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☞ Details: Legislative Audit Bureau Letter Report February 2008: Bridge Inspection Program

(FORM UPDATED: 08/11/2010)

WISCONSIN STATE LEGISLATURE ...
PUBLIC HEARING - COMMITTEE RECORDS

2007-08
(session year)

Joint
(Assembly, Senate or Joint)

Committee on Audit...

COMMITTEE NOTICES ...

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- Executive Sessions ... **ES**
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INFORMATION COLLECTED BY COMMITTEE FOR AND AGAINST PROPOSAL

- Appointments ... **Appt** (w/Record of Comm. Proceedings)
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- Hearing Records ... bills and resolutions (w/Record of Comm. Proceedings)
  (**ab** = Assembly Bill) (**ar** = Assembly Resolution) (**ajr** = Assembly Joint Resolution)
  (**sb** = Senate Bill) (**sr** = Senate Resolution) (**sjr** = Senate Joint Resolution)
- Miscellaneous ... **Misc**

* Contents organized for archiving by: Stefanie Rose (LRB) (October 2012)

STATE OF WISCONSIN

Letter Report

Bridge Inspection Program

February 2008

Legislative Audit Bureau

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Janice Mueller
State Auditor

February 27, 2008

Senator Jim Sullivan and
Representative Suzanne Jeskewitz, Co-chairpersons
Joint Legislative Audit Committee
State Capitol
Madison, Wisconsin 53702

Dear Senator Sullivan and Representative Jeskewitz:

At your request, we have completed a limited-scope review of the Department of Transportation's (DOT's) bridge inspection program. In fiscal year 2006-07, DOT spent approximately $2.3 million to inspect Wisconsin's 5,188 state-owned bridges, including an estimated $1.0 million to hire private consultants with specialized inspection expertise.

Federal and state law require DOT to inspect all bridges owned or maintained by the State at least once every 24 months. We found that 98.1 percent of routine inspections were completed on time between January 2003 and November 2007. During this period, 98.9 percent of routine inspections conducted on structurally deficient bridges, which are bridges that have deteriorated or developed structural problems, were completed within the required 24-month intervals. Both of these inspection rates have improved since our 2001 evaluation of DOT's bridge inspection program (report 01-17).

DOT has not implemented procedures for monitoring routine bridge maintenance work performed by county highway departments or verifying the cost of completed maintenance work. Therefore, we include a recommendation for DOT to develop policies and procedures to track the type and cost of routine bridge maintenance work performed by counties, which totaled $5.7 million in 2006.

In general, the condition of state-owned bridges has improved in recent years. The percentage of state-owned bridges that are structurally deficient declined from 7.4 percent in 2002 to 4.2 percent in 2007, when there were 219 such bridges statewide. However, 34 state-owned bridges are more than 80 years old, exceeding the typical 75-year life span of bridges.

We appreciate the courtesy and cooperation extended to us by DOT in conducting this review.

Sincerely,

Janice Mueller

Janice Mueller
State Auditor

JM/DS/ss

Enclosure

BRIDGE INSPECTION PROGRAM

The Department of Transportation (DOT) is required by federal and state law to inspect all bridges owned or maintained by the State at least once every 24 months. Bridge inspections are performed to ascertain the structure's current condition and anticipate future problems. They also allow DOT to rate a bridge's safety, provide a continuous record of a bridge's condition and rate of deterioration, and help DOT determine whether to impose vehicle weight limits or to close a bridge. DOT uses inspection results to initiate routine bridge maintenance activities, such as repairing damaged bridge railings, or to plan large rehabilitation projects, such as reconstructing the entire bridge. Almost all routine maintenance work identified by inspectors is performed by county highway departments, which are then reimbursed by DOT for their time and materials.

In October 2001, the Legislative Audit Bureau released an evaluation of DOT's bridge inspection program (report 01-17). We found that bridge inspections were not always completed in a timely manner, DOT generally did not monitor counties' expenditures for routine bridge maintenance work that had been identified by bridge inspectors, and updated traffic count information was typically not used to help determine a bridge's condition.

On August 1, 2007, a steel deck truss bridge on an interstate highway over the Mississippi River in Minneapolis collapsed, resulting in the deaths of 13 people and injuring more than 100 others. As a result of this collapse, attention focused on the safety of bridges throughout the nation. In August 2007, DOT identified 16 deck truss bridges in Wisconsin with designs similar to that of the bridge that collapsed in Minneapolis. Subsequently, two of those bridges were replaced by bridges with updated designs that had been planned before the collapse. DOT conducted special inspections of Wisconsin's 14 deck truss bridges in August 2007 and determined they were safe for public travel.

At the request of the Co-chairs of the Joint Legislative Audit Committee, we conducted a limited-scope review of DOT's bridge inspection program that focused on:

- whether DOT performed routine inspections of all state-owned bridges at least once every 24 months from January 2003 through November 2007;
- how DOT staff oversee the completion of bridge maintenance work identified by bridge inspectors and completed by counties;
- the extent to which current traffic count information is included in bridge inspection reports and DOT bridge data; and
- the inspection history and condition of a randomly chosen sample of 50 bridges that were classified as structurally deficient in 2000.

To complete this review, we interviewed DOT bridge inspectors and Federal Highway Administration officials, examined DOT's bridge inspection policies and procedures, and analyzed DOT's bridge inspection data. We also spoke with representatives of the counties and private firms that maintain and rehabilitate state-owned bridges. We did not analyze the inspection and maintenance of bridges that are not DOT's responsibility, including bridges on county and town roads and municipal streets, which are the responsibility of local governments, and bridges that carry only railroad, pedestrian, or bicycle traffic.

Bridge Inspection Process

Responsibility for inspecting state-owned bridges is divided among DOT staff in eight offices within five regions. In addition to these eight offices, DOT's central office in Madison develops inspection policies and provides specialized knowledge and equipment for inspections statewide. DOT also contracts with private consultants for certain complex inspections. For inspection purposes, a bridge is defined in administrative rules as a structure longer than 20 feet that carries vehicular traffic over a depression or obstruction. However, DOT considers some larger bridges to comprise multiple bridge units, each of which is inspected individually, as if it were a separate bridge. As of November 2007, Wisconsin had 4,916 single-unit state-owned bridges and 34 multi-unit bridges with a combined 272 units, for a total of 5,188 state-owned bridge units statewide. In our analyses, we considered each bridge unit to be a separate bridge.

Figure 1 shows the location of the five regions and eight regional offices, as well as the number of state-owned bridges in each region as of November 2007.

