



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

H-517B

Date: June 8, 1988

In reply refer to: H-88-21

Honorable James H. Burnley
Secretary
U.S. Department of Transportation
Washington, D.C. 20590

On April 5, 1987, two of the five spans of the New York State Thruway (I-90) bridge over the Schoharie Creek fell about 80 feet into a rain-swollen creek after pier 3, which partially supported the two spans, collapsed. Ninety minutes after the initial collapse, pier 2 and a third span collapsed. Four passenger cars and one tractor-semitrailer plunged into the creek, and 10 persons were fatally injured. 1/

In 1979, all bridges on public roads (including New York State Thruway Authority (NYSTA) bridges) became subject to the National Bridge Inspection Standards (NBIS) of the Federal Highway Administration (FHWA). The NBIS requires all bridges to be inspected at 2-year intervals, but the individual States can decide the level and detail of inspections for particular elements of the bridges. Inspections are to be made in accordance with the "Manual for Maintenance Inspection of Bridges" 2/ published by the American Association of State Highway and Transportation Officials (AASHTO).

The NBIS stipulates that: (1) each highway department have a bridge inspection organization, (2) bridge inspectors meet minimum qualifications, (3) each structure be rated as to its safe load carrying capacity, and (4) inspection records and bridge inventories be prepared and maintained in accordance with the NBIS. The depth and frequency of inspections is to depend on such factors as age, traffic characteristics, state of maintenance, and known deficiencies.

1/ For more information, read Highway Accident Report--"Collapse of New York State Thruway Authority (I-90) Bridge Over the Schoharie Creek, Amsterdam, New York, April 5, 1987" (NTSB/HAR-88/02).

2/ First edition published in July 1970. Subsequent editions have been printed in 1974, 1979, and 1984.

The FHWA reviews State bridge inspection programs to determine if a State is meeting inspection frequency, has qualified inspectors, and if the programs comply with the bridge inspection and inventory requirements. The reviews are conducted on three levels: (a) the FHWA division office conducts an annual review of the State's bridge inspection program and discusses with State officials the State's compliance with the minimum requirements of the NBIS; (b) the FHWA regional office conducts additional reviews to determine if the division office audit is reasonable and sound; and (c) the FHWA headquarters office in Washington, D.C., reviews regional programs and provides overall administration of the NBIS.

Over the years, FHWA headquarters has directed its division offices to review the conditions in each State to identify those governmental entities that have not complied with the NBIS. In 1986, FHWA conducted a management review of the New York State Department of Transportation (NYSDOT) bridge inspection program, which encompassed the NYSTA inspection program. (The FHWA division office has never directly reviewed the bridge inspection program of the NYSTA.) The FHWA noted that the NYSTA did not meet the inspection frequency on 50 percent of its bridges. The FHWA also expressed concern that the NYSDOT underwater inspection program was behind schedule.

In November 1987, the FHWA conducted a field survey of all States and found that about 43,000 bridges had overdue inspections. The overdue inspections were 7.5 percent of the 577,000 bridges in the nation. According to the NYSDOT, FHWA data on inspections of bridges within New York indicate that in 1986 and 1987, about 5 to 6 percent of the bridges had not been inspected for more than 2 years.

Before 1985, the FHWA had not emphasized underwater inspections or required FHWA divisions to review the State's underwater inspection capabilities in their annual reviews of the bridge inspection program. As a result of the National Transportation Safety Board's investigation into the collapse of the Chickasawbogue Bridge in April 1985, ^{3/} in June 1985, the FHWA required each State to develop such a program. Each State was to have (as a minimum): (1) written criteria as to when underwater inspection was required, (2) a list of bridges in need of underwater inspections and the frequency needed, (3) method of underwater inspection, and (4) specific records of inspection results and followup to any identified major deficiencies. On April 9, 1986, an FHWA memorandum to each regional administrator stated that if a State did not have an underwater inspection program, the State was not complying with the NBIS.

