
Office of Inspector General
Audit Report

*FRA's Interim Statement of Policy
on the Safety of Railroad Bridges*

Federal Railroad Administration

Report Number: TR-1999-077

Date Issued: March 31, 1999

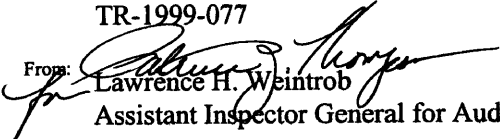




Memorandum

U.S. Department of
Transportation
Office of the Secretary
of Transportation
Office of Inspector General

Subject: **ACTION: Report on FRA's Interim Statement of** Date: **March 31, 1999**
Policy on the Safety of Railroad Bridges
TR-1999-077

From: 
Lawrence H. Weintrob
Assistant Inspector General for Auditing

Reply to
Attn. of: JA-1

To: Federal Railroad Administrator

We are providing this report for your information and use. Your March 19, 1999 comments to our March 5, 1999 draft report were considered in preparing this report. A synopsis of the report follows this memorandum.

In your comments to the draft report, you concurred with the report findings and recommendations. We consider your comments and actions planned to be responsive to each recommendation. However, in order to consider the recommendations resolved, FRA will need to provide action target dates for completing each of the proposed actions. This information should be furnished to this office within 15 days of this report. Additionally, we request FRA provide this office copies of its final bridge safety policy and revised bridge safety compliance program (as structured in response to the audit recommendations). Please note that the actions planned by FRA are subject to the followup provisions of Department of Transportation Order 8100.1C.

We appreciate the cooperation and assistance extended by you and your staff. If you have any questions, or require additional information, please contact me at 366-1992 or Patricia J. Thompson, Deputy Assistant Inspector General for Surface Transportation, at 366-0687.

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Attachment

FRA's Interim Statement of Policy on the Safety of Railroad Bridges Federal Railroad Administration

Report No. TR-1999-077

March 31, 1999

Objective

The objective of the audit was to determine whether the Federal Railroad Administration's (FRA) interim statement of policy (policy) is sufficient to ensure railroads established effective bridge inspection and management programs (bridge programs).

Background

Over a recent 10 year period, Class I railroads¹, which own 82 percent of the nation's 100,000 railroad bridges, have experienced an 8 percent increase in average train loads, from 2,662 tons in 1988 to 2,861 tons in 1997. In addition, technological advancements have allowed use of larger, longer freight cars, increasing carload capacity from 263,000 to 315,000 pounds². Railroads have also introduced double-stacked container railcars for their intermodal rail service³ which, according to the Association of American Railroads, has grown from 3 million trailers and containers in 1980 to 8.7 million in 1997. FRA officials project that rail traffic will increase annually through the year 2006. Therefore, there is a clear need to focus on the structural integrity of bridges due to the trend toward heavier loads and increased traffic levels.

The need to focus on structural integrity of bridges is also driven by the aging and composition of the nation's bridges. In 1992 and 1993, FRA conducted a bridge safety survey, which found that more than half of the nation's 100,000 bridges were built before 1920. Sixty-eight percent of the bridges are made of metal or timber, which are both vulnerable to additional stresses and fatigue from increases in weight and traffic. Another 20 percent of the bridges are made of masonry, which are vulnerable to deterioration more from the effects of time and nature than from trainloads. The remaining 12 percent of the bridges were not identified by bridge type. The following chart depicts the number of railroad bridges by type of railroad.

¹According to the Association of American Railroads, Class I railroads are those that have operating revenue of \$255 million or more, and Class II railroads are those that have operating revenues between \$20.4 and \$255 million. The Association of American Railroads defines Class III railroads as local and switching/terminal railroads.

²Source: GAO Report RECD-97-142, Rail Transportation: FRA's New Approach to Railroad Safety.

³Intermodal rail service is the movement of trailers or containers by rail and at least one other mode of transportation.

RAILROAD BRIDGE POPULATION

Railroad Type	Number of Bridges ⁴	Percent
Class I	82,676	82%
Class II	6,216	6%
Class III	10,260	10%
Passenger	1,749	2%
Totals	100,901	100%

Source: FRA 1992 – 1993 Railroad Bridge Safety Survey

FRA conducted its survey in 1992 and 1993 to evaluate whether the condition of railroad bridges posed a significant hazard to the safety of the public. The results of the survey indicated that, although Class I and Class II freight railroads and major passenger and commuter railroads had comprehensive, effective bridge programs, the quality of bridge programs at the smaller, Class III railroads varied greatly. For example, 11 of 39 small railroads surveyed had no record of having inspected their bridges. While FRA did not consider this a systemic problem⁵, FRA noted that the consequences of a bridge failure on a small railroad could be as severe as on a large railroad, with substantial costs and the same risk of human casualties and environmental damage. FRA concluded that, in the future, the railroad industry will need to closely monitor bridge integrity and capacity to ensure continued safe transit. As a result, FRA issued an interim policy to provide technical guidelines it deemed essential for the railroads to maintain successful bridge programs.

The 12 guidelines included in the interim policy were based on engineering criteria used by the railroad industry, published in the American Railway Engineering and Maintenance-of-Way Association's Manual of Railway Engineering. Key elements of the guidelines include determining current bridge capacity and load ratings; performing and documenting annual bridge inspections; and verifying that bridges not owned by the operating railroad are maintained by the owner. (See Attachment 1 for the 12 guidelines.) The guidelines, however, are only suggested criteria for railroads to use to ensure the structural integrity of bridges. FRA chose to adopt a voluntary policy, rather than issue regulations, since FRA did not consider bridge safety a systemic

⁴ Represents the number of bridges carrying railroad track. According to FRA's Bridge Engineer this figure represents the most current estimate of the number of bridges carrying railroad track.

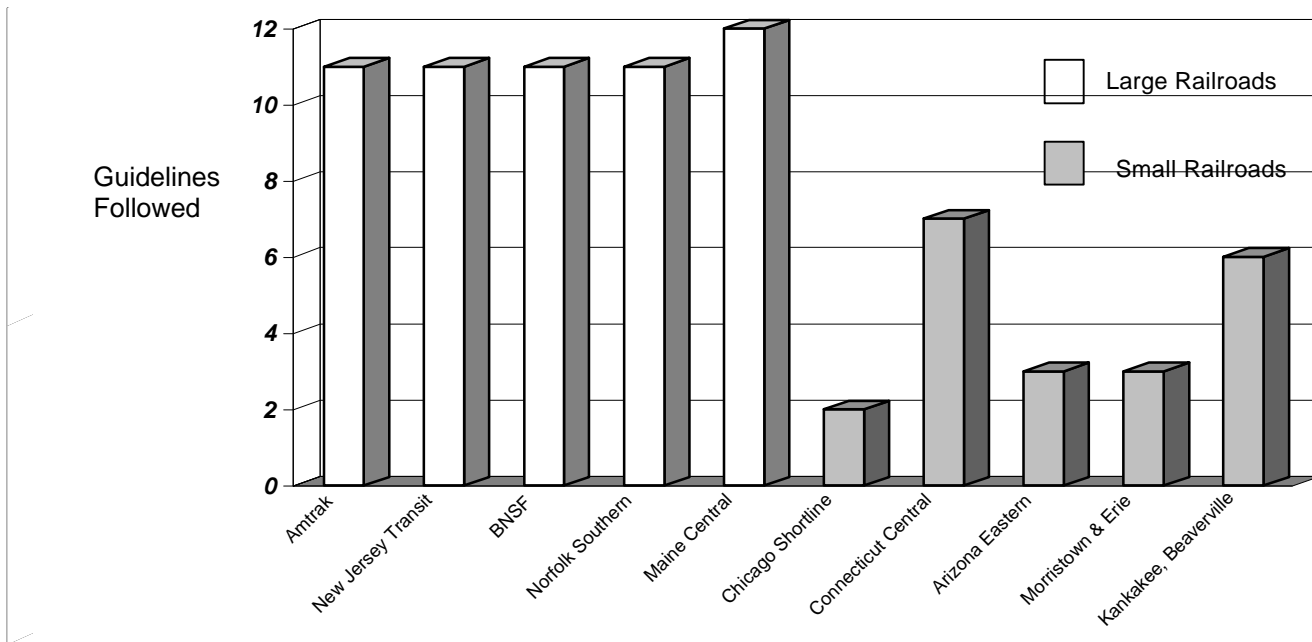
⁵ FRA noted that, in the past five decades, no fatalities had been caused by the structural failure of a railroad bridge. During the period 1993 through 1997, only 11 train accidents were caused by bridge misalignment or failure.

problem. The interim policy also described a monitoring program, to be performed by FRA inspectors, of the railroads' bridge programs. FRA expects to issue the final policy by April 1999.