Federal Highway Administration staff with whom we spoke indicated general satisfaction with DOT's bridge inspection program and believe it is among the best in the nation. DOT's written bridge inspection procedures are also generally consistent with the regulations and guidelines promulgated by the Federal Highway Administration and the American Association of State Highway Transportation Officials, which is a nonprofit and nonpartisan national organization. The Federal Highway Administration and DOT's central office annually conduct a quality assurance review in two of the eight regional offices to ensure that inspection guidelines are followed; bridges are inspected thoroughly, consistently, and in a timely manner; and inspectors are qualified under state and federal regulations.

Before inspecting a bridge, an inspector typically examines the bridge's design plans and prior inspection reports, notes the bridge's age and its condition at the time of the prior inspection, and reviews recently completed repair and maintenance work. This information allows the inspector to formulate a plan for inspecting the bridge, including any features or structural configurations that may need special attention.

Figure 1

Department of Transportation Regions
November 2007

Most routine inspections take less than one day to complete, and some take less than an hour, although inspections of bridges with complex designs or structural problems can last several days. Inspectors visually assess all aspects of a bridge's condition, including the bridge deck, which is the surface on which vehicles travel; the superstructure, which includes the girders and other features that support the bridge deck; and the substructure, which includes the piers and other features that support the superstructure. Inspectors determine, for example, whether:

- cracks that may affect the bridge's structural integrity are present;
- concrete piers and supports are deteriorating;

- water flowing under the bridge has deteriorated the substructure or soil around the bridge;

- metal girders are corroded, cracked, or need repainting;

- potholes are forming on the bridge deck, or the pavement around the bridge is rough; and

- routine bridge maintenance is needed, such as cleaning the bridge deck water drains of debris, resealing the joints between concrete slabs on the bridge deck, or trimming overgrown brush around the bridge.

After each routine inspection, bridge inspectors complete a standardized report that is entered into DOT's bridge inspection database and to which the central office has access. They note the overall condition of the bridge deck, superstructure, and substructure; determine more specific condition ratings for various bridge parts, such as the concrete, steel beams and braces, and railings; list routine maintenance recommendations; and provide written comments about the bridge. The bridge inspection database gives the inspectors access to information about past inspections and the prior condition of bridges.

In addition to routine inspections, which are most common, DOT also conducts several other types of inspections, including:

- in-depth, which are intensive inspections that use special equipment or techniques to follow up on deficiencies noted during routine inspections;

- fracture critical, which are inspections to assess the condition of bridge components, such as girders, whose failure may result in a bridge's collapse;

- underwater dive, which are inspections to access and monitor bridge elements that are below the water level; and

- interim, which are inspections to monitor a known or suspected deficiency, conducted at intervals less than every two years.

Expenditures and Staffing

The bridge inspection program is part of DOT's state highway maintenance, repair, and traffic operations program, which maintains and repairs state highways and bridges; removes snow and mows roadsides; and maintains pavement markings, traffic signs, traffic signals, and highway lighting. In recent years, funding increases for the highway maintenance, repair, and traffic operations program have not kept pace with increases in other DOT programs. From fiscal year (FY) 2002-03 through FY 2006-07, funding increased by:

- 3.7 percent for the state highway maintenance, repair, and traffic operations program;

- 8.9 percent for the state highway rehabilitation program, which improves existing highways and bridges; and

- 23.7 percent for the major highway development program, which constructs new highways and makes significant improvements to existing highways.

To help address funding limitations in prior years and to take into account additional miles of new highways and increased traffic levels, 2007 Wisconsin Act 20, the 2007-09 Biennial Budget Act, provides $203.9 million of segregated state funds in FY 2007-08 for the state highway maintenance, repair, and traffic operations program, which is a 13.7 percent increase from the $179.4 million budgeted in FY 2006-07. Program funding will increase to $212.2 million, or by 4.1 percent, in FY 2008-09.

DOT does not maintain detailed expenditure information for the bridge inspection program and, therefore, used time-reporting records to estimate expenditures for the salaries and fringe benefits of its bridge inspection staff, as well as other program costs incurred, such as travel, supplies, and private consultant costs.

In FY 2006-07, bridge inspection expenditures, including state staff and consultant costs, were approximately $2.3 million, while expenditures for routine bridge maintenance were $6.9 million, as shown in Table 1. Total expenditures for bridge inspections and routine bridge maintenance increased by 7.1 percent from FY 2002-03 through FY 2006-07.

Table 1

Estimated Expenditures for Bridge Inspections and Routine Bridge Maintenance

	FY 2002-03	FY 2003-04	FY 2004-05	FY 2005-06	FY 2006-07
Bridge Inspections					
State Staff	$ 994,500	$1,101,700	$1,156,100	$1,199,600	$1,317,100
Consultants	1,154,400	1,378,800	1,912,400	1,138,100	1,010,300
Subtotal	2,148,900	2,480,500	3,068,500	2,337,700	2,327,400
Routine Bridge Maintenance					
State Staff and Related Work	1,196,100	895,500	1,023,300	1,276,300	1,160,800
Work Performed by Counties[1]	5,257,000	5,453,400	4,757,800	4,962,100	5,722,600
Subtotal	6,453,100	6,348,900	5,781,100	6,238,400	6,883,400
Total	**$8,602,000**	**$8,829,400**	**$8,849,600**	**$8,576,100**	**$9,210,800**

[1] Expenditures for calendar years 2002 through 2006.

Federal and state regulations require DOT bridge inspectors to attend training and be registered as professional engineers, or have at least five years of bridge inspection experience, or be certified by the National Institute for Certification in Engineering Technologies. We examined quality assurance reviews that were performed by the Federal Highway Administration and DOT's central office from 2003 through 2006. These reviews indicated that all DOT inspectors met at least minimum qualifications to conduct inspections. Although more than 60 DOT staff are qualified to complete inspections, most are not directly involved with the bridge inspection program. Bridge inspectors at DOT's eight regional offices complete most inspections, but none inspects bridges on a full-time basis. They are also responsible for:

- overseeing bridge maintenance work completed by counties;
- advising local governments on how to conduct local bridge inspections; and
- preparing planning documents for bridge rehabilitation and replacement projects.

As shown in Table 2, DOT staff in 13.72 full-time equivalent (FTE) positions inspected bridges in FY 2006-07, based on DOT's time-reporting records. This includes 11.58 FTE staff in the five regions and 2.14 FTE staff in DOT's central office. Total positions changed little from FY 2002-03 through FY 2006-07.

