



MISC 4a

State Senator  
**Chuck Chvala**  
SENATE MAJORITY LEADER

January 8, 2001

The Honorable Roger Breske  
Wisconsin State Senator  
Rm. No. 18 S., Capitol  
Madison, WI 53703

Dear Senator Breske:

The Senate Committee on Organization has approved your request for the Members of the Committee on Insurance, Tourism and Transportation, as well as Senators Schultz, Lasee and Zien, (as previous members of the Committee) to travel to Milwaukee, Wisconsin on January 11, 2001 for the purpose of conducting a Joint Public Hearing on the failure of the Hoan Bridge.

It is the Committee's understanding that you are seeking reimbursement for all actual and necessary expenses associated with the committee members' attendance at this hearing. It is further understood that you are seeking reimbursement for additional staff support from your committee clerk, the Senate Sergeant-at-Arms and overnight accommodations, as needed.

Your request has been approved contingent upon the Senate not being in session. Please let me know if you have any questions.

Sincerely,

**CHUCK CHVALA**

Chairman

Senate Committee on Organization

State Capitol, Post Office Box 7882, Madison, WI 53707-7882 ■ Phone: (608) 266-9170 ■ Fax: (608) 266-5087

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# ROGER BRESKE

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January 9, 2001

The Honorable Chuck Chvala, Chair  
Senate Committee on Organization  
The State Capitol  
Room No. 211 South  
**VIA INTER-DEPARTMENTAL MAIL**


Dear Senator Chvala:

I write to request approval for the Senate Committee on Insurance, Tourism and Transportation to travel to Milwaukee, Wisconsin, for the purposes of conducting a joint public hearing regarding the structural failure of the Hoan Bridge, the Department of Transportation's plans for reconstruction and other related public safety issues. The hearing is scheduled to take place at 10:00AM on January 11, 2001, and will be held at the War Memorial Center.

I am requesting Senate reimbursement for all necessary and actual expenses of Committee members and Committee staff. I am also requesting reimbursement for overnight accommodations for those members who require it. In addition to this, we will be in need of Senate Sergeant staff to help facilitate the hearing.

Thank you for your consideration of this request. If you have any questions regarding this request, please feel free to give me a call.

Sincerely,



ROGER BRESKE, CHAIR  
Senate Committee on Insurance, Tourism,  
Transportation & Corrections

RB/ekp

# ROGER BRESKE

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January 3, 2001

The Honorable Chuck Chvala, Chair  
Senate Committee on Organization  
The State Capitol  
Room No. 211 South  
**VIA INTER-DEPARTMENTAL MAIL**

*Vaughn - Pls.  
send a new letter  
dated Jan. 9 w/  
corrected Cmte  
name. Thanks!*

Dear Senator Chvala:

I write to request approval for the Senate Committee on Insurance, Tourism, Transportation ~~and Corrections~~ to travel to Milwaukee, Wisconsin, for the purposes of conducting a joint public hearing regarding the structural failure of the Hoan Bridge, the Department of Transportation's plans for reconstruction and other related public safety issues. The hearing is scheduled to take place at 10:00AM on January 11, 2001, and will be held at the War Memorial Center.

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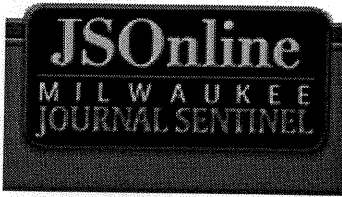
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ROGER BRESKE, CHAIR  
Senate Committee on Insurance, Tourism,  
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# A bridge too risky

From the Journal Sentinel

Last Updated: Dec. 19, 2000

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Once the butt of local jokes, the Hoan Bridge has become the bane for thousands of motorists who have had to find another way to get around. As far as they're concerned, it makes little difference whether the problems that forced the closing of the Hoan and the tricky demolition of part of the span were caused by since-discredited welding techniques, questionable steel, design problems or weather.

They and other taxpayers who may have never crossed the Hoan but helped pay for it have every right to be angry. They also are entitled to answers. Bridges are supposed to last longer than 23 years, especially when they handle far less volume than originally intended.