Results

We concluded the technical elements of the policy, if followed, are appropriate for maintaining effective bridge programs, which in turn contribute to ensuring bridges remain capable of managing current rail traffic as well as projected increases. However, as currently proposed, the policy is not mandatory and implementation by some railroads could be improved. While the large railroads had comprehensive bridge programs that generally incorporated the bridge safety guidelines, the small railroads had less comprehensive programs⁶. (See chart below.) Details of the specific technical guidelines followed by each railroad are contained in Attachment 2.

Technical Policy Guidelines Followed By Railroads⁷



Although the small railroads only own approximately 10 percent of the nation's 100,000 bridges, their bridge programs continued to reflect deficiencies similar to those identified by FRA's survey 5 years ago. For example, only one of the five small railroads we reviewed performed and documented annual inspections. This indicates

⁶ For the purposes of this audit, we use the term "large railroads" to include Class I, Class II, and major passenger and commuter railroads. We use the term "small railroads" to include Class III railroads.

⁷ Represents guidelines incorporated into the railroads' bridge programs that were substantiated by documentation.

small railroads have not achieved acceptable improvement in the intervening years. Since large freight and passenger railroads also operate over bridges owned by the small railroads, and sometimes even transport hazardous materials, the potential consequences of a bridge failure could be severe.

We also found that FRA had not implemented a program, as described in its policy, to monitor the railroads' bridge inspection programs. FRA may inspect railroad bridges during track inspections and does inspect railroad bridges in response to specific complaints. However, FRA has not conducted periodic or regularly scheduled evaluations of railroad bridge inspection and management practices since FRA's Director, Safety Assurance and Compliance, does not consider railroad bridge programs a high priority for assigning its resources. In addition, FRA Regional track personnel did not consider track inspectors adequately trained to perform bridge inspections. Accordingly, FRA needs to implement its own monitoring of railroads' bridge inspection programs to have reasonable assurance of the safety and structural integrity of railroad bridges.

FRA's Railroad Bridge Policy Has Not Improved The Quality Of Small Railroads' Bridge Programs

FRA's policy on rail bridge safety provides railroads technical guidelines for establishing effective bridge programs. The guidelines incorporate a wide variety of effective bridge management and inspection methods and represent the general criteria FRA will use to evaluate each railroad's bridge inspection and management practices. Of the 10 bridge programs we reviewed, the 5 large railroads had comprehensive programs that incorporated all but one (relating to verifying bridge maintenance) of the bridge safety guidelines. However, the bridge programs of the five small railroads we reviewed continued to exhibit problems similar to those FRA found in its survey 5 years ago.

Because we were concerned with the adequacy of the small railroad bridge programs we reviewed, we enlisted the U. S. Army Corps of Engineers to evaluate the structural condition of four bridges owned by two of the small railroads, the Arizona Eastern Railway and Morristown & Erie Railway. While the Corps of Engineers did not identify any deficiencies that were critical to the bridges' overall structure, it did find soil erosion and debris buildup that could undermine the stability of the bridges supporting substructure during flooding conditions. An example of debris buildup at Morristown & Erie Railway Bridge 5.73 is pictured below. We provided copies of the Corps of Engineers' bridge inspection reports to FRA and both railroads in advance of this report.



“Debris Buildup Next To Bridge”

Examples of deficiencies in implementing FRA’s policy guidelines are shown below.

- *FRA’s policy guidelines state bridge capacity ratings should be determined from analyses of bridge structural components, their condition, and the stresses imposed by loads during transport over the bridge.* The rating is necessary because unrestricted transit of loads in excess of a bridge’s capacity can shorten the useful life of the bridge and jeopardize the safety of the trains operating over it. None of the five small railroads we reviewed fully implemented this guideline. For example, the General Manager at the Kankakee, Beaverville & Southern Railroad said the railroad relied on past operating loads as an indication of a bridge’s current capacity, but he could not provide documentation for us to evaluate past equipment loads. Therefore, it is uncertain how or whether the railroad determined past or current loads. The safety concerns associated with exceeding bridge capacity are compounded if adequate bridge inspections are not conducted with recommended frequency, as discussed in the next paragraph.
- *FRA’s policy guidelines indicate that bridge inspections should be performed at least annually and should be recorded to ensure bridges conform to their design structure and bridge capacity rating.* Only one of the five small railroads we reviewed (Kankakee, Beaverville & Southern Railroad) performed verifiable, annual inspections. Three of the five railroads stated they performed bridge inspections annually, but we were unable to verify any inspections because the railroads did not have inspection documentation. The Chicago Short Line Railway, for example, did not require inspectors to prepare bridge inspection reports. The fifth railroad, Connecticut Central Railroad, which did not own any of the bridges it operated over,

did maintain documentation. However, the documentation showed that 12 of 17 bridges the railroad operated over were inspected every 2 years, and the remaining 5 bridges every 4 years.

- *FRA's policy guidelines state railroads that operate over a bridge owned by another entity should verify the bridge has been properly maintained by the owner to ensure the bridge will safely support the trains that operate over it and the loads imposed on it.* Seven of the railroads we reviewed (four large railroads and three small railroads) that operated over bridges owned by others did not verify the bridges were properly maintained. The Superintendent at the Chicago Short Line Railway stated he was unaware of FRA's policy, and indicated the railroad did not verify whether the bridge owners (CSX Transportation, Conrail, and Belt Railway of Chicago) had inspected and maintained the 21 bridges the Chicago Short Line Railway operated over.

FRA Needs to Improve Monitoring of Railroad Bridge Programs

We found that FRA has not implemented the bridge inspection monitoring program, as described in its policy, to ensure railroads maintain the structural integrity of their bridges. FRA's Bridge Engineer, who is responsible for analyzing and overseeing the general state of repair of railroad bridges, indicated he performed little followup on bridge programs after FRA completed its 1992-1993 survey. In addition, Regional track inspectors only inspected railroad bridges during track inspections if they found a serious problem with the track carried by the bridge, or in response to complaints about a specific bridge, or as part of special reviews requested by FRA Headquarters. However, inspecting bridges in a reactive manner is not the most effective way of assuring safety. In fact, "reaction" is contrary to FRA's "proactive" safety program. While FRA has performed reviews of railroad bridge programs as part of its Safety Assurance and Compliance Program (SACP), FRA has not made these reviews a requirement. Even if the reviews were a standard part of the SACP, it is important to remember that FRA does not plan to perform SACP assessments of all railroads⁸.

FRA did not perform routine or proactive evaluations of railroad bridge programs because it did not consider bridge programs a high priority for assigning its limited staff resources. FRA's Acting Associate Administrator for Safety stated FRA has only one Bridge Engineer and does not have the resources to adequately inspect the railroad industry's bridges. As of July 1998, FRA had 67 track inspectors and 49 State track inspectors to monitor over 600 railroads and more than 100,000 railroad bridges. Although FRA's principal regional inspectors, track inspectors, track specialists, and

⁸Audit fieldwork for OIG Audit Report TR-1998-210, "Safety Assurance and Compliance Program," September 30, 1998, disclosed bridge program reviews were only performed for 2 of the 10 SACP projects reviewed.

State track inspectors received training on the principles and practices of railroad bridge inspection, track personnel in six of eight FRA Regions stated the training was not detailed enough to enable them to perform bridge inspections.

In view of the aging of the nation's railroad bridges and the increased loads they are being required to carry, we concluded FRA needs to finalize its policy and implement its own monitoring.

Recommendations

We recommended the Federal Railroad Administrator finalize the bridge safety policy. Furthermore, the policy's guideline on bridge safety responsibility should be rewritten to indicate specific actions FRA considers necessary for large and small railroads to safeguard train operations over their bridges and bridges owned by others.

We also recommended FRA adopt a graduated approach to improve its monitoring of railroad bridge programs. Specifically, we recommended FRA assign sufficient staff to conduct routine periodic evaluations of railroad bridge programs, ensure that such personnel are adequately trained, and maximize FRA's efforts by targeting resources to conduct evaluations of bridge programs of small railroads.

Additionally, we recommended FRA further enhance its monitoring efforts by developing a consistent methodology for conducting routine evaluations of railroad bridge programs. If FRA's monitoring and evaluation efforts disclose continued bridge program deficiencies, FRA should issue mandatory bridge safety regulations to ensure the safety of railroad bridges is maintained.

Management Position

FRA concurred with the report findings and recommendations and has taken or planned actions to address the recommendations. To finalize its bridge safety policy, FRA is currently seeking approval from the Office of the Secretary for resolution of an issue related to the Federalism assessment of the impact of the policy on State bridge regulations. In addition, FRA also agreed to rewrite the policy's guideline on bridge safety responsibility to indicate specific actions FRA considers necessary for large and small railroads to safeguard train operations over their bridges and bridges owned by others.

FRA also agreed that a well-structured, programmatic approach to the evaluation of railroad bridge safety programs should be implemented at an early date. With respect to staff resources, FRA will continue to request additional staffing for bridge safety and other important safety priorities and allocate resources made available by the Administration and the Congress with the objective of optimizing safety results. Additionally, FRA will include in its track inspector training programs an appropriate reinforcement of the training already provided, together with an update on the final bridge policy. The training will also include an explanation of FRA's bridge safety compliance program (as structured in response to the audit recommendations) and a restatement of the agency's expectations of track personnel in the field. FRA agreed that small railroads pose the most significant challenge with respect to management of their bridges, and will target its bridge policy compliance efforts at small railroads.