Table 2

Bridge Inspection FTE Staff Positions

Region	FY 2002-03	FY 2003-04	FY 2004-05	FY 2005-06	FY 2006-07
North Central	1.29	1.88	1.91	1.81	1.66
Northeast	1.41	1.48	1.63	1.41	1.77
Northwest	1.60	1.93	2.02	2.06	2.38
Southeast	1.91	2.46	2.20	2.87	3.13
Southwest	3.22	2.70	2.91	3.04	2.64
Central Office	3.68	2.60	2.49	1.81	2.14
Total	**13.11**	**13.05**	**13.16**	**13.00**	**13.72**

As shown in Table 3, bridge inspection expenditures for state staff, including salaries and fringe benefits, travel, and supplies, were an estimated $1.3 million in FY 2006-07. DOT indicated that increased salary and fringe benefit costs accounted for most of the 32.4 percent increase in expenditures from FY 2002-03 through FY 2006-07.

Table 3

Estimated State Staffing Expenditures for the Bridge Inspection Program

Region	FY 2002-03	FY 2003-04	FY 2004-05	FY 2005-06	FY 2006-07
North Central	$ 97,900	$ 155,100	$ 169,400	$ 152,800	$ 165,700
Northeast	107,800	114,200	130,300	131,300	179,200
Northwest	136,300	178,200	186,700	198,100	231,500
Southeast	150,300	215,200	208,000	273,700	294,000
Southwest	240,300	232,100	262,900	287,500	257,900
Central Office	261,900	206,900	198,800	156,200	188,800
Total	**$994,500**	**$1,101,700**	**$1,156,100**	**$1,199,600**	**$1,317,100**

Federal law permits the use of private bridge consultants to conduct inspections, but DOT remains responsible for ensuring that consultant-led inspections are conducted in accordance with federal regulations and inspection guidelines and are completed by qualified inspectors. Consultants are typically hired when an inspection requires specialized expertise or equipment. For example, consultants conduct most underwater inspections, as well as some in-depth inspections on large bridges. Consultants have also been hired to complete routine inspections on large bridges in the Southeast Region when DOT staff availability was limited or specialized equipment was needed, although none were hired for this purpose in 2007.

As shown in Table 4, estimated consultant expenditures varied during the five-year period we reviewed and were highest in FY 2004-05, when they totaled $1.9 million, primarily because the central office contracted for a large number of underwater dive inspections. The North Central Region had no consultant expenditures during the five-year period because all consultant work in that region was completed through contracts managed by the central office.

Table 4

Estimated Consultant Expenditures for the Bridge Inspection Program

Region	FY 2002-03	FY 2003-04	FY 2004-05	FY 2005-06	FY 2006-07
North Central	$ 0	$ 0	$ 0	$ 0	$ 0
Northeast	0	37,700	105,300	183,400	40,700
Northwest	0	0	0	0	143,800
Southeast	1,076,800	578,200	632,400	259,900	371,900
Southwest	0	94,500	0	0	0
Central Office	77,600	668,400	1,174,700	694,800	453,900
Total	**$1,154,400**	**$1,378,800**	**$1,912,400**	**$1,138,100**	**$1,010,300**

Inspection Frequency

We reviewed DOT's bridge inspection data from January 2003 through November 2007 to determine whether routine inspections of all state-owned bridges had been completed at least once every 24 months, as required by federal and state law. To do so, we determined when the initial routine inspection of a given bridge had occurred during this time period and then calculated the time until each subsequent inspection was completed. The Federal Highway Administration indicated that a routine inspection that is completed one or two months late is not a serious infraction of federal law and is unlikely to endanger the public.

As shown in Table 5, 98.1 percent of routine inspections were completed within 24 months of a prior inspection. This is an improvement from the 84.1 percent of on-time inspections our 2001 evaluation found to have been completed from January 2000 through August 2001. DOT's ability to complete timely bridge inspections has been enhanced by its bridge inspection database, which creates automated reports that allow inspectors to determine when each bridge must be inspected.

Table 5

Inspection Frequency of State-Owned Bridges
January 2003 through November 2007

Region	Number of Inspections	Percentage of Inspections Completed Within: 24 Months or Less	25 to 26 Months	More than 26 Months
North Central	1,047	99.4%	0.4%	0.2%
Northeast	1,556	95.1	3.6	1.3
Northwest	1,998	99.4	0.6	0.0
Southeast	1,600	97.7	1.6	0.7
Southwest	2,211	98.9	1.0	0.1
Overall	**8,412**	98.1	1.4	0.5

We found that 1.4 percent of routine inspections were completed one or two months late, and 38 inspections, or 0.5 percent, were completed more than 26 months after a prior inspection. Of these 38 inspections, 37 occurred within 32 months of a prior inspection, while 1 occurred 37 months after the prior inspection. DOT provided several reasons why inspection frequencies may have exceeded the required 24 months, including:

- specialized equipment, such as a "reach all" vehicle to inspect the underside of a bridge, is sometimes not readily available;
- unfavorable weather conditions may delay planned inspections; and
- certain bridges may have been overlooked during DOT's organizational transition in May 2005 from eight districts to five regions.

Adhering to required inspection frequencies is particularly important for bridges that have deteriorated or developed structural problems. Although such structurally deficient bridges require routine inspections as frequently as other bridges, federal legislation currently under consideration would require them to be inspected annually. We reviewed the inspection histories of all 219 state-owned bridges that were classified as structurally deficient as of November 2007.

As shown in Table 6, 98.9 percent of routine inspections of the 219 structurally deficient bridges were completed within the required 24-month intervals from January 2003 through November 2007. This is an improvement from the 92.0 percent of on-time inspections of structurally deficient bridges that our 2001 evaluation found to have been completed from January 2000 through August 2001. However, our current audit found that five inspections, or 1.1 percent, were completed late, including one inspection that was completed eight months late.

Table 6

Inspection Frequency of Structurally Deficient State-Owned Bridges
January 2003 through November 2007

Region	Number of Inspections	Percentage of Inspections Completed Within: 24 Months or Less	25 to 26 Months	More than 26 Months
North Central	53	100.0%	0.0%	0.0%
Northeast	79	100.0	0.0	0.0
Northwest	129	99.2	0.8	0.0
Southeast	96	95.8	3.1	1.1
Southwest	105	100.0	0.0	0.0
Overall	**462**	98.9	0.9	0.2

As noted, Wisconsin currently has 14 deck truss bridges that are structurally similar to the Minneapolis bridge that collapsed in August 2007. We reviewed DOT's data and found that 100.0 percent of the routine inspections of these bridges were completed within the required 24-month intervals from January 2003 through November 2007.