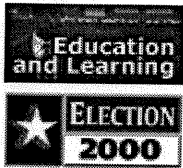
As if the indefinite closing of the bridge and the undetermined cost of repairing it weren't enough to swallow, the public has something else to be nervous about: the real possibility that the demolition work might cause major damage to the Milwaukee Metropolitan Sewerage District facilities underneath. Heaven knows the district and the people it serves have had enough problems this year with heavy rains and sewage bypasses.

State transportation officials, admirably, have snapped into action. Clearly, they are trying to get some answers and deal with the imminent danger of bridge collapse and related problems.

One valid question for which they seek answers is whether the contractors, steel manufacturers or designers should be held financially responsible if the subsequent inquiry shows that they were at fault. Joe Maassen, deputy general counsel for the state Department of Transportation, points out that the statute of limitations might well preclude the state from successfully seeking remuneration. But if negligence is found, that should not prevent the state from at least trying to recover some of the cost.

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History shows that area motorists, with the help of transportation officials, are quite good at finding alternate routes during reconstruction projects, including the resurfacing of I-94 and Highway 45. The state DOT needs to get busy again doing just that with public education campaigns and perhaps additional bus routes. The out-of-the-blue closing of the Hoan also underscores the need to pick up the pace for other transportation priorities, including rebuilding of freeways and roads and the obvious need for some sort of rapid transit system.

Fortunately, state transportation officials are moving ahead with plans to extend the year-old Lake Parkway, which had given the Hoan new life until the bridge problems surfaced. Rather than ending as it does now at E. Layton Ave., on the north end of Mitchell International Airport, the parkway would be connected to S. Pennsylvania Ave., allowing motorists traveling on the parkway to continue south on Pennsylvania, a four-lane arterial that was rebuilt only two years ago.

It's a terrific idea. The Hoan is eventually going to be repaired and, once it is, the combination of the Lake Parkway and Pennsylvania Ave. will provide yet another route to and from the south shore.

Appeared in the Milwaukee Journal Sentinel on Dec. 20, 2000.

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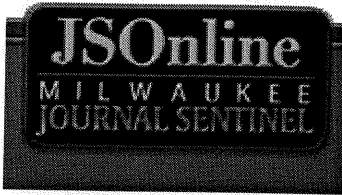
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# Expert says cold damaged bridge

## He suggests Hoan was ailing from loads, weather, steel fatigue

By TOM HELD of the Journal Sentinel staff

Last Updated: Dec. 22, 2000

Severe cold played a "very, very large role" in the failure of the two steel support girders that broke under the northbound lanes of the Hoan Bridge, an expert working on the Hoan said Friday.

Mark Loizeaux, president of the demolition firm hired to take down the damaged portion of the bridge, theorized that a confluence of cold, metal fatigue and heavy traffic loads led to the failure that has left the bridge closed indefinitely.

The morning the girders gave way on Dec. 13, the temperature dropped to a low of 4 below zero, according to the National Weather Service.

"The temperature had an awful lot to do with the event, the failure of the steel," said Loizeaux, who has studied damaged and failed structures around the world. "Not the cold in and unto itself, but the cold engaged with other factors, which I believe precipitated the failure of the center girder first, then followed by the eastern girder."

When those two girders fractured, a

### Hoan Bridge



Photo/Gary Porter  
Judy Grzegorski, safety manager with United Water Services, walks Friday on a pile of gravel that was used to absorb the shock when a 130-foot, 520-ton damaged section of the Hoan Bridge was dropped with the use of explosives Thursday near the Milwaukee Metropolitan Sewerage District plant.

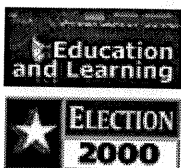


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200-foot section of the northbound lanes slumped several feet, remaining suspended only by a third girder that has since developed an 18-inch tear.

Loizeaux has been demolishing bridges, buildings and other structures most of his life. In 1976, he and his brother, Doug, took over the demolition business that their late father founded in the 1950s.

"I am fairly well recognized in the international industry as an expert in failed structures and handling forensic analysis of failed structures," Loizeaux said. "That is not my role here, but I am curious.

"My opinion is that the cold played a very, very large role."

