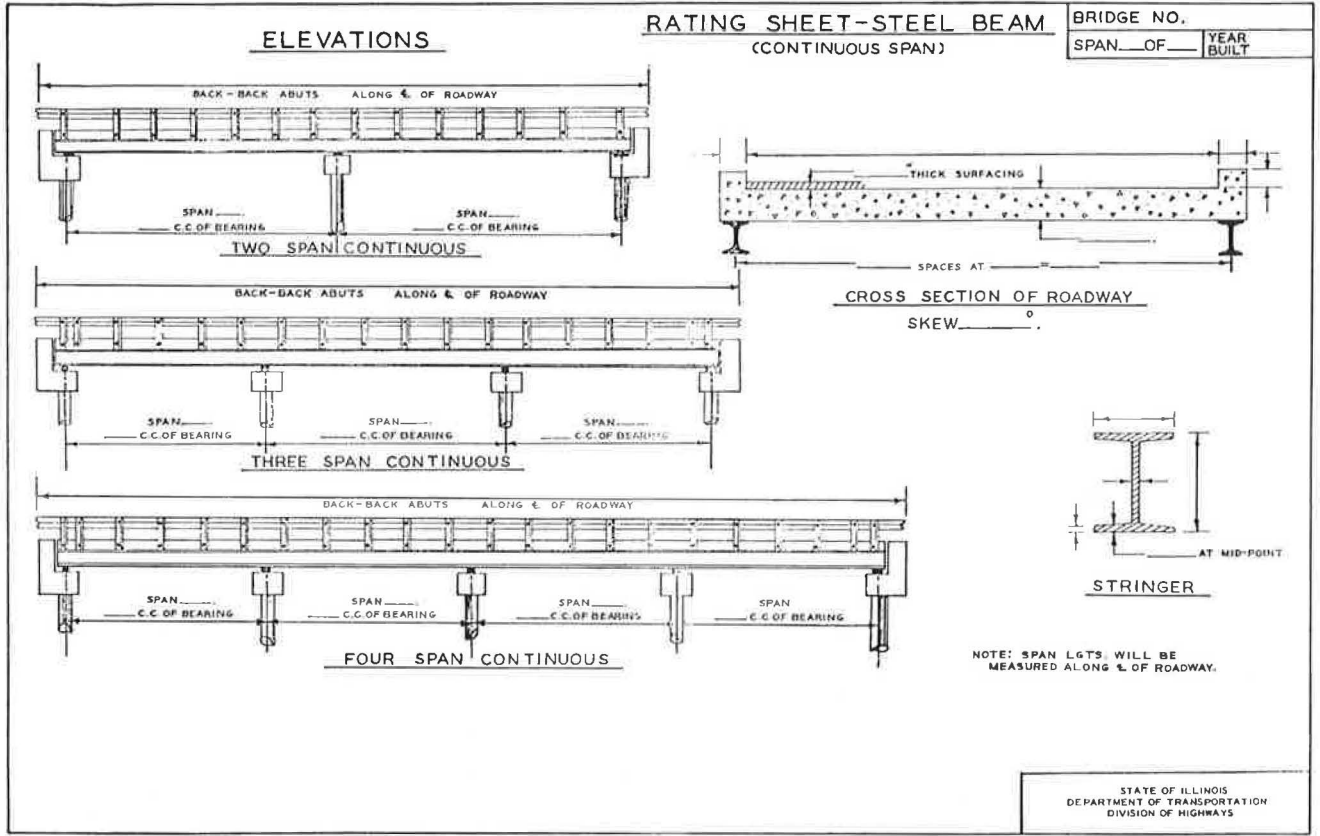
Date _____ Inspected by _____ Approx. Temp. _____

Figure 6.