FRA indicated that it could not possibly commit to periodic evaluations of all railroad bridge programs without significantly reducing attention to track safety, roadway worker safety, and other important priorities. However, FRA agreed that a manageable number of railroads, on a selected basis, should be evaluated each fiscal year. This approach should permit FRA to address the most urgent emerging safety needs.

FRA also provided additional comments addressing suggested technical corrections and clarifications. These comments addressed the effect that bridge aging and composition, as well as stresses imposed by increased train loads, have on the bridges that carry those trains; and the impact stronger freight car wheel assemblies have on car weight. FRA also commented that the bridge defects cited by the U.S. Army Corps of Engineers were not critical structural deficiencies. FRA further commented that the training provided to its track inspectors was to observe bridge conditions, rather than perform bridge inspections.

Office of Inspector General Comments

We reviewed FRA's suggested corrections and clarifications and made changes to the report as appropriate. Our specific comments in response to FRA's concerns regarding stresses imposed on rail bridges, the structural integrity of bridges inspected by the U.S. Army Corps of Engineers, and the adequacy of FRA's track inspector training are discussed in the Audit Comment section of this report.

We also reviewed the actions taken and planned by FRA and determined these actions to be responsive to the report's recommendations. However, in order to consider the recommendations resolved, FRA will need to provide action target dates for completing each of the proposed actions. Additionally, we request FRA provide the OIG copies of its final bridge safety policy and revised bridge safety compliance program (as structured in response to the audit recommendations). The actions taken and planned by FRA are subject to the followup provisions of Department of Transportation Order 8100.1C.

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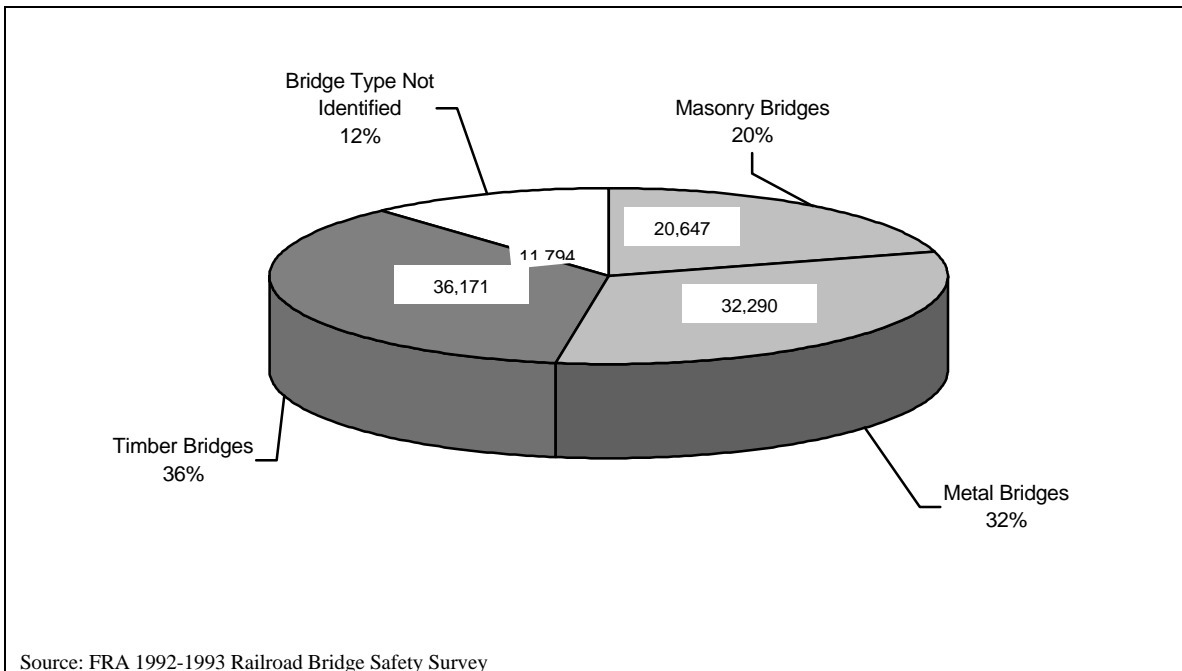
I. INTRODUCTION

Background

The Federal Railroad Administration's (FRA) Office of the Associate Administrator for Safety is responsible for the administration of rail safety programs. One of the office's functions is to inventory railroad bridges and to evaluate the structural integrity of railroad bridges and railroad bridge programs. Within the Office of the Associate Administrator for Safety, FRA's Bridge Engineer is responsible for analyzing and overseeing the general state of repair of railroad bridges.

The need for effective railroad bridge programs was addressed in FRA's 1992-1993 bridge safety survey which indicated that 68 percent of the nation's railroad bridges, which are made from timber and metal (see chart below), are subject to additional stresses and fatigue from future heavier loads and increased rail traffic.

**BRIDGE POPULATION
FOR ALL U.S. RAILROADS BY TYPE**

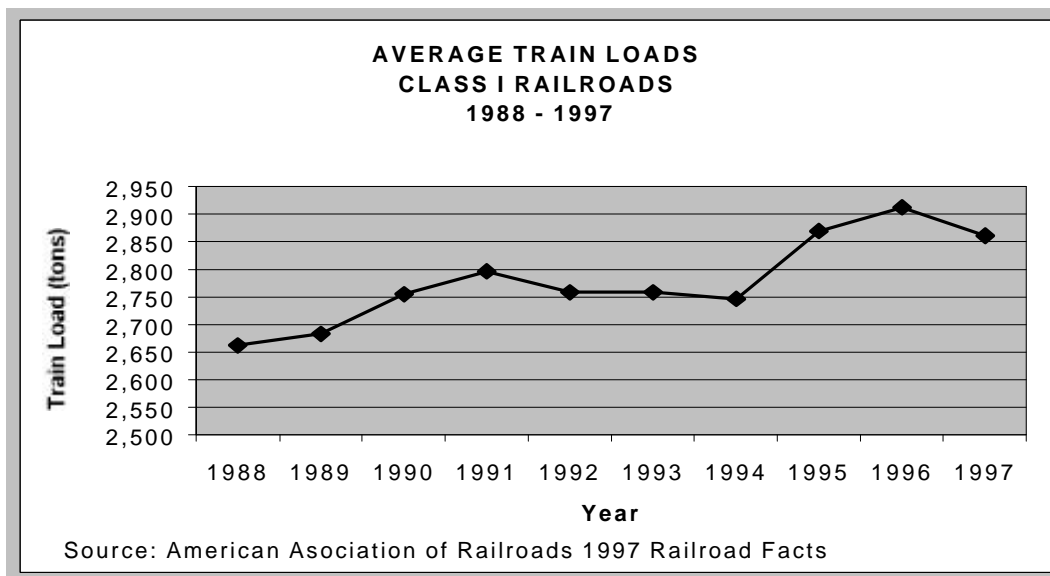


FRA's survey indicated that, over the next two decades, the railroad industry will need to closely monitor older metal bridges' capacity to safely handle the heavier loads imposed by modern railcars. FRA further stated the high maintenance cost

of timber trestles under the heavy, frequent loads is rendering many of them uneconomical for continued service. Masonry bridges are subject to greater deterioration from the effects of time and nature than from trainloads.

Our analysis of rail freight traffic information published by the Association of American Railroads indicates that, over the past 10 years, Class I railroads, which own 82 percent of the nation's railroad bridges, have experienced an 8 percent increase in average train loads, from 2,662 tons in 1988 to 2,861 tons in 1997 (see chart below).

INCREASES IN CLASS I RAILROAD TRAIN LOADS



In addition, the railroad industry has made improvements in technology and advancements in the strength of freight car wheel assemblies which have allowed railroads to use larger and longer freight cars and increase freight car maximum gross load capacity from 263,000 to 315,000 pounds⁹. Railroads have also introduced double-stacked container railcars for their intermodal rail service¹⁰, increasing the load of the railcars. According to the Association of American Railroads, intermodal traffic has grown from 3 million trailers and containers in 1980 to 8.7 million in 1997. FRA officials have also indicated that rail traffic is expected to increase annually through the year 2006.

⁹ GAO Report RECD-97-142, Rail Transportation: FRA's New Approach to Railroad Safety.

¹⁰ Intermodal rail service is the movement of trailers or containers by rail and at least one other mode of transportation.

In 1992, FRA initiated a railroad bridge safety survey to evaluate whether the condition of railroad bridges posed a significant hazard to the safety of the public. The survey was initiated in response to concerns over the nation's aging bridges, increased traffic and rail loads, and the potential consequences of a bridge failure. The survey reported that more than half of the nation's 100,000 railroad bridges were constructed prior to 1920.