^{3/} For more information, see Highway Accident Report--"Collapse of the U.S. 43 Chickasawbogue Bridge Spans Near Mobile, Alabama, April 24, 1985" (NTSB/HAR-86/01).

In its investigation of the collapse of the Mianus River Bridge, 4/ and again in its investigation of the collapse of the Chickasawbogue Bridge, the Safety Board found that the annual reviews of the State bridge inspection programs performed by the FHWA are essentially "paper audits." Reviews by the FHWA division, region, and headquarters do little more than verify that State bridge inspection reports -- the Structure Inventory and Appraisal Sheet (SI&A) -- are completed and that all the boxes are checked on the SI&A sheets. The sufficiency ratings developed from the SI&A sheets are used to establish priorities for rehabilitation or replacement projects. While FHWA personnel do visit the field to observe bridge inspectors in action, the visits are not frequent enough for FHWA personnel to observe the inspection of all types of bridges within the States.

The need for proper audits and reviews was highlighted in both investigations. As a result of the Mianus River Bridge investigation, the Safety Board, on July 19, 1984, issued Safety Recommendation H-84-56 to the U.S. Department of Transportation (DOT):

Direct the DOT Inspector General to review the Federal Highway Administrator's bridge inspection audit program for its sufficiency in establishing State compliance with the National Bridge Inspection Standards.

The DOT responded that three Inspector General audits of FHWA bridge programs had been expanded to include bridge inspection, and that the Inspector General's office would review the effectiveness of FHWA in obtaining compliance with the NBIS. As a result of this action, recommendation H-84-56 has been classified "Closed--Acceptable Action."

On May 15, 1987, the DOT Office of the Inspector General, Region 3 forwarded copies of a final report on the audit of the Quality of Bridge Inspection to the FHWA Region 1 Administrator. The audit had been conducted at the FHWA Region 1 office, the FHWA division offices, and State Highway offices in three Region 1 States -- New York, New Jersey, and Vermont. The audit included a review of bridge inspections made predominantly from June 1984 to June 1986, and its objectives were to evaluate the adequacy of (1) State Highway Agency Office bridge inspection procedures and internal controls for ensuring that bridge inspections were complete and thorough and (2) FHWA policies and procedures for determining whether the State Highway offices' bridge inspection programs were in compliance with the NBIS.

4/ For more information, see Highway Accident Report--"Collapse of a Suspended Span of Interstate Route 95 Highway Bridge Over the Mianus River, Greenwich, Connecticut, June 28, 1983" (NTSB/HAR-84/03).

The results of this audit indicated that management of the bridge inspection programs in FHWA Region 1 needed improvement because full compliance with the NBIS in Region 1 had never been achieved during the preceding 15 years. Among other deficiencies, the audit indicated that before June 1985, the FHWA had not emphasized underwater inspections and had not required the FHWA divisions to review the States' underwater inspection capabilities. Following a June 26, 1985, FHWA directive on NBIS underwater inspections, the audit indicated that the three States had performed underwater inspections on selected bridges but had not established formal comprehensive programs to identify all bridges requiring an underwater inspection. In New York, only 2 of the 11 transportation regions in the State had performed any underwater inspections.

Although the FHWA audit report made no recommendations concerning underwater inspections, it concluded that the FHWA Region 1 bridge inspection program was below standard primarily because the region had not required the States to allocate sufficient resources to bridge inspection programs and to the development of capable inspection organizations. Further, Region 1 had not taken aggressive action such as the temporary suspension of Federal aid to encourage the States to comply with the NBIS.

The FHWA was already aware that the NYSTA was not inspecting its bridges within the time specified by the NBIS. In its 1986 review of the New York State Bridge Program, the FHWA New York division office pointed out that of the approximately 250 bridges that the NYSTA needed to inspect, 50 percent had not been inspected within the last 2 years. In addition, the below-water substructural components of several of these bridges, including the Schoharie Creek Bridge, had never been inspected.