In October and November 2007, DOT installed electronic sensors on the 14 bridges, which are located in the Northwest and Southwest regions, to collect information 24 hours per day on the motion and amount of strain placed on the bridges. DOT is removing the sensors from the bridges during February and March 2008 and has contracted with consultants to analyze the results, which will be used to determine whether any unusual stresses are affecting the bridges.

As recommended by the Federal Highway Administration, DOT plans to more closely monitor the steel gusset plates that help hold together steel truss bridges, because preliminary information indicates that the inappropriate design of one such plate may have caused the Minneapolis bridge to collapse. Bridge inspectors will continue to examine these steel gusset plates during future inspections. In addition, DOT plans to evaluate the design capacity of all components on steel truss and fracture critical bridges, which have components whose failure may result in a bridge's collapse. This evaluation will occur if a bridge is renovated and either the bridge's traffic levels increase or weight is added to the bridge's supporting elements, such as when a heavier bridge deck is added during construction.

Routine Bridge Maintenance

While examining bridges, inspectors identify any needed routine bridge maintenance work. Timely routine maintenance work does not improve a bridge's structural integrity, but it postpones the need for more costly rehabilitation projects and may extend a bridge's life span. DOT's bridge inspectors provide county highway departments with work orders that list all

routine bridge maintenance work to be completed and the estimated cost of the work. After the work is done, county highway departments submit invoices to the DOT region in which they are located, which then reimburses the counties. DOT may also contract with private contractors for large routine maintenance projects or if county highway departments lack the staff or equipment to complete the work. In addition, Wisconsin shares the costs of maintenance work done on border bridges equally with neighboring states.

Routine bridge maintenance is funded as part of DOT's state highway maintenance, repair, and traffic operations program. DOT does not maintain detailed expenditure information for the time state staff spend on activities other than inspections, such as identifying maintenance needs, ensuring county highway departments complete the work, and planning future maintenance needs. Therefore, it used time-reporting records to estimate state staff expenditures associated with routine bridge maintenance, including salaries, fringe benefits, travel, and supplies. Expenditures for work done by contractors and other states were estimated statewide but could not be provided for each region.

As shown in Table 7, estimated expenditures for routine bridge maintenance activities totaled $1.2 million in FY 2006-07, including $900,500 incurred by state staff and $260,300 incurred by contractors and other states. Expenditures incurred by state staff increased steadily from FY 2002-03 through FY 2006-07, while expenditures for work completed by contractors and other states varied from year to year.

Table 7

Estimated Expenditures for Routine Bridge Maintenance[1]

Region	FY 2002-03	FY 2003-04	FY 2004-05	FY 2005-06	FY 2006-07
North Central	$ 94,300	$126,200	$ 129,900	$ 162,100	$ 170,400
Northeast	79,900	131,700	137,500	163,000	197,800
Northwest	140,600	98,400	102,200	126,600	167,900
Southeast	96,500	131,000	165,300	150,400	137,200
Southwest	154,000	160,800	94,900	86,300	101,600
Central Office	40,700	101,500	122,900	146,600	125,600
Subtotal	606,000	749,600	752,700	835,000	900,500
Contractors	32,600	53,900	26,100	248,100	103,400
Other States	553,200	88,700	238,000	186,000	154,000
Other[2]	4,300	3,300	6,500	7,200	2,900
Subtotal	590,100	145,900	270,600	441,300	260,300
Total	**$1,196,100**	**$895,500**	**$1,023,300**	**$1,276,300**	**$1,160,800**

[1] Does not include the costs of maintenance work performed by counties.
[2] Includes state-furnished bridge materials and payments to public utilities for electricity used during maintenance work.

DOT uses a model to determine annual budgets for all maintenance work to be completed in each county, and the regional offices allocate this funding to various activities performed by counties on state highways, including roadway maintenance, roadside maintenance, and routine bridge maintenance. Every year since the model was established in 1992, the amount budgeted has been less than the amount that the model has indicated is needed to complete all maintenance activities. DOT central office staff and bridge inspectors in two of the five regions indicated that there are insufficient funds to pay for all maintenance work identified during bridge inspections. As a result, the inspectors prioritize recommended work and in some instances may postpone work that does not affect a bridge's safety. For example:

- The Southwest Region's Madison office categorizes maintenance work on a scale of one (work should be completed within one month) to four (work should be completed within one year) and indicated that there is typically enough funding to complete the higher-priority work.

- The Northwest Region's Eau Claire office compiles and prioritizes a list of maintenance work at the end of each year and then decides which work can be completed with the available funding. For example, erosion of bridge elements requires immediate attention, whereas work such as deck sealing and brush clearing has a lower priority.

As shown in Table 8, total expenditures for routine bridge maintenance work performed by counties increased from $5.3 million in calendar year (CY) 2002 to $5.7 million in CY 2006, or by 7.5 percent. In CY 2006, the most recent year for which information is available, expenditures for routine bridge maintenance ranged from $490,900 in the North Central Region to $1.7 million in the Northeast Region. Appendix 1 shows CY 2006 bridge maintenance expenditures in each county.

Table 8

Expenditures for Routine Bridge Maintenance Work Performed by Counties

Region	2002	2003	2004	2005	2006
North Central	$ 572,800	$ 459,200	$ 602,300	$ 437,600	$ 490,900
Northeast	1,531,900	1,687,400	1,584,100	1,561,500	1,730,400
Northwest	680,400	716,300	642,200	866,300	852,300
Southeast	1,046,700	1,060,200	765,000	843,900	1,121,700
Southwest	1,425,200	1,530,300	1,164,200	1,252,800	1,527,300
Total	**$5,257,000**	**$5,453,400**	**$4,757,800**	**$4,962,100**	**$5,722,600**

Although bridge inspectors with whom we spoke are generally satisfied with the work performed by the counties, they indicated that some counties lack the necessary staff and resources to complete quality work in a timely manner. Our 2001 evaluation indicated that DOT's central office may wish to develop procedures to monitor and document work completed by counties. To date, it has not done so. As a result, DOT's various regional offices have established their own procedures for verifying that counties complete identified routine maintenance work. For example, the Southwest Region's Madison office recently hired a staff member to visit bridges and ensure routine maintenance work for which counties have requested reimbursement was actually completed. In the Northwest Region's Eau Claire office, staff examine bridges immediately after high-priority work is completed, while minor work is checked during the next inspection.