Loizeaux said the structural engineers and other experts who will determine what caused the Hoan's failure also will consider the amount of fatigue in the steel and the loads being carried over the bridge.

Two days before the girders broke, more than 700 trucks hauled about 15,000 tons of salt from the Port of Milwaukee over the Hoan's northbound lanes.

### Cold weather common

The steel holding up the Hoan has withstood hundreds of days with temperatures below zero since the bridge was built in the early '70s and opened in 1977. In that time, Milwaukee has averaged about 15 days per year with a low temperature at zero or below, according to the weather service.

And the bridge has endured the two coldest days in the city's history, Jan. 17, 1982, and Feb. 3, 1996. The temperature hit 26 below on both days.

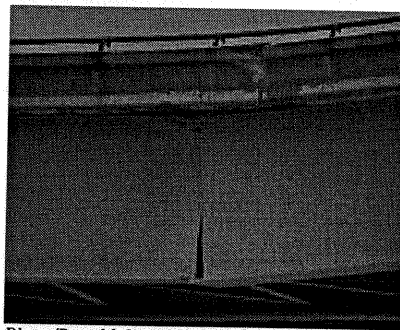
But cold is a common factor in brittle fractures like the ones that suddenly caused the girders to break on Dec. 13.

"Temperature reacts with steel, and if it becomes really, really cold, the steel becomes brittle," Loizeaux said.

The week that Loizeaux and his workers with Controlled Demolitions Inc. have spent in Milwaukee has been a frustrating one, as the cold and persistent wind hampered their preparations to demolish a 130-foot section of the bridge.

In fact, the weather forced Loizeaux to abandon plans to demolish the damaged

Aerial view of the damaged portion of the Hoan Bridge.



Photo/Ronald Overdahl  
The crack in the girder and the buckling of the road are clearly visible.

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section today. Loizeaux expects to restart work on the bridge Tuesday, based on the forecast for more favorable weather.

"I need 48 hours with the right temperature and the right winds," Loizeaux said. "I need two days of time with the wind below 15 mph and the temperature in the mid to upper 20s."

Jim Santoro, a consultant working with Controlled Demolitions, said the conditions over the last three days limited the preparation work to about 1 1/2 hours per day.

All of the explosive charges necessary have been placed on the road surface of the bridge, but the wind and cold have thwarted the efforts to place charges on the steel girders under the bridge deck.

Loizeaux said the cold caused hydraulic systems to fail in the lifts used to elevate workers up to the girders more than 100 feet above the ground.

"Today, we tried to go and the machines would not respond adequately," Loizeaux said.

The temperature Friday barely crept above 10 degrees, and the wind blew steadily around 15 mph. Santoro said the wind speed at 100 feet off the ground regularly exceeded the 20-mph limit for safety.

Don Rhodes, communications manager for the state Department of Transportation, said caution and safety were more important than the need to stay on a project schedule.

"It's unsafe to put explosives on girders 100 feet above the ground in these conditions," Rhodes said. "We will not put people's lives in jeopardy."

### **Will bridge stay up?**

There is some question, though, about whether the damaged section of the Hoan will remain in place over the next several days of expected cold and wind.

Officials fear that the section, if it falls, could damage other portions of the northbound lanes and the Milwaukee Metropolitan Sewerage District buildings and equipment on Jones Island, below the bridge. The CDI crew is setting up the demolition to pull the damaged structure away from a sewage treatment plant building that serves as the plant's nerve center.

Rhodes said monitoring devices attached to the damaged section of the bridge show it has remained stable as the CDI crew worked to install the explosive charges. The movement the devices have detected has been the normal expansion and contraction of the bridge as the temperature changes throughout the day, he said.



Loizeaux said it appeared that the damaged portion of the bridge had stabilized.

"Could the structure fall? That's possible," he said. "I think it's stabilized where, if we can make it until next Tuesday, I think the structure will still be there.

"That gives the best odds of survival of the balance of the bridge and mitigating any damage to the facilities below."

Appeared in the Milwaukee Journal Sentinel on Dec. 23, 2000.