RAILROAD BRIDGE POPULATION

Railroad Type	Number of Bridges¹¹	Percent
Class I	82,676	82%
Class II	6,216	6%
Class III	10,260	10%
Passenger	1,749	2%
Totals	100,901	100%

Source: FRA 1992 – 1993 Railroad Bridge Safety Survey

FRA's survey reported on the policies and practices used by 80 railroads that own more than 90 percent of the nation's railroad bridges. The objective of the survey was to determine if the railroad industry managed the inspection, maintenance, and condition of track-carrying bridges well enough to ensure public safety or if Federal intervention was needed. FRA determined that Class I, Class II, and major passenger and commuter railroads had comprehensive, effective bridge programs. However, FRA found that the quality of bridge programs at the smaller, Class III railroads varied greatly. FRA found some small railroads had exemplary programs, while others were unaware of the existence of bridges on their property and the problems that could arise from bridge failure. For the 39 Class III railroads surveyed, FRA determined 11 railroads had no record of having inspected their bridges, 2 railroads could not document the frequency of bridge inspections, and 1 railroad assumed the bridges were being inspected by the owning state agency.

In response to the survey, FRA issued its interim statement of policy (policy) on bridge safety in April 1995 to provide railroads technical guidelines FRA considered essential for successful bridge programs (Attachment 1). The policy guidelines were based on the same engineering criteria used by the railroad

¹¹ Represents the number of bridges carrying railroad track. According to FRA's Bridge Engineer this figure represents the most current estimate of the number of bridges carrying railroad track.

industry, published in the American Railway Engineering and Maintenance-of-Way Association's Manual of Railway Engineering.

The policy states that FRA inspectors would conduct regular evaluations of railroad bridge programs. The objective of these evaluations is to document the practices of the evaluated railroad and to disclose any program weaknesses affecting public safety. The policy states that when problems are disclosed, FRA will seek a cooperative resolution with the railroad. If FRA and the railroad fail to resolve the problem and public safety is jeopardized, FRA will issue an emergency order against the railroad. FRA concluded that, even without specific bridge safety regulations, it maintains authority under 49 U.S. Code Section 20101 (formerly the Federal Railroad Safety Act of 1970), to inspect any railroad facility that affects safety and, if necessary, to remove it from service. In February 1996, for example, FRA issued Emergency Order No. 19, requiring Tonawanda Island Railroad to discontinue operation of trains over a bridge until repairs were made. FRA inspected the bridge in response to concerns raised by a New York State railroad safety inspector.

Scope and Methodology

We initially contacted 26 railroads in order to obtain an understanding of their bridge programs. The railroads included 2 Class II regional freight railroads, 22 Class III local freight railroads, and 2 passenger railroads, and were selected because of bridge program related problems identified in FRA's survey¹². Railroad officials were interviewed to provide information on the number of bridges operated over, ownership of the bridges, elements of the railroad's bridge program, and qualifications of their bridge staff. Based on the responses received, we selected 3 of the 26 railroads, and 7 additional railroads to visit. The railroads were judgmentally selected to provide a mix of freight and passenger railroads: 2 Class I freight railroads, 1 Class II regional freight railroad, 5 Class III local freight railroads, and 2 passenger railroads.

¹² Class I railroads were excluded from our initial sample since FRA's 1992-1993 bridge survey did not identify problems with these railroads' bridge programs. However, to provide comprehensive coverage of railroad bridge programs for both large and small railroads, we included Class I railroads in our sample of railroads to be visited.

RAILROADS VISITED

Class	Railroad	Location	Bridges Owned
I	Burlington Northern Santa Fe Railway	Fort Worth, TX	14,083
I	Norfolk Southern Corporation	Atlanta, GA	7,325
II	Maine Central Railroad	N. Billerica, MA	546
III	Arizona Eastern Railway	Claypool, AZ	182
III	Chicago Short Line Railway	Chicago, IL	8
III	Connecticut Central Railroad*	Middletown, CT	0
III	Kankakee, Beaverville & Southern Railroad	Beaverville, IL	74
III	Morristown & Erie Railway	Morristown, NJ	15
**	Amtrak	Philadelphia, PA	1,165
**	New Jersey Transit	Newark, NJ	609

*Connecticut Central Railroad was purchased by Providence and Worcester Railroad after we completed our audit fieldwork. Providence and Worcester Railroad purchased the track rights to use the 17 bridges Connecticut Central Railroad operated over.

**Passenger railroads.

Our audit included the review of railroad inspection records, bridge drawings, bridge repair and maintenance records, and consultant reports. We interviewed bridge owners, operating railroad personnel, and staff at FRA Headquarters and regional offices. In addition, we visited FRA regional offices in Cambridge, Massachusetts, and Philadelphia, Pennsylvania, to discuss the bridge program and to review related records.

The Office of Inspector General (OIG) Engineer Advisor assisted in evaluating FRA's policy and bridge inspection training course. The OIG Engineer Advisor also assisted the audit team in evaluating the sufficiency of each railroad's bridge program, and in selecting four bridges for the Corps of Engineers to review. We accompanied the Corps of Engineers on its inspection of one of the four bridges.

This audit was performed in accordance with Government Auditing Standards as prescribed by the Comptroller General of the United States.

II. FINDING AND RECOMMENDATIONS

Finding. Implementation and Monitoring of Railroad Bridge Policy Needs To Be Improved

FRA's policy on the safety of railroad bridges, if followed, is an appropriate approach to maintaining effective bridge programs. However, as currently proposed, the policy is not mandatory, and implementation by some railroads needs to be improved. While the large railroads had comprehensive bridge programs that generally incorporated the bridge safety guidelines, the small railroads had less comprehensive programs. The small railroads' bridge programs continued to reflect deficiencies similar to those identified by FRA's survey 5 years ago. These continued deficiencies indicate the small railroads have not achieved acceptable improvement in the intervening years.

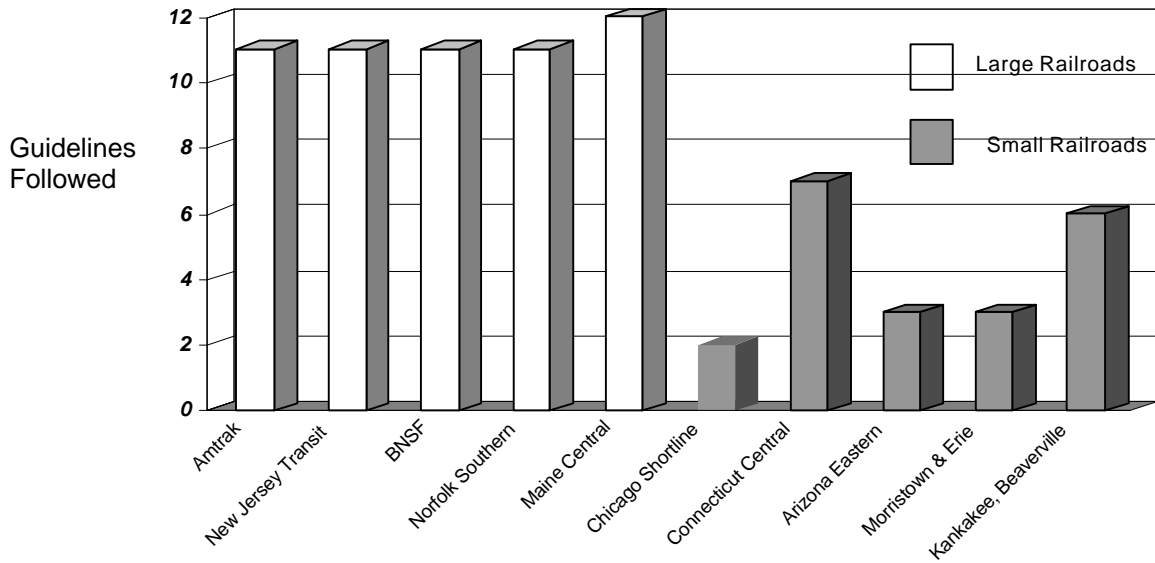
We also found that FRA had not implemented a program, as described in its policy, to monitor the railroads' bridge inspection programs. Although FRA may inspect railroad bridges during track inspections and does inspect railroad bridges in response to specific complaints, FRA does not conduct regular or periodic evaluations of railroad bridge inspection and management programs. Accordingly, FRA needs to implement its own monitoring of railroads' bridge inspection programs to have reasonable assurance of the safety and structural integrity of railroad bridges.

FRA's Railroad Bridge Interim Policy Has Not Improved The Quality Of Small Railroads' Bridge Programs

FRA's policy on rail bridge safety provides railroads technical guidelines for establishing effective bridge programs. The guidelines incorporate a wide variety of effective bridge management and inspection methods and represent the general criteria FRA will use to evaluate each railroad's bridge program. According to the OIG Engineer Advisor, the technical guidelines included in the policy were based on the same engineering criteria used by the railroad industry, published in the American Railway Engineering and Maintenance-of-Way Association's Manual of Railway Engineering. Based on the OIG Engineer Advisor's review of the policy and consultation with a railroad bridge industry expert, the OIG Engineer Advisor concluded the policy is technically sufficient to be followed by the industry to implement safe bridge inspection and management programs to ensure the structural integrity of bridges.