On January 27, 1988, the DOT Office of the Inspector General informed the Safety Board that it had completed an audit of the FHWA National Bridge Inspection Program (NBIP) for the period from January 1984 through June 1986. The objectives of the audit were to evaluate the adequacy of the States' programs for conducting bridge inspections and FHWA's controls for managing the NBIP. They found weaknesses in the bridge inspection programs of the seven States audited, including New York State. The audit, which included information from the FHWA Region 1 audit previously mentioned, showed that States had not performed underwater inspections, established adequate internal controls, or conducted thorough inspections. While the FHWA has acted to strengthen its controls for managing the NBIP, the Office of the Inspector General found that the FHWA had not adequately (1)

monitored essential elements of the States' bridge inspection programs, (2) ensured that States were providing written responses indicating the corrective action taken on identified deficiencies, and (3) evaluated the FHWA divisions' monitoring of the States' bridge inspection programs. Further, the Inspector General found that these conditions existed because (1) standards and other criteria did not clearly require the State to perform underwater inspections and establish internal controls over bridge inspections, (2) States did not have the proper equipment available for making inspections, (3) States were not required to document corrective actions taken on deficiencies reported by bridge inspectors, (4) States had not allocated sufficient resources to the bridge inspection program, and (5) the FHWA had not established sufficient control for monitoring the States' bridge inspection programs. The DOT Inspector General also made eight recommendations, and the FHWA responses to the recommendations were published in the DOT Inspector General's report.

Based on its prior investigations of bridge accidents and on the DOT Inspector General's findings and recommendations, the Safety Board concludes that, as an agency, the FHWA has lacked aggressiveness and initiative in formulating and implementing a comprehensive bridge inspection program among the States. Moreover, the FHWA has been particularly slow to encourage the States to adopt comprehensive underwater inspection programs and to provide guidance on the proper inspection techniques and procedures that should be employed.

With regard to the State of New York, the Safety Board believes that despite the distinct institutional difference between the NYSDOT and the NYSTA, the FHWA should have held the State responsible for the inspection of all bridges on public roads, including the bridges on the Thruway, in accordance with the NBIS, and withheld Federal aid pending NYSDOT's acceptance of its responsibility. As the matter stood, NYSTA's inadequate inspections, although reported to the NYSDOT, were never carefully scrutinized to detect and correct the inadequacies.

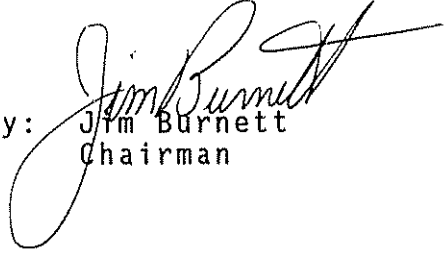
The Safety Board recognizes that FHWA management's response to the DOT Inspector General's recommendations, if fully implemented, will correct many of the deficiencies with the NBIP as implemented by the various States. However, the Safety Board also recognizes that the FHWA has had difficulty in the past in obtaining State compliance with the NBIS and with the development of programs to provide adequate guidance on inspection techniques and procedures. Consequently, the Safety Board believes that regular scrutiny by the DOT Inspector General is needed to ensure effective FHWA oversight of the States' compliance with the NBIS.

Therefore, the National Transportation Safety Board recommends that the U.S. Department of Transportation:

Direct the DOT Inspector General to periodically review the Federal Highway Administration's bridge inspection audit program for its sufficiency in establishing State compliance with the National Bridge Inspection Standards. (Class II, Priority Action) (H-88-21)

Also, the Safety Board issued Safety Recommendations H-88-12 through 15 to the American Association of State Highway and Transportation Officials; H-88-16 through -20 to the Federal Highway Administration; H-88-22 to the New York State Department of Transportation; and H-88-23 to the American Association of State Highway and Transportation Officials, the International Bridge, Tunnel and Turnpike Association, the National Association of Counties, the National League of Cities, and the National Association of Towns and Townships.

BURNETT, Chairman, KOLSTAD, Vice Chairman, and LAUBER and NALL, Members, concurred in this recommendation.

By: 
Jim Burnett
Chairman