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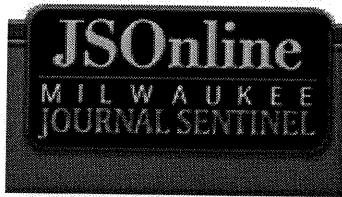
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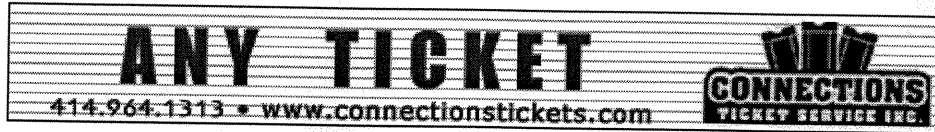
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# 26 state bridges similar to Hoan

## DOT to inspect girders with questionable welds

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: Dec. 23, 2000

Milwaukee's heavily traveled High Rise Bridge and at least 25 other steel bridges across Wisconsin were built with the same design drawbacks and now-discredited welding techniques as the failed Hoan Bridge, the state Department of Transportation says.

The High Rise Bridge, which carries I-43/94 over the Menomonee Valley just south of downtown, is one of eight such bridges in Milwaukee County alone, in addition to the now-closed Hoan Bridge. Most of the Milwaukee County bridges are on or over I-94.

Other similar bridges include the Bay Bridge, which carries state Highway 42/57 over the Sturgeon Bay Ship Canal in Door County; the I-90 bridge over the Mississippi River near La Crosse; and four Fox River bridges in Green Bay, Appleton and Oshkosh.

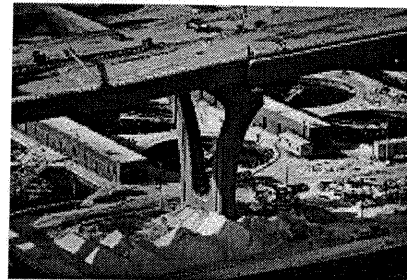
Starting Wednesday, four teams of inspectors are to fan out across the state to examine these 26 state-owned bridges and make sure that none of

### Hoan Bridge



Photo/Gary Porter

Judy Grzegorski, safety manager with United Water Services, walks Friday on a pile of gravel that was used to absorb the shock when a 130-foot, 520-ton damaged section of the Hoan Bridge was dropped with the use of explosives Thursday near the Milwaukee Metropolitan Sewerage District plant.



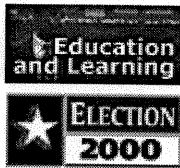
Photo/Jeffrey Phelps

Aerial view of the damaged portion of the Hoan Bridge.

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them is endangered by the same kinds of defects that cracked the girders holding up a section of Milwaukee's lakefront Hoan Bridge, which links I-794 to the new Lake Parkway.

All of the other bridges are believed to be safe, said Phil Fish, state bridge inspection supervisor. And nationwide, officials know of only two other bridges that failed the same way as the Hoan - one in the Twin Cities in 1975 and one in Pittsburgh in 1979, state Transportation Secretary Terry Mulcahy said.

### Public safety 'paramount'

But state officials want to take extra precautions because "the safety of the public is paramount," Gov. Tommy G. Thompson said in a written statement.

Safety concerns also forced a temporary halt Friday to a demolition team's efforts to blow up the damaged section of the Hoan Bridge before it falls on its own, possibly wrecking a Milwaukee Metropolitan Sewerage District building. High winds and low temperatures repeatedly interrupted preparations for the blast, now postponed until the middle of this week.

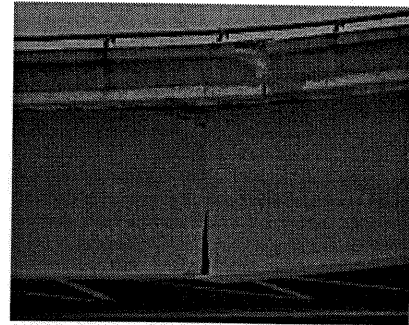
On Saturday, engineers monitored the damaged section of the northbound lanes with high-tech sensors as police guarded the explosives-laden bridge, Transportation Department spokesman Don Rhodes said. The demolition experts have been sent home for the holiday but could return on a few hours' notice if the weather improves or the bridge deteriorates, he said.

The demolition team has assured state officials that the explosives won't go off if the bridge falls on its own, because detonation devices are not in place, Rhodes said.