Our review of 10 railroads’ bridge programs found that the 5 large railroads we reviewed had comprehensive bridge programs which incorporated most of the technical guidelines in the policy, while the 5 small railroads we reviewed did not. (See chart below.)

Technical Policy Guidelines Followed By Railroads¹³



Details of the specific technical guidelines that were followed by each railroad are contained in Attachment 2. A discussion of our findings for the large and small railroads follows.

Large Railroads’ Bridge Programs Incorporated Most Policy Guidelines

The five large railroads we reviewed had comprehensive bridge programs that incorporated all but one (relating to verifying bridge maintenance) of the bridge safety guidelines included in the interim policy.

The large railroads’ bridge programs incorporated FRA policy guidelines which included key elements for determining bridge capacity, controlling bridge loads, and performing and documenting annual bridge inspections. For example, Amtrak, a large passenger railroad, maintained a Bridge/Structure Inspection

¹³ Represents guidelines incorporated into the railroads’ bridge programs that were substantiated by documentation.

Manual, bridge inventory list, equipment load drawings, bridge capacity ratings, inspection reports, and bridge repair drawings. At the time of this review, Amtrak was developing a computerized bridge management system to identify bridge inspection and repair history, bridge load ratings, and inspection dates. As of September 1998, Amtrak had 76 positions within its Structures Division to perform inspection and maintenance of the 1,165 railroad bridges Amtrak owns.

All five large railroads we reviewed also had readily accessible bridge design, construction, maintenance, and repair records to permit the determination of safe loads. Norfolk Southern Corporation, for example, which owns 7,325 bridges, maintained original bridge drawings and records of significant repairs. Burlington Northern Santa Fe Railway Company, which owns 14,083 bridges, recorded repairs in its bridge inspection records and plans. The five railroads also followed FRA's policy guideline for bridge loads which states railroads should restrict the movement of railcars and locomotives whose weight or configuration exceed the nominal capacity of the bridges.

We also concluded, based on our review of railroad inspection reports, that the large railroads performed bridge inspections annually, or more frequently, as indicated by the condition of the bridge or bridge traffic levels. New Jersey Transit, for example, which owns 609 bridges, performed bridge inspections at least annually, with open deck bridges inspected every 6 months. Special inspections were performed after unusual weather conditions or damage to a bridge.

However, four of the five railroads that operated over bridges, owned by other large and small railroads, did not verify the bridges were properly maintained. According to FRA guidelines, railroads that operate over a bridge should verify that the bridge has been properly maintained by the owner to ensure the bridge will safely support the trains that operate over it and the loads imposed upon it. Only one of the five large railroads, Maine Central Railroad, followed this guideline. Two other large railroads, Amtrak and Norfolk Southern Corporation, did not verify whether the owners of the bridges they operated over had maintained and inspected the bridges. Amtrak and Norfolk Southern Corporation officials stated their railroads operated over bridges owned or maintained by small railroads. At Burlington Northern Santa Fe Railway Company, the railroad operated over bridges owned by both railroads and non-railroads (such as Federal and local governments, or private companies), but only verified bridge maintenance performed by the non-railroad owners. New Jersey Transit, verified maintenance was performed for all bridges they operated over, except bridges owned by Amtrak.

In response to FRA’s interim statement of policy, the Association of American Railroads commented that the provision for operating railroads to verify bridge owner maintenance responsibilities needed to be clarified. FRA responded that since the policy was a guideline and not a regulation, greater detail was not necessary. FRA also stated that it was not unusual for different arrangements to exist for bridge maintenance responsibility within the railroad industry. FRA stated, for example, that one party may own a segment of track, another party may own the bridge supporting the track, and a third party may dispatch trains over the track supported by the bridge. FRA concluded it did not want to interfere with any railroad arrangement that provides for the safe operations of trains over bridges.

FRA did, however, modify the provisions of this guideline in its proposed final policy, changing the language from “verifying” to “ensuring” that the bridge is being maintained by a responsible organization. Since we found both large and small railroads did not implement this provision as stated in the interim policy, we recommend FRA clarify the guideline in its final policy to provide specific actions it considers necessary to safeguard train operations over bridges that are not owned by the operating railroads.

Deficiencies Identified In Small Railroads’ Bridge Programs

We contacted 24 small railroads identified in the FRA survey to determine if they implemented FRA’s policy guidelines. Based on the information reported by these railroads, we determined the small railroads did not have comprehensive bridge programs which incorporated FRA’s guidelines. We found several variations in the types of bridge programs maintained, the frequency and manner in which inspections were recorded, and the railroads’ identification of their bridges carrying capacity. The following results were compiled based on the information provided by the railroads:

- Bridge Programs**
- 4 railroads had formal written bridge programs
 - 19 railroads had informal bridge inspection programs
 - 1 railroad had no bridge inspection program

- Bridge Inspections**
- 19 railroads prepared bridge inspection reports
 - 5 railroads did not prepare inspection reports

 - 20 railroads inspected bridges at least annually
 - 4 railroads did not inspect bridges at least annually

- Bridge Capacity**
- 13 railroads had bridge capacity ratings
 - 11 railroads did not have bridge capacity ratings

To evaluate the small railroads bridge programs further, we visited 3 of the 24 small railroads that were included in FRA's survey and 2 additional small railroads. During our visits to the railroads, we compared each railroad's inspection and management program to FRA's bridge safety policy. We also reviewed railroad inspection records, bridge drawings, bridge repair and maintenance records, and consultant reports. We also interviewed bridge owners and operating railroad personnel.

Using FRA's interim policy guidelines as criteria for successful bridge programs, we identified several deficiencies in the bridge programs maintained by the five small railroads we evaluated. For example, none of the five railroads had bridge programs that included key guidelines for determining current bridge capacity ratings and bridge loads; and verifying owners properly inspected and maintained their bridges. In addition, only one of the five railroads performed and documented annual bridge inspections. These deficiencies are of particular concern since FRA found similar problems 5 years ago when it completed its 1992-1993 bridge survey. Our findings in each of these areas are discussed below.

Bridge Capacity Ratings and Bridge Loads. The policy states bridge capacity ratings should be determined from analyses of bridge structural components, their condition, and the stress loads imposed during transport over the bridge. In addition, railroads should restrict the movement of trains whose loads exceed the bridge's capacity. Whenever the bridge condition changes or the loads transported increase, the bridge capacity rating should be recalculated. This allows the railroad to properly control loads operating over the bridge. Loads continuing to operate over a bridge in excess of the bridge's capacity can shorten the useful life of the bridge, thereby jeopardizing the safety of the trains operating over the bridges.

We found that none of the five small railroads we reviewed fully implemented FRA guidelines for determining bridge capacity ratings and bridge loads. While these railroads did not determine the current safe capacity of their bridges, each railroad believed the stress of their train loads using the structure did not exceed the bridge's maximum capacity. However, the need for current and accurate bridge capacity ratings and bridge loads is increasingly important because of the aging of the nation's railroad bridges and anticipated increases in future train loads and rail traffic.

At the Arizona Eastern Railway, for example, interviews with the railroad's Roadmaster disclosed the railroad did not perform bridge load capacity ratings and had no documents to identify bridge ratings. In addition, Arizona Eastern Railway did not maintain documents identifying the loads trains placed on its bridges. The railroad's General Manager stated the maximum loads (263,000 pounds) currently operating over its track for its trains were less than the maximum loads (275,000 pounds) carried by trains operated by the previous bridge owner, the Southern Pacific Railroad. However, since the Arizona Eastern Railway did not maintain inspection reports or provide documents identifying repairs made to bridges, the railroad would not be able to determine the current safe load capacity of its bridges.

The Kankakee, Beaverville, & Southern Railroad also did not perform bridge load capacity ratings. Instead, the railroad's General Manager said the railroad relied on past operating loads as an indication of a bridge's current capacity. However, the General Manager could not provide us documentation to evaluate past equipment loads. Additionally, since the railroad did not know when its bridges were constructed, record bridge repairs made, and perform bridge load calculations, the railroad would not be able to determine current bridge capacity ratings. In addition, the railroad did not implement any speed restrictions unless work was being done on a bridge.

Periodic Bridge Inspections. According to FRA's policy guidelines, periodic bridge inspections are necessary to determine a structure's conformance with its design or rating. The guidelines state that the inspections should be performed at least annually according to standard industry practice; should be scheduled from an accurate bridge inventory list that includes the due date of the next inspection; and should be recorded to identify the structure inspected, the date of the inspection, the name of the inspector, the components inspected, and their condition.