DOT does not have a standard procedure for counties to request reimbursement for routine bridge maintenance work, and invoices submitted to DOT's regional offices typically do not indicate the specific type and cost of work performed on each bridge. Our 2001 evaluation noted that DOT may wish to provide assistance to the regional offices to ensure counties do not overcharge for maintenance work. To date, DOT has not done so. As a result, some regional offices have established their own procedures for tracking the amount counties charge for completing the work. For example:

- The Southwest Region's Madison office implemented a database to collect information on the cost of routine maintenance work performed by the counties. After counties complete work identified by inspectors, they send an invoice that indicates the type of work that was performed on each bridge and the cost of the work. This information is entered into the database and can be used to track the costs of various types of maintenance work or the total cost of work performed on specific bridges.

- The Northwest Region's Eau Claire office requires counties to report the cost of maintenance work that has been completed on each bridge, including the number of hours spent on particular tasks, the hourly rate of the county staff who performed the work, and the equipment used. Information in these reports is used to help estimate the costs of future work.

- The Northeast Region is in the process of requiring counties to report on the labor, equipment, and material costs of maintenance work performed on each bridge and the date the work was performed. As of December 2007, 8 of 11 counties in the region were providing these reports.

DOT staff acknowledge that counties could potentially overcharge DOT for routine bridge maintenance work or bill for work that was not completed, given the current procedures and systems in place in some areas of the state. Having information about the type and cost of the routine bridge maintenance work counties complete on each bridge would not only help ensure that program funds are spent appropriately, it would also allow bridge inspectors to more accurately estimate the cost of future work.

☑ Recommendation

We recommend the Department of Transportation develop policies and procedures to allow regional office staff to better track the type and cost of routine bridge maintenance work performed by counties on each state-owned bridge.

Condition of Wisconsin's Bridges

DOT's bridge inspection database contains information that describes the condition of each state-owned bridge, including its age, structural features, and average daily traffic. Completing routine maintenance work or larger rehabilitation projects can improve a bridge's condition. We reviewed the overall condition of Wisconsin's bridges and determined whether conditions have changed over time.

Bridges are typically built to last for approximately 75 years, although a bridge's life span can be affected by a variety of factors, including traffic levels and maintenance work. Table 9 shows the ages of state-owned bridges. We found that more than one-third were 20 years old or less in November 2007, while 34 bridges, or 0.7 percent, have been in service for more than 80 years. Appendix 2 contains additional information on the condition of bridges that have been in service for more than 80 years.

Table 9

Ages of State-Owned Bridges
November 2007

Age of Bridge	Number of Bridges	Percentage
10 years or less[1]	1,045	20.1%
11 to 20 years	844	16.3
21 to 30 years	603	11.6
31 to 40 years	978	18.8
41 to 50 years	1,138	21.9
51 to 60 years	278	5.4
61 to 70 years	118	2.3
71 to 80 years	150	2.9
More than 80 years	34	0.7
Total	**5,188**	**100.0%**

[1] Includes a number of bridges that are still under construction.

DOT may close a bridge to all traffic or restrict the weight limit of vehicles using the bridge if inspectors determine that structural conditions warrant this action. In November 2007, only one state-owned bridge was closed, because it had not yet been torn down since the bridge that replaced it was built.

As a result of an inspection that discovered concerns with one bridge pier, DOT closed the McCleary Bridge, near Wausau in Marathon County, in August 2007. Bridge construction had been completed in June 2005, at an estimated cost of $9.2 million. In October 2007, DOT determined the west side of the bridge was safe for motorists and reopened two of the bridge's four lanes. Structural repairs are ongoing, and DOT anticipates work will be completed in May 2008.

Bridges that are deteriorating can often remain open and safe as long as they are not used by excessively heavy vehicles. Statutes generally prohibit vehicles weighing more than 80,000 pounds from being operated on state highways. However, 2005 Wisconsin Act 167, which was enacted in March 2006, increased the maximum vehicle weight to 98,000 pounds, provided that a vehicle permit is obtained from DOT and a vehicle meets certain statutory requirements regarding the distribution of its weight across several axles.

DOT will restrict the use of a bridge if it cannot handle the expected vehicle weight. It will also reassess the weight that a bridge can accommodate if inspectors notice bridge elements are deteriorating or if construction work adds extra weight to a bridge. DOT indicated that the number of bridges with weight restrictions has increased as a result of 2005 Wisconsin Act 167, including 56 state-owned bridges that have maximum vehicle weights of 90,000 pounds. In November 2007, 76 state-owned bridges had weight restrictions, including:

- 4 bridges in the North Central Region;
- 15 bridges in the Northeast Region;
- 22 bridges in the Northwest Region;
- 10 bridges in the Southeast Region; and
- 25 bridges in the Southwest Region.

Federal and state legislation currently under consideration may affect how and when Wisconsin determines bridge weight restrictions. DOT indicated that the weight a bridge can handle is initially determined when the bridge is designed, and thereafter as needed. The National Highway Bridge Reconstruction and Inspection Act of 2007, introduced in Congress in October 2007, would require states to calculate weight capacity at least once every two years for certain bridges. In addition, 2007 Assembly Bill 238, which was introduced as a result of the Legislative Council's 2006 Special Committee on Highway Weight Limits, would require DOT to study the benefits and costs of Wisconsin truck size and weight limit laws, which may result in changes to those laws and the need for additional bridge weight restrictions or bridge rehabilitation projects.

Deficient Bridges

The Federal Highway Administration requires states to report annually on various aspects of each bridge using a standardized scale. Based on this information, a bridge may be classified as structurally deficient. Although a structurally deficient bridge is not necessarily unsafe, it may require immediate rehabilitation to remain open, may be restricted to lighter vehicles, or may be closed.

As shown in Table 10, 4.4 percent of all state-owned bridges in Wisconsin were structurally deficient in 2006, which is a decline from 7.4 percent in 2002. In 2006, the most recent year for which national information is available, Wisconsin had the second-lowest percentage of structurally deficient bridges among seven midwestern states and the sixteenth-lowest percentage nationwide. In November 2007, 219 state-owned bridges in Wisconsin, or 4.2 percent, were classified as structurally deficient. Appendix 3 shows the number of structurally deficient bridges in each DOT region and county as of November 2007.

Table 10

Percentage of State-Owned Bridges Classified as Structurally Deficient

	2002	2003	2004	2005	2006
Minnesota	4.7%	3.7%	3.5%	3.5%	3.1%
Wisconsin	7.4	6.7	5.4	5.1	4.4
Indiana	2.1	2.1	2.0	3.4	4.4
Ohio	4.6	4.4	4.3	4.9	4.6
Iowa	5.0	5.4	5.2	5.3	6.3
Illinois	8.3	7.4	7.8	8.2	8.7
Michigan	17.9	17.0	16.3	15.8	15.2
U.S.	8.8	8.6	8.5	8.5	8.4

2007

4.2

We reviewed a random sample of 50 state-owned bridges that were structurally deficient in 2000 to evaluate whether their conditions subsequently changed. As of January 2008, 23 of the 50 bridges had been replaced with new structures. The replaced bridges ranged in age from 42 to 91 years old at the time of replacement. Of the 27 bridges that have not been replaced, approximately one-half had major construction work completed since 2000, and 20 were no longer classified as structurally deficient, likely because of construction or routine maintenance work.