STRUCTURE INVENTORY AND APPRAISAL SHEET

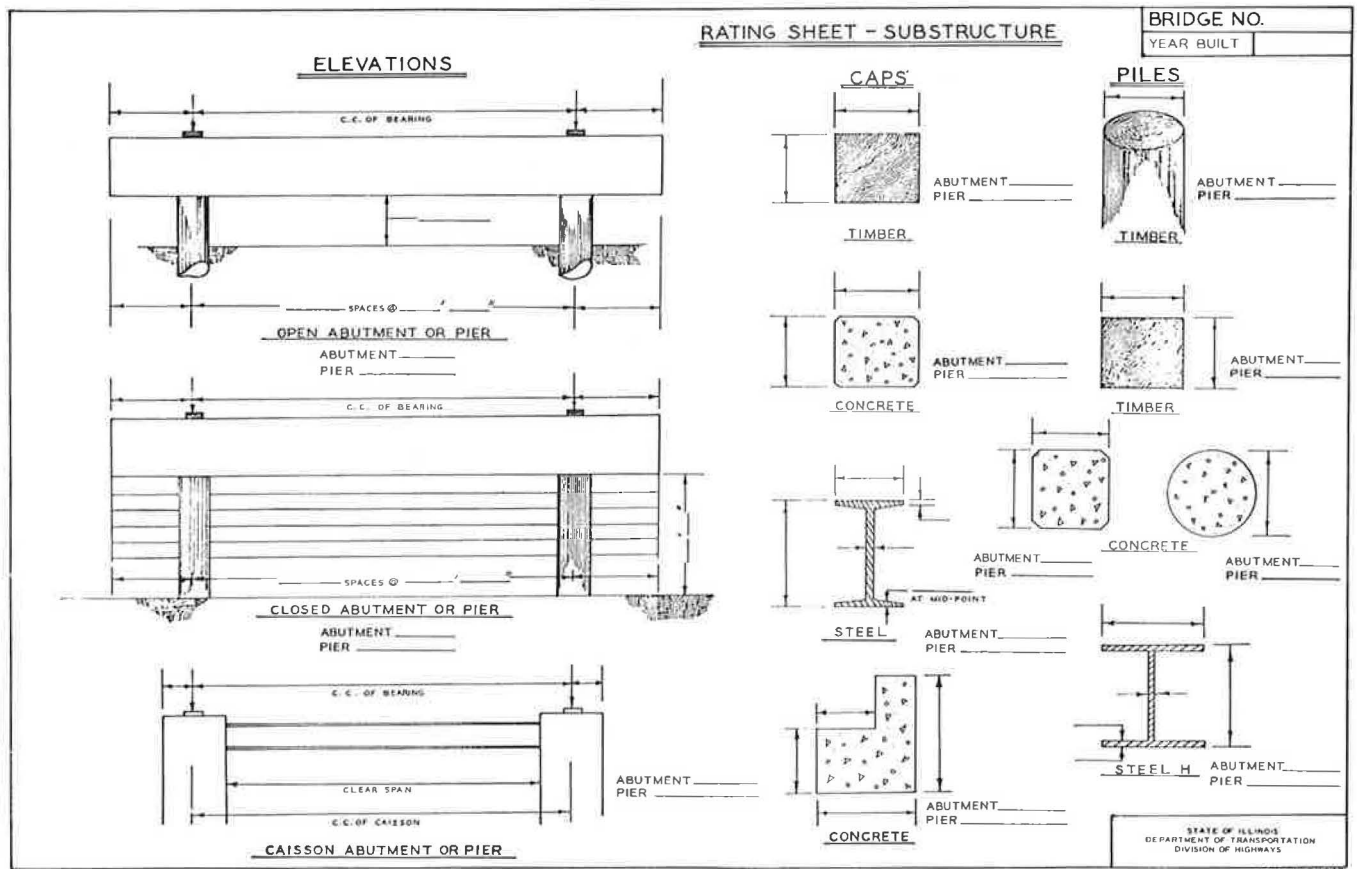
IDENTIFICATION		CLASSIFICATION		By	Date	Item No.	Card Control Number	Card Col.
1 State	23 Fed. Aid System	Transfer of Data						
2 Highway District	24 Administrative	Condition Analysis						
3 County	25 Administrative	Appraisal						
4 City/Town	26 Functional	Cost						
5 Principal Route		General Review						
6 Features Crossed		Maintenance Inspection						
7 Principal Route <input type="checkbox"/> Over <input type="checkbox"/> Under								
8 Structure No. _____ 1 of _____	STRUCTURE DATA		42 Type Service					
9 Location	27 Year Built	43 Structure Type -Main						
10	28 Lanes on Str. <input type="checkbox"/> Under	44 -Approach						
11 Route	29 ADT on Str. (30) Year	45 No. of Spans -Main						
12 Milepost	31 Design Load	46 -Approach						
13 Road Section No.	32 Appr. Rdwy. Width W/ Shield	47 -Total						
14 Sub-section No.	33 Median <input type="checkbox"/> Open <input type="checkbox"/> Closed	48 Max. Span Length	ft.					
15 Latitude	34 Skew	49 Structure Length	ft.					
16 Longitude	35 Ground Level By-Pass <input type="checkbox"/> Yes <input type="checkbox"/> No	50 Sidewalk Rt.	ft. Lt. ft.					
17 ODD Road Section	36 Hydraulic Structure <input type="checkbox"/> Yes <input type="checkbox"/> No	51 Roadway (curb-curb)	ft.					
18 ODD Bridge Letter	37 Report Available <input type="checkbox"/> Yes <input type="checkbox"/> No	52 Deck Width (out-out)	ft.					
19	38 Navigation Control <input type="checkbox"/> Yes <input type="checkbox"/> No	53 Vert. Clear. over Deck	ft.					
20 Toll <input type="checkbox"/> Yes <input type="checkbox"/> No	39 -Vertical	54 Underclearance-Vert.	ft.					
21 Custodian	40 -Horizontal	55 -Lateral-Right	ft.					
22 Owner	41 Relief Structures	56 -Left	ft.					
23 F.A.P. No.		57 Utilities						
CONDITION		Material	Condition Analysis	Rating (S-D)				
58 Deck								
59 Superstructure								
60 Substructure								
61 Channel & Channel Protection								
62 Culvert & Retaining Walls								
63 Estimated Remaining Life	55 Approach Alignment							
64 Permit Capacity	66 Rated Loading							
APPRAISAL		Deficiencies		Rating (S-D)				
67 Structural Condition								
68 Deck Geometry								
69 Underclearances - Vert. & Lateral								
70 Safe Load Capacity								
71 Waterway Adequacy								
72 Approach Alignment								
PROPOSED IMPROVEMENTS								
73 Year Needed	Completed	Describe						
74 Type of Service								
75 Type of Work								
76 Improvement Length	ft.							
77 Design Loading	lb.							
78 Roadway Width	ft.							
79 Number of Lanes	82 Prop. Rdwy. Improvement - Year							
80 ADT	(81) Year	83 - Type						
COST OF IMPROVEMENTS				84 \$ _____,000.				
Remarks								

Figure 7.



FORM BLR M-1044

Figure 8.



FORM BLR 1044