Only one of the five small railroads we reviewed performed and documented annual inspections. Although three other small railroads reviewed claimed bridge inspections were performed at least annually, we were unable to verify that the inspections were performed because the railroads did not maintain inspection documentation. The three small railroads either did not prepare bridge inspection reports, or recorded bridge defects on informal notes taken during regular track inspections. At the Chicago Short Line Railway, for example, the railroad stated it performed bridge inspections monthly, but did not provide documentation to support its statements because it did not require its inspectors to prepare bridge inspection reports.

The fifth railroad, the Connecticut Central Railroad, maintained documentation which indicated 12 bridges it operated over were inspected every 2 years by the bridge owner, the Connecticut Department of Transportation (ConnDOT). Our interviews with ConnDOT's Project Engineer disclosed ConnDOT hired consulting engineers to perform routine inspections every 2 years on the bridges' main structure components. The Connecticut Central Railroad also operated over five bridges that were inspected by the Providence & Worcester Railroad. According to information provided by the railroad's Chief Engineer, the Providence & Worcester Railroad's bridges were inspected every 4 years.

Verification of Bridge Maintenance Activities. Under FRA guidelines, bridge owners are responsible to provide proper inspection and maintenance to ensure a bridge will safely support trains that operate over it and loads imposed upon it. In addition, FRA policy states the operating railroad that authorizes train movements over a bridge should verify that the maintenance responsibility for the bridge is being fulfilled. The policy also states the bridge owner may assign responsibility for maintenance of the bridge to another party to ensure the safety of the bridge.

None of the three small railroads reviewed, that operated over bridges owned by others, verified inspection and maintenance of bridges. Officials at two of these three railroads stated they were not aware of the FRA policy. The Chicago Short Line Railway, for example, operated over 21 bridges owned by other railroads. However, the Chicago Short Line Railway's Superintendent, who was unaware of FRA's policy, stated the railroad did not verify whether the bridge owner had inspected and maintained the bridges. In addition, the one small railroad assigned inspection and maintenance responsibility by the bridge owners did not provide documentation it inspected the bridges.

Bridge Inspections Performed by the Corps of Engineers

Because we were concerned with the adequacy of the small railroad bridge programs we reviewed, we enlisted the U. S. Army, Corps of Engineers to evaluate the structural condition of four bridges owned by two of the small railroads, the Arizona Eastern Railway and Morristown & Erie Railway. We selected specific bridges based on our review of engineering reports prepared by outside consultants that identified bridges requiring repair. The Corps of Engineers found that while no deficiencies were identified which were critical to the bridges' structure, the bridges were vulnerable to substructure failure during flooding conditions due to soil erosion and debris buildup.

Arizona Eastern Railway Bridges

An August 1995 engineering report, evaluating the railroad's rail system, concluded Arizona Eastern Railway's timber bridges were in fair to poor condition and identified more than 60 timber bridges needing repairs immediately or within 6 months. Specific concerns were addressed for bridges MP 1195.22 and MP 1196.31. The Corps of Engineers' June 1998 inspection of Bridge MP 1195.22 concluded the bridge was in good structural condition, but soil erosion was causing distress that could undermine the railroad tracks and allow additional movement of the backwall. (See picture below.)



“Bridge MP 1195.22 - Backwall Movement Due To Erosion”

The Corps of Engineers' observation of Bridge MP 1196.31 found the bridge was in fair to poor condition and that flood conditions could cause soil erosion and bridge failure. The Corps of Engineers recommended the railroad replace broken bridge members, and monitor future soil erosion. During the Corps' observation, the railroad's General Manager indicated Bridge MP 1196.31 was scheduled to be replaced in the near future.

Morristown and Erie Railway Bridges

A November 1996 consultant's inspection report identified substandard conditions of Morristown and Erie Railway's bridges MP 5.73 and MP 8.28. The report

identified decay on Bridge MP 5.73 that required repairs within 1 to 5 years. The Corps of Engineers' inspection of Bridge MP 5.73 found the bridge was in good to fair condition. However, 5 out of 10 piers were exposed to decay and debris making the bridge vulnerable to further erosion and weakening its support structure. (See picture below.)



“Bridge 5.73 - Exposed Piers Subject To Decay”

Morristown & Erie's bridge MP 8.28 was reported by the consultant in 1996 to be unsafe and subject to failure at any time. The consultant recommended extensive repairs be made as soon as possible or at least within 1 year. At the time of the Corps of Engineers' June 1998 visit, the railroad was repairing Bridge MP 8.28, which precluded the Corps of Engineers from performing a detailed inspection. These repairs were being made nearly 2 years after the consultant's inspection report recommended the railroad correct unsafe conditions on this bridge. Based on our review of small railroads' bridge programs and the Corps of Engineers bridge inspections, we concluded that the small railroads could improve their bridge programs by following FRA policy guidelines.

FRA Needs to Improve Monitoring of Railroad Bridge Programs

FRA's interim policy states that FRA inspectors will conduct regular evaluations of railroad bridge inspection and management practices to document the practices

of the evaluated railroad and to disclose any program weaknesses that could affect the safety of the public. FRA also stated that, should it find through its monitoring that widespread bridge structural problems have developed, FRA may use the information to commence formal rulemaking proceedings.

However, FRA did not conduct regular or periodic evaluations of railroad bridge programs. We found that regular evaluations were not performed because FRA's Director, Safety Assurance and Compliance stated FRA does not consider railroad bridge programs a high priority for assigning its resources. In addition, FRA Regional track personnel stated they did not consider track inspectors adequately trained to perform bridge inspections.

FRA's Evaluations of Railroad Bridge Inspection and Management Practices Need to be More Comprehensive

FRA's Regional track inspectors only inspected railroad bridges as part of track inspections, or in response to complaints about a specific bridge, or as part of special reviews requested by FRA Headquarters¹⁴. In addition, FRA track inspectors may review a railroad's bridge program as part of a Safety Assurance and Compliance Program (SACP) review. Details of our findings in these areas are presented below.

Regional Track Inspections. FRA officials in six of eight regions stated bridges would be reviewed as part of track inspections if track inspectors found a serious problem with the track carried by the bridge. The inspections would generally be documented as notes to the track inspection reports, but not formally recorded in FRA's Railroad Inspection Reporting System database. Two of the eight regions, Region 3 and Region 4, indicated they observed the condition of bridges during track inspections to identify any obvious problems. In addition, only Region 1 and Region 5 stated they routinely monitored railroad bridge programs. However, our review of FRA Region 1's track inspection reports, for seven track inspectors during the period January 1997 through January 1998, did not identify that any railroad bridge program reviews had been performed. At FRA Region 5, inspection reports were not available to verify whether the inspections included a review of the railroads' bridge programs.

¹⁴ In response to concerns raised by the Federal Railroad Administrator after an Amtrak train derailment on the Portal Bridge in Secaucus, New Jersey in November 1996, FRA performed inspections of moveable railroad bridges. FRA determined no material problems existed with moveable bridges inspected.

Response to Complaints. FRA regional officials we interviewed in the six regions stated bridge inspections would be performed as a result of complaints received. We visited two of these six regions to review documentation supporting their statements. Our review at FRA Region 1 disclosed the region received four complaints during the period October 1994 through February 1998 related to bridge issues. In each instance a track inspector conducted an on-site inspection of the bridge in question. Our review of FRA Region 2's inspection reports and complaint files disclosed no bridge complaints during Fiscal Year 1997.

SACP Reviews. A SACP review is intended to provide a systemwide assessment of safety conditions at a railroad. As part of FRA's approach to safety, FRA included reviews of railroad bridge inspection and management programs during certain SACP reviews. However, railroad bridge program reviews were only performed for two of the ten SACPs we reviewed. Based on these two SACP reviews, FRA concluded the railroads needed to improve their bridge programs. FRA recommended, for example, that CSX, a large railroad, instruct its bridge inspectors to enter inspection reports into CSX's inspection reporting system within 7 days of completion, and modify the inspection reporting system to identify the actual date of inspection. FRA also recommended CSX develop a system to schedule bridge inspections from the reporting system, and dedicate sufficient personnel to perform bridge inspections to ensure all deficient conditions are detected and corrected.

Although FRA included reviews of railroad bridge programs during the two SACP efforts discussed above, such reviews were not performed during all SACP projects. In addition, since FRA does not plan to perform SACP assessments of all small railroads, additional monitoring and evaluation efforts are needed.

Insufficient Resources Assigned for Evaluating Railroad Bridge Programs

According to FRA's Director, Office of Safety Assurance and Compliance, bridge issues were not a high priority for assigning FRA resources. In addition, the Acting Associate Administrator for Safety stated FRA has only one Bridge Engineer who spends approximately 25 percent of his time on bridge-related issues due to other FRA responsibilities. The Bridge Engineer stated he did little followup on railroads' bridge programs after FRA completed its 1992-1993 survey. As of July 1998, FRA had 67 track personnel and was assisted by 49 State track inspectors. According to the FRA's Acting Associate Administrator for Safety, "FRA does not have the resources to adequately inspect the railroad industry's bridges, given that there are more than 100,000 bridges on the more than 600 railroads that comprise the nation's railroad system." In Fiscal Year 1999, FRA received funding for eight additional principal regional inspectors. FRA stated the principal inspector positions will be used to bring railroad bridge structural problems to the attention of rail carriers undergoing SACP audits or to the attention of FRA management who can then take action against the railroad.