A bridge may also be classified as functionally obsolete, indicating that it was designed to standards that engineers no longer use. Over time, improvements are made to design requirements in order to improve bridge safety. For example, bridges designed today have wider shoulders than those designed several decades ago. A functionally obsolete bridge is not necessarily unsafe or in danger of collapse.

As shown in Table 11, 7.5 percent of all state-owned bridges in Wisconsin were classified as functionally obsolete in 2006, which is a slight decline from 7.7 percent in 2002. In 2006, Wisconsin had the second-lowest percentage of functionally obsolete bridges among seven midwestern states, and the eighth-lowest percentage nationwide. However, in November 2007, 10.2 percent of all state-owned bridges in Wisconsin, or 527 bridges, were classified as functionally obsolete. DOT indicated that the increase occurred in 2007 because inaccurate calculations had been made in previous years, and correcting these errors resulted in a larger number of bridges being classified as functionally obsolete. Appendix 3 shows the number of functionally obsolete bridges in each DOT region and county as of November 2007.

Table 11

Percentage of State-Owned Bridges Classified as Functionally Obsolete

	2002	2003	2004	2005	2006
Minnesota	6.4%	5.6%	5.5%	5.4%	5.6%
Wisconsin	7.7	8.5	8.2	7.6	7.5
Iowa	11.0	9.1	8.8	8.4	7.7
Indiana	9.1	9.4	9.3	8.8	8.6
Illinois	10.8	10.5	10.0	9.7	9.2
Michigan	14.0	14.5	14.3	13.6	15.0
Ohio	12.4	15.0	14.9	15.1	15.6
U.S.	15.0	14.9	14.8	14.7	14.7

Bridge Sufficiency Ratings

A bridge's sufficiency rating provides a measure of its overall condition and helps determine its priority for rehabilitation or replacement. The sufficiency rating is a number from 0 to 100, with 100 indicating a bridge in perfect condition. It is determined by a number of factors, including a bridge's structural features and safety, its serviceability and the extent to which it is functionally obsolete, and the extent to which it is essential for public use.

As shown in Table 12, approximately three-fourths of state-owned bridges in all five DOT regions had sufficiency ratings of at least 80.0 as of December 2007. The average sufficiency rating statewide has remained largely consistent in recent years, increasing from 85.2 in 2003 to 85.5 in 2007.

Table 12

Sufficiency Ratings for State-Owned Bridges
December 2007

Rating	North Central Region	Northeast Region	Northwest Region	Southeast Region	Southwest Region
0 to 19.9	0.2%	0.8%	0.3%	1.1%	0.2%
20.0 to 39.9	1.2	1.4	1.1	0.4	0.8
40.0 to 59.9	3.4	3.2	5.5	3.4	3.4
60.0 to 79.9	17.6	14.8	18.6	23.0	19.4
80.0 to 100.0	77.6	79.8	74.5	72.1	76.2
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Average Rating	85.9	86.9	84.2	84.8	86.1

We analyzed changes in sufficiency ratings during our review of 50 state-owned bridges that were structurally deficient in 2000. The sufficiency ratings of bridges that underwent major construction work, such as a new bridge deck, increased by an average of 11.4 points, while the sufficiency ratings of bridges without major construction work increased by an average of 2.0 points. DOT indicated that a bridge's sufficiency rating could increase as a result of routine maintenance work or changes in traffic use.

Sufficiency ratings are used to determine if bridges are eligible for federal Highway Bridge Program funds. Bridges on public roads become eligible for these funds if they:

- are classified as structurally deficient or functionally obsolete;
- have not been constructed or had major reconstruction in the past ten years; and
- have a sufficiency rating of 80.0 or less, making them eligible for rehabilitation funds, or less than 50.0, making them eligible for replacement funds.

Federal Highway Bridge Program funds typically pay for a portion of rehabilitation and replacement project costs. As of December 2007, 118 state-owned bridges were eligible for federal bridge rehabilitation funding, while 9 state-owned bridges—all of which were built in the 1930s and are located in DOT's Northeast Region—were eligible for federal bridge replacement funds. DOT received $31.4 million in Highway Bridge Program funds in federal fiscal year 2007-08, most of which will be spent on local bridges. DOT annually spends approximately $100.0 million to rehabilitate and replace state-owned bridges.

Federal Highway Administration guidelines suggest that average daily traffic counts, which affect sufficiency ratings, be updated every three years for interstate highways and other principal highways, while average daily traffic counts for other types of highways should be updated every six years. In general, DOT adheres to these guidelines, although it updates the average daily traffic counts on minor highways only once every ten years. In 2006, these minor highways carried less than 20.0 percent of total traffic on all state highways.

Our 2001 evaluation found that average daily traffic counts were maintained in a database that was not electronically linked to DOT's bridge inspection database, and that approximately two-thirds of the average daily traffic counts in the bridge inspection database were outdated. We recommended that DOT include the most recent average daily traffic counts in the bridge inspection database and use them to determine state-owned bridges' sufficiency ratings. Doing so could potentially give DOT access to additional federal funds to repair deteriorating bridges, although DOT believed the amount would not increase significantly.

In our current review, we found that average daily traffic count information continues to be maintained in a database that is not electronically linked to the bridge inspection database, because DOT does not believe it is cost-effective to link them. Central office staff indicated that bridge inspectors are supposed to manually update the average daily traffic count information when inspection results are entered in the bridge inspection database. We found, however, that inspectors throughout the state do not uniformly do so.

We calculated the extent to which the average daily traffic counts were updated in DOT's bridge inspection database within the last six years, which is the longest period suggested by the Federal Highway Administration. As shown in Table 13, the average daily traffic counts for 70.2 percent of state-owned bridges were last updated from 2002 through 2007. The proportion of average daily traffic counts that were last updated in this six-year period varied from 76.4 percent in the North Central Region to 62.0 percent in the Northeast Region. Statewide, almost one-third of the average daily traffic counts in the bridge inspection database are more than six years old.