Track Personnel Did Not Consider FRA's Bridge Training Adequate

Track personnel in six of eight FRA regions stated that their staff was not sufficiently trained to perform bridge inspections. According to the FRA Bridge Engineer, all 67 FRA principal regional inspectors, track inspectors, and track specialists and approximately 60 percent of the 49 State inspectors assisting FRA have taken FRA's "Principles and Practices of Railroad Bridge Inspection" training course through June 1998. However, track personnel in six of eight FRA Regions stated bridge inspections were not performed because FRA's training course was not detailed enough to enable them to perform realistic bridge inspections.

The OIG Engineer Advisor's review of the course material determined that the course provided the necessary steps and procedural guidance to perform a basic bridge inspection. According to the OIG Engineer Advisor, the course provided the knowledge needed to recognize different types of bridges, make a basic evaluation of the structural integrity of a railroad bridge by visual observation, and to distinguish between conditions that indicate structural deficiency and those that are non-critical. The OIG Engineer Advisor concluded the course would enable track inspectors to identify potential bridge problems, but was not intended to have

track inspectors perform engineering tasks, such as calculating bridge capacity ratings or designing structural bridge repairs.

However, since FRA regional staff did not believe the training course was adequate to enable inspectors to perform bridge inspections, FRA should consider providing additional bridge inspection training for its inspection staff.

Recommendations

We recommend that the Federal Railroad Administrator:

1. Finalize the bridge safety policy. Furthermore, the policy's guideline on bridge safety responsibility should be rewritten to indicate specific actions FRA considers necessary for large and small railroads to safeguard train operations over their bridges and bridges owned by others.
2. Adopt a graduated approach to improve its monitoring of railroad bridge programs. Specifically, we recommend FRA assign sufficient staff to conduct routine periodic evaluations of railroad bridge programs, ensure that such personnel are adequately trained, and maximize FRA's efforts by targeting resources to conduct evaluations of bridge programs of small railroads.
3. Enhance its monitoring efforts by developing a consistent methodology for conducting periodic evaluations of railroad bridge programs. If FRA's monitoring and evaluation efforts disclose continued bridge program deficiencies, FRA should issue mandatory bridge safety regulations to ensure the safety of railroad bridges is maintained.

Management Position

FRA concurred with the report findings and recommendations and has taken or planned actions to address the recommendations. A summary of the corrective actions for each recommendation is highlighted below. A copy of FRA's response addressing each of the recommendations is included as an appendix to this report.

Recommendation No. 1. FRA agreed to finalize its bridge safety policy. FRA is currently seeking approval from the Office of the Secretary for resolution of an issue related to the Federalism assessment of the impact of the policy on State bridge regulations. FRA also agreed to rewrite the policy's guideline on bridge safety responsibility to indicate specific actions FRA considers

necessary for large and small railroads to safeguard train operations over their bridges and bridges owned by others. If requested, OIG will provide assistance to FRA regarding the clarifying language.

Recommendation No. 2. FRA agreed that a well-structured, programmatic approach to the evaluation of railroad bridge safety programs should be implemented at an early date. Using a graduated approach, FRA's involvement would be limited to identifying and addressing bridge inspection and repair policy deficiencies that pose a threat to the safety of train operations. With respect to staff resources, FRA will continue to request additional staffing for bridge safety and other important safety priorities and allocate resources made available by the Administration and the Congress with the objective of optimizing safety results.

Additionally, FRA will include in its track inspector training programs an appropriate reinforcement of the training already provided, together with an update on the final bridge policy. The training will also include an explanation of FRA's bridge safety compliance program (as structured in response to the audit recommendations) and a restatement of the agency's expectations of track personnel in the field. Lastly, FRA agreed that small railroads pose the most significant challenge with respect to management of their bridges, and will target its bridge policy compliance efforts at small railroads.

Recommendation No. 3. FRA indicated that it could not possibly commit to periodic evaluations of all railroad bridge programs without significantly reducing attention to track safety, roadway worker safety, and other important priorities. However, FRA agreed that a manageable number of railroads, on a selected basis, should be evaluated each fiscal year. This approach should permit FRA to address the most urgent emerging safety needs.

FRA also provided additional comments addressing suggested technical corrections and clarifications. These comments addressed the effect that bridge aging and composition, as well as stresses imposed by increased train loads have on the bridges that carry those trains and the impact stronger freight car wheel assemblies have on car weight. FRA also provided comments related to the U.S. Army Corps of Engineers' findings for the Arizona Eastern Railway bridge inspections. FRA further commented that the training provided to its track inspectors was to observe bridge conditions, rather than perform bridge inspections.

Audit Comments

We reviewed FRA's suggested corrections and clarifications and made changes to the report as appropriate. However, the following audit comments are provided in response to specific concerns raised by FRA regarding stresses imposed on rail bridges, the structural integrity of bridges inspected by the U.S. Army Corps of Engineers, and the adequacy of FRA's track inspector training.

Stresses Imposed on Rail Bridges. FRA's comments on the background section of the draft report note that the increase in average train loads or the gross tons per train have no effect on the stresses in bridges that carry those trains. FRA also noted that the aging and composition of the Nation's bridges have no effect on the integrity of the bridges. Additionally, FRA stated that the increase in the strength of freight car wheel assemblies has nothing to do with the increase in car weight.

While FRA's response indicates that the issues of bridge age, composition, and increases in rail car weight are not the governing factors with respect to a bridge's integrity, these issues have been highlighted as concerns in other FRA documents. For example, Section 1.1 of FRA's Bridge Inspection Training Manual, "Principles and Practices of Bridge Inspection," states that "...bridges that were constructed to carry 50 ton cars have been 'stretched' to carry 100 ton cars and in some cases forced to carry 120 ton cars...", resulting in "...faster deterioration as a result of the heavier load cycles." This section further states that "...bridges are carrying rail traffic volume and loadings completely unforeseen at the time the design and specifications were applicable to the structure." Additionally, "...current trends toward heavier loads, higher speeds, the use of higher strength steels and welded construction, the possibility of fatigue failure in many older bridges- as well as in some relatively new bridges – is a matter of concern."

FRA's October 21, 1997, "Safety Assessment of the CSX/Norfolk Southern Proposed Acquisition of Conrail" also noted FRA's concerns for bridge management, maintenance, and rehabilitation due to bridge aging and fatigue. The safety assessment noted that with the increased traffic levels anticipated in the railroads' operating plans, the lifetimes of the bridges may be reduced. Additionally, if traffic increases, the bridges will require increased levels of repair, rehabilitation, or replacement as they continue to age.

Structural Integrity of Bridges. FRA commented that the defects cited for the Arizona Eastern Railway Bridge 1196.31 were not critical structural deficiencies. According to FRA, one defect involved a common deterioration problem, and the other defect involved a component of the bridge that was not critical to the structural integrity of the bridge. FRA further commented that

the potential for scour and accumulation of sand and drift has long been recognized by the railroad.

We agree with FRA that the bridge conditions noted in our draft report were not critical structural deficiencies. As we stated, the U.S. Army Corps of Engineers found that while no deficiencies were identified which were critical to the bridge's structure, the bridge was vulnerable to substructure failure during flooding conditions due to soil erosion.

Track Inspector Training. FRA commented that its track inspectors are not trained to perform bridge inspections. They are trained to observe bridge conditions, monitor bridge inspections, and to accurately report their findings to FRA's Bridge Engineer.

We agree with FRA that track inspectors are not trained to be bridge engineers. Our report acknowledges that FRA's bridge inspection training course was not intended to have track inspectors perform engineering tasks, such as calculating bridge capacity ratings or designing structural bridge repairs. However, since FRA regional staff did not believe the training course they attended was adequate, we recommended FRA provide additional training for its inspection staff.

We reviewed the actions taken and planned by FRA and determined these actions to be responsive to the report's recommendations. However, in order to consider the recommendations resolved, FRA will need to provide action target dates for completing each of the proposed actions. Additionally, we request FRA provide the OIG copies of FRA's final bridge safety policy and revised bridge safety compliance program (as structured in response to the audit recommendations). The actions taken and planned by FRA are subject to the followup provisions of Department of Transportation Order 8100.1C.

FRA INTERIM POLICY GUIDELINES

- (1) **Bridge Safety Responsibility.** The owner of the track carried by a bridge shall ensure the bridge will safely support trains that operate over it and loads imposed upon it. The operating railroad that authorizes train movements over a bridge should take whatever steps are necessary to verify the maintenance responsibility for the bridge is being fulfilled.
- (2) **Bridge Capacity.** The safe capacity of bridges should be determined by competent engineers using accepted principles of structural design and analysis.
- (3) **Bridge Loads.** Each railroad operating over bridges should restrict the movement of railcars and locomotives whose weight or configuration exceed the nominal capacity of the bridges.
- (4) **Bridge Records.** The organization responsible for the safety of a bridge should keep design, construction, maintenance and repair records to permit safe loads.
- (5) **Design/Rating Specifications.** The recommended specifications for the design and rating of bridges are found in the “Manual for Railway Engineering” published by the American Railway Engineering and Maintenance-of-Way Association.
- (6) **Periodic Inspections.** Perform annual bridge inspections to determine whether a structure conforms to its design or rating condition and if not, the degree of nonconformity.
- (7) **Underwater Inspections.** Bridge inspections include measuring and recording the condition of substructure support at locations subject to erosion from moving water and performing underwater inspections, where necessary.
- (8) **Special Inspections.** Perform special inspections after an occurrence that might have reduced the capacity of the bridge, such as flood, derailment, or an unusual impact.
- (9) **Inspection Records.** Recording bridge inspections and incorporating this information into a bridge management program to ensure that exceptions on the reports are corrected or accounted for.
- (10) **Bridge Inspectors/Engineers.** Bridge inspections being performed by competent technicians whose training and experience enable them to detect and record indications of distress. Accurate information about the condition of a bridge should be evaluated by an engineer competent to determine the capacity of the bridge.
- (11) **Scheduling Inspections.** Bridge management programs include a means to ensure that each bridge is inspected at the prescribed frequency and bridge inspections are scheduled from an accurate bridge inventory that includes the due date of the next inspection.
- (12) **Special Considerations.** Proper inspection and analysis of railroad bridges requires familiarity with the loads, details, and indications of duress that are unique to these structures.

RAILROADS FOLLOWING FRA INTERIM POLICY GUIDELINES

Guidelines*	1. Bridge Safety Responsibility	2. Bridge Capacity	3. Bridge Loads	4. Bridge Records	5. Design/Rating Specification	6. Periodic Inspections	7. Underwater Inspections	8. Special Inspections	9. Inspection Records	10. Inspectors/ Engineers	11. Scheduling Inspections	12. Special Consideration
Large Railroads												
Amtrak		X	X	X	X	X	X	X	X	X	X	X
New Jersey Transit		X	X	X	X	X	X	X	X	X	X	X
BNSF		X	X	X	X	X	X	X	X	X	X	X
Norfolk Southern		X	X	X	X	X	X	X	X	X	X	X
Maine Central	X	X	X	X	X	X	X	X	X	X	X	X
Small Railroads												
Chicago Short Line						X (1)	N/A	X		X		
Connecticut Central				X	X		X	X	X	X	X	
Arizona Eastern	N/A					X (1)	X	X		X		
Morristown & Erie		X (1)	X (1)	X (1)	X	X (1)		X	X (1)	X		
Kankakee, Beaverville, So.						X	X	X	X	X	X	

* - Description of each FRA policy guideline is provided in Attachment 1.

X - Guideline Incorporated in Railroad's Bridge Program.

X (1) - Documentation not provided to support railroad's compliance with the guideline.



U.S. Department
of Transportation
**Federal Railroad
Administration**

Memorandum

Date: **MAR 19 1999**

Reply to Attn. of:

Subject: Draft of Proposed Report on "FRA's Interim Statement of Policy
on the Safety of Railroad Bridges"

From: Jolene M. Molitoris
Administrator

To: Lawrence H. Weintrob
Assistant Inspector General for Auditing

Federal Railroad Administration (FRA) has reviewed the draft report and, with the clarifications and qualifications set forth below, generally agrees with the findings and recommendations. We appreciate the considerable effort that went into the report and the information it provides to the agency for improvement of our bridge safety program. A small number of technical corrections and comments are attached for your use.

FRA does wish to emphasize that the structural safety of railroad bridges is only one of scores of safety programs that FRA seeks to maintain in order to foster zero tolerance for any loss of life, personal injury or threat to property or the human environment associated with railroad operations. Although as a safety agency FRA would prefer to be able to give each of these programs greater emphasis, public resources are limited and difficult resource allocation decisions must be made. For example, during the period since initiation of FRA's program development effort for railroad bridges, FRA has responded to congressional mandates to issue and implement final rules for Bridge Worker Safety (49 CFR Part 214, subpart B), Roadway Worker Protection (49 CFR Part 214, subpart C), and Locomotive Auxiliary Alerting Lights (49 CFR §§ 229.125 and 229.133). Each of these efforts has required training of FRA personnel and programmatic follow-up through direct contacts with railroads. Because of unavoidable staffing conflicts, each has detracted from the effort available to develop and implement the bridge safety policy. In FRA's view, each of these other efforts has deservedly taken precedence over efforts related to the bridge safety policy due to the greater immediate safety risk associated with those subject matters (as evidenced by fatal and non-fatal injuries incurred). However, in the absence of these competing priorities FRA would have been able to give greater attention to bridge program evaluation.

Your recommendations and our specific responses follow:

1. **“Finalize the bridge safety policy.”**

Response: FRA agrees, and is currently seeking approval from the Office of the Secretary for resolution of an issue related to the Federalism assessment for the policy.

“Furthermore, that policy should clarify the bridge safety responsibility guideline to indicate specific actions FRA considers necessary for large and small railroads to safeguard train operations over their bridges and bridges owned by others.”

Response: FRA agrees that clarification of this issue will be important to promoting best practices with respect to safety operations over railroad bridges. FRA will seek the views of the OIG staff regarding clarifying language.

2. **“Adopt a graduated approach to improve its monitoring of railroad programs. Specifically, we recommend FRA assign sufficient staff to conduct routine periodic evaluations of railroad bridge programs, ensure that such personnel are adequately trained, and maximize FRA’s efforts by targeting resources to conduct evaluations of bridge programs of small railroads.”**

3. **“Enhance its monitoring efforts by developing a consistent methodology for conducting periodic evaluations of all railroad bridge programs.”**

Responses to Recommendations 2 and 3:

“Adopt a graduated approach...improve monitoring ...by developing a consistent methodology”: FRA agrees that a well-structured, programmatic approach to evaluation of railroad bridge safety programs should be implemented at an early date. The approach should be “graduated,” such that the degree of FRA involvement is limited to that clearly necessary to identify and address deficiencies in bridge inspection and repair policies that are of such gravity as to pose a threat to safety of train operations.

“[A]ssign sufficient staff to conduct routine periodic evaluations of ...all railroad bridge programs”: Unfortunately, FRA could not possibly commit to periodic evaluations of all railroad bridge programs without significantly reducing attention to track safety, roadway worker safety, and other important priorities. FRA does agree that a manageable number of railroads, selected by an appropriate mix of exception information and other criteria, should be evaluated during each fiscal year. This approach should permit FRA to determine the effectiveness and current relevance of the policy and to address the most urgent emerging safety needs. FRA will continue to request additional staffing for bridge safety and other important safety priorities through the budget process and will allocate resources

made available by the Administration and the Congress with the objective of optimizing safety results.

“[M]aximize FRA’s efforts by targeting resources to conduct evaluations of bridge problems of small railroads”: Information developed by the OIG confirms FRA’s previous conclusions that small railroads pose the most significant challenge with respect to management of their bridges. FRA agrees that bridge policy compliance efforts should be primarily targeted at small railroads. FRA will utilize principal inspectors and other designated staff, together with complaints and results of bridge monitoring during track inspections, to identify those small railroads for which formal program evaluations are warranted.

“Ensure that [personnel assigned to evaluate railroad bridge programs] are adequately trained”: The draft report at page 17 clearly reflects the adequacy of FRA’s initial training program, which was directed at preparing track inspectors to monitor bridge conditions during their regular duties (*not* to “inspect” or “rate” bridges) and to evaluate railroad bridge inspection programs for basic sufficiency against the interim guidelines. As you know, FRA cannot afford to employ a cadre of bridge inspectors and engineers to duplicate the efforts of the railroads. FRA does believe that the training already provided can provide a foundation for identifying exceptions supporting special inspections of bridges by qualified personnel (e.g., FRA’s bridge engineer or an engineering firm engaged by a small railroad at FRA’s suggestion). FRA personnel can best develop their skills by practicing them, a pattern that should be very routine given the fact that there is, on average, one railroad bridge for each 1.5 route miles of railroad in the United States.

Nevertheless, given the obvious misunderstandings disclosed by the OIG inquiries of FRA field staff, FRA will include in its recurrency training programs appropriate reinforcement of the training already provided, together with an update on the final bridge policy, an explication of the bridge safety compliance program (as structured in response to the audit recommendations) and a careful restatement of the agency’s expectations with respect to the role of field personnel in the track discipline.

I want to again extend my thanks for the very professional and helpful approach of the OIG staff in pursuing this important audit. I hope our responses are useful as you finalize the report. If you have further questions about our responses, Associate Administrator for Safety George Gavalla should be able to assist you or your staff (493-6300).

Attachment