Table 13

Period in Which Bridge Average Daily Traffic Counts Were Last Updated[1]
Percentage of State-Owned Bridges

Region	1980 through 1990	1991 through 2001	2002 through 2007
North Central	2.7%	20.9%	76.4%
Northeast	11.2	26.8	62.0
Northwest	4.5	20.8	74.7
Southeast	3.1	32.8	64.1
Southwest	4.6	22.1	73.3
Statewide	5.1	24.7	70.2

[1] In DOT's bridge inspection database.

Sufficiency ratings tend to decline as traffic counts increase, but other factors, such as structural features and safety, typically influence the sufficiency rating more than the average daily traffic count. DOT and the Federal Highway Administration indicated that higher average daily traffic counts may affect a bridge's sufficiency rating only when traffic levels exceed certain thresholds, such as 500 and 5,000 vehicles per day. In December 2007, 160 bridges with average daily traffic counts taken before 2002 had sufficiency ratings that were only slightly higher than the levels needed to be eligible for federal funding, if other criteria are also met. DOT acknowledged the importance of the database containing updated average daily traffic counts, and it anticipates that the database will be completely updated by April 1, 2008.

■ ■ ■ ■

Appendix 1

Calendar Year 2006 Expenditures for Routine Bridge Maintenance Performed by Counties

By Region

Region	Amount
North Central	
Adams	$ 7,000
Florence	12,700
Forest	100
Green Lake	9,800
Iron	200
Langlade	6,900
Lincoln	45,100
Marathon	152,600
Marquette	54,600
Menominee	0
Oneida	14,800
Portage	28,000
Price	29,800
Shawano	10,400
Vilas	10,300
Waupaca	37,600
Waushara	6,700
Wood	64,300
Subtotal	**$490,900**
Northeast	
Brown	$ 257,100
Calumet	1,500
Door	610,800
Fond du Lac	41,200
Kewaunee	5,500
Manitowoc	42,800
Marinette	151,800
Oconto	4,500
Outagamie	34,400
Sheboygan	6,800
Winnebago	574,000
Subtotal	**$1,730,400**

Region	Amount
Northwest	
Ashland	$ 11,800
Barron	129,500
Bayfield	57,200
Buffalo	7,100
Burnett	6,400
Chippewa	51,800
Clark	16,400
Douglas	35,000
Dunn	48,000
Eau Claire	36,900
Jackson	11,100
Pepin	5,700
Pierce	225,100
Polk	13,400
Rusk	15,900
Sawyer	14,200
St. Croix	96,400
Taylor	20,200
Trempealeau	22,600
Washburn	27,600
Subtotal	**$852,300**
Southeast	
Kenosha	$ 59,300
Milwaukee	594,200
Ozaukee	46,200
Racine	43,800
Walworth	118,000
Washington	68,300
Waukesha	191,900
Subtotal	**$1,121,700**

Region	Amount
Southwest	
Columbia	$ 683,200
Crawford	70,600
Dane	83,400
Dodge	14,700
Grant	60,300
Green	7,100
Iowa	111,000
Jefferson	11,700
Juneau	31,600
La Crosse	60,200
Lafayette	41,800
Monroe	98,000
Richland	60,200
Rock	74,000
Sauk	76,700
Vernon	42,800
Subtotal	**$1,527,300**
Total	**$5,722,600**

Appendix 2

Location and Condition of State-Owned Bridges More Than 80 Years Old

November 2007

County	Bridge Location	Spans	Year Built	Sufficiency Rating[1]	Structurally Deficient	Functionally Obsolete	Weight Restrictions	Average Daily Traffic Count[2]
Ashland	State Highway 112	White River	1926	96.5				1,650
Clark	State Highway 98/Elm Dr.	Bear Creek	1920	72.2				3,033
Columbia	State Highway 44	Fox River	1901	95.4				580
Columbia	US Highway 51	Rocky Run Creek	1923	87.8				4,000
Crawford	State Highway 131/Pine St.	Kickapoo River	1922	45.3	X		X	1,500
Douglas	State Highway 105/Union St.	St. Louis River	1910	42.6		X	X	1,909
Fond du Lac	US Highway 151	Pipe Creek	1924	59.1				4,170
Iowa	State Highway 130	Otter Creek	1923	83.8				990
Juneau	US Highway 12/State Highway 16	Webster Creek	1920	98.5				2,500
Kenosha	State Highway 142	Des Plaines River	1926	80.6				3,651
La Crosse	State Highway 162	Dutch Creek	1927	56.7	X			908
Lafayette	State Highway 78	Cherry Creek	1924	60.3				300
Lincoln	State Highway 64/W. Main St.	Prairie River	1904	67.1		X		12,810
Lincoln	4th St.	Wisconsin River	1922	46.6	X	X		14,270
Lincoln	State Highway 64/State Highway 107/W. Main St.	Wisconsin River	1927	49.3				8,520
Marathon	State Highway 107	Little Rib River	1923	89.2				1,220
Marinette	US Highway 141/Main St.	Wausaukee River	1925	45.5	X		X	6,050
Outagamie	US Highway 15	Black Otter Creek	1921	92.0				12,810
Portage	US Highway 10/Main St.	Plover River	1926	57.9				19,202

County	Bridge Location	Spans	Year Built	Sufficiency Rating[1]	Structurally Deficient	Functionally Obsolete	Weight Restrictions	Average Daily Traffic Count[2]
Racine	State Highway 38	Root River	1925	73.6				9,810
St. Croix	State Highway 128/Oak St.	Tiffany Creek	1925	79.5				2,770
Taylor	State Highway 73	Hay Creek	1926	82.0				839
Trempealeau	US Highway 53/Main St.	Beaver Creek	1925	9.5	X	X	X	5,140
Vernon	State Highway 162/N. Ridge Rd.	Coon Creek	1927	68.2				690
Vernon	State Highway 162	Coon Creek	1927	69.8		X		690
Walworth	State Highway 120	Como Creek	1919	58.8			X	7,082
Walworth	State Highway 36	White River	1924	50.6	X		X	4,700
Waukesha	US Highway 18	Bark River	1919	82.4				3,800
Waukesha	US Highway 18	Bark River	1924	73.5				6,300
Waukesha	State Highway 16/Wisconsin Ave.	Oconomowoc River	1924	37.8		X		18,630
Waukesha	State Highway 83	Oconomowoc River	1916	74.7		X		3,050
Waupaca	US Highway 10/State Highway 49/State Highway 110	Walla Walla Creek	1923	56.7		X		16,900
Waupaca	State Highway 49/State Highway 161/Main St.	Little Wolf River	1927	84.1				4,360
Winnebago	State Highway 114/Commercial St.	Fox River	1927	80.1				16,100

[1] As of December 2007.
[2] Based on the year in which the counts were most recently updated in DOT's bridge database.

Appendix 3

Number and Percentage of Deficient State-Owned Bridges

November 2007

Region/County	Total Bridges	Structurally Deficient Bridges		Functionally Obsolete Bridges	
		Number	Percentage	Number	Percentage
North Central					
Adams	8	0	0.0%	0	0.0%
Florence	8	0	0.0	0	0.0
Forest	11	0	0.0	0	0.0
Green Lake	10	0	0.0	0	0.0
Iron	18	2	11.1	0	0.0
Langlade	12	1	8.3	1	8.3
Lincoln	53	1	1.9	7	13.2
Marathon	164	7	4.3	10	6.1
Marquette	37	0	0.0	0	0.0
Menominee	3	0	0.0	0	0.0
Oneida	14	0	0.0	1	7.1
Portage	85	1	1.2	0	0.0
Price	21	1	4.8	3	14.3
Shawano	56	3	5.4	3	5.4
Vilas	11	0	0.0	0	0.0
Waupaca	68	2	2.9	9	13.2
Waushara	21	1	4.8	0	0.0
Wood	51	4	7.8	6	11.8
Subtotal	**651**	**23**	**3.5**	**40**	**6.1**
Northeast					
Brown	250	5	2.0	18	7.2
Calumet	13	0	0.0	1	7.7
Door	17	4	23.5	4	23.5
Fond du Lac	77	1	1.3	8	10.4
Kewaunee	18	0	0.0	0	0.0
Manitowoc	91	1	1.1	3	3.3
Marinette	49	2	4.1	4	8.2
Oconto	40	1	2.5	1	2.5
Outagamie	83	2	2.4	5	6.0
Sheboygan	85	0	0.0	4	4.7
Winnebago	157	4	2.5	23	14.6
Subtotal	**880**	**20**	**2.3**	**71**	**8.1**

Region/County	Total Bridges	Structurally Deficient Bridges		Functionally Obsolete Bridges	
		Number	Percentage	Number	Percentage
Northwest					
Ashland	19	0	0.0%	0	0.0%
Barron	65	3	4.6	0	0.0
Bayfield	34	0	0.0	0	0.0
Buffalo	76	6	7.9	10	13.2
Burnett	15	0	0.0	0	0.0
Chippewa	138	8	5.8	17	12.3
Clark	43	0	0.0	0	0.0
Douglas	61	0	0.0	1	1.6
Dunn	92	7	7.6	3	3.3
Eau Claire	115	6	5.2	7	6.1
Jackson	75	7	9.3	2	2.7
Pepin	17	1	5.9	1	5.9
Pierce	58	2	3.4	5	8.6
Polk	13	0	0.0	1	7.7
Rusk	30	1	3.3	0	0.0
Sawyer	20	1	5.0	0	0.0
St. Croix	107	5	4.7	6	5.6
Taylor	25	4	16.0	2	8.0
Trempealeau	75	3	4.0	5	6.7
Washburn	20	0	0.0	1	5.0
Subtotal	**1,098**	**54**	**4.9**	**61**	**5.6**
Southeast					
Kenosha	57	3	5.3	6	10.5
Milwaukee	527	33	6.3	198	37.6
Ozaukee	50	1	2.0	1	2.0
Racine	58	1	1.7	2	3.4
Walworth	119	4	3.4	2	1.7
Washington	75	0	0.0	2	2.7
Waukesha	182	23	12.6	16	8.8
Subtotal	**1,068**	**65**	**6.1**	**227**	**21.3**

Region/County	Total Bridges	Structurally Deficient Bridges		Functionally Obsolete Bridges	
		Number	Percentage	Number	Percentage
Southwest					
Columbia	98	4	4.1%	8	8.2%
Crawford	68	6	8.8	6	8.8
Dane	290	20	6.9	41	14.1
Dodge	66	3	4.5	7	10.6
Grant	74	3	4.1	8	10.8
Green	29	1	3.4	0	0.0
Iowa	58	1	1.7	2	3.4
Jefferson	73	3	4.1	5	6.8
Juneau	80	4	5.0	2	2.5
La Crosse	107	2	1.9	8	7.5
Lafayette	42	0	0.0	1	2.4
Monroe	153	3	2.0	5	3.3
Richland	78	3	3.8	3	3.8
Rock	120	0	0.0	20	16.7
Sauk	82	3	3.7	8	9.8
Vernon	73	1	1.4	4	5.5
Subtotal	1,491	57	3.8	128	8.6
Total	**5,188**	**219**	**4.2%**	**527**	**10.2%**


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State has improved its bridges, audit finds

Inspection program called one of the best in the country

By PATRICK MARLEY
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Posted: Feb. 27, 2008

Madison - An audit released Wednesday says the state Department of Transportation has reduced the number of structurally deficient state-owned bridges by nearly 70% in recent years while at the same time improving the timeliness of its inspections.

But the report, by the Legislative Audit Bureau, found that 34 state-owned bridges in the state are more than 80 years old - five years past the 75-year lifespan of most bridges.

Lawmakers requested the audit after a Minneapolis bridge collapsed Aug. 1, killing 13.

Auditors found improvements in the bridge inspection program since they last reviewed it in 2001. At that time, they found 16% of state-owned bridges were late in getting inspections.

The latest report found that more than 98% of state-owned bridges were inspected within the required 24 months. Most that were inspected late were inspected within 26 months, but 28 bridges took longer than that. One bridge was not inspected for 37 months.

The audit also found that 4.4% of state-owned bridges were structurally deficient in 2006, down from 7.4% in 2002.

The state's rate of deficient bridges is the second-lowest among Midwestern states and about half the national rate of 8.4%. Structurally deficient bridges are those that are deteriorating and limited to lighter vehicles. They are not necessarily unsafe.

Officials with the Federal Highway Administration told auditors Wisconsin has one of the best bridge-inspection programs in the country.

The audit identified 34 state-owned bridges that were five or more years past the typical 75-year lifespan of a bridge. They make up 0.7% of Wisconsin's 5,188 state-owned bridges. The oldest - on Highway 44 over the Fox River in Columbia County - was built in 1901.

Four of the 34 bridges are in Waukesha County - Highway 83 over the Oconomowoc River; Highway 16 (Wisconsin Ave.) over the Oconomowoc River; and two stretches of Highway 18 that span the Bark River.

The Highway 38 bridge over the Root River in Racine County is also more than 80 years old.

From the Feb. 28, 2008 editions of the Milwaukee Journal Sentinel