After the blast, state officials will conduct an intensive inspection of the parts of the Hoan that didn't sag Dec. 13. Eight teams of inspectors will examine the other segments of the bridge before any of it reopens to the public, Mulcahy said.

Previous inspections of the other 26 Wisconsin bridges didn't turn up any major problems. But similar inspections didn't find the Hoan Bridge's girder problems, either, and the state wants to use what it's learned about the Hoan to double-check the other bridges, Fish said.

The High Rise Bridge could be in better shape than some of the others because a 1987-'89 overhaul brought much of the bridge up to current standards, Fish said.



Photo/Ronald Overdahl  
 The crack in the girder and the buckling of the road are clearly visible.

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Also under study on I-94 in Milwaukee County are two bridges over W. Oklahoma Ave., one northbound and one southbound; one each over W. Washington St. and N. 26th St.; one in the Stadium Interchange; and one over the freeway just west of Miller Park. The other Milwaukee County bridge carries state Highway 100 over Underwood Creek in Wauwatosa.

Two bridges over I-43 in Walworth County also will be reviewed, along with two I-90/94 bridges each in Columbia and Sauk counties; seven bridges in northeastern Wisconsin; and five bridges in western Wisconsin.

All 26 bridges under study share three characteristics with the Hoan, Fish said:

- They were welded between 1961 and 1985. During those years, bridges were welded together on site, sometimes in unfavorable weather. Before then, bridges were riveted together; since then, large sections have been welded in factories, then bolted together on site.
- They lack redundancy, meaning a crack in a single girder could cause part of the bridge to sag or fall.
- They have steel girders running under a concrete deck.

Together with the Hoan Bridge, the bridges under study represent slightly more than one-half of 1% of Wisconsin's 4,815 state-owned bridges. Fish and his staff also are checking whether any of the 8,608 bridges owned by local governments match the profile, although he believes few do.

To review the bridges, state inspectors will split into three-person teams, each with a truck-mounted Reach-All unit. Those units have cranes that can position a man-basket under a bridge.

During each inspection, one inspector will drive the truck onto a bridge, then operate the crane. The other two inspectors will be in the man-basket, examining all the girders by sight and touch.

The Transportation Department owns three of the Reach-All units. The fourth belongs to the Milwaukee Department of Public Works, which is lending it to the state for free, Fish said.

State officials also will ask Minnesota authorities to help inspect the I-90 bridge over the Mississippi River north of La Crosse.

Weather permitting, all of the bridge inspections are to be completed by the end of January, Fish said. He could not estimate how much they will cost.

Wisconsin has a comprehensive bridge inspection program that examines every bridge in the state at least once every two years, with in-depth inspections at least once every five years for certain bridges, including the Hoan, Fish said.

Since 1992, inspections of the damaged Hoan Bridge span have revealed minor wear and tear that was fixed with routine repairs, but "nothing major," said Sriramulu Vinnakota, a Marquette University engineering professor who

reviewed some of the inspection reports at the Journal Sentinel's request.

The reports typically rated that segment, known as S2A, as a 5 ("fair") or 6 ("satisfactory") on the federal government's 0-to-9 bridge quality scale. Those grades are a bit below average for a bridge that's less than 30 years old, said Habib Tabatabai, assistant professor of civil engineering and mechanics at the University of Wisconsin-Milwaukee.

But although the ratings were below average, they weren't low enough to suggest any major problems, said Al Lindner, a principal in the engineering firm of Graef, Anhalt, Schloemer & Associates, which has conducted Hoan Bridge inspections since 1992.

Fish and Lindner said they don't believe the Hoan Bridge failure shows a flaw in the inspection process. However, the investigation of why the Hoan failed could lead to improved inspection techniques, Fish said.

Nationally, Wisconsin is among the top 10 states in bridge quality, according to the Federal Highway Administration's National Bridge Inventory. That ranking says only 18% of Wisconsin's 13,423 bridges would qualify for federal aid for rehabilitation or replacement.

Wisconsin is tied with California and Delaware for eighth-best among the 50 states and the District of Columbia. Arizona ranks first, with 5% of its bridges rated deficient or obsolete, while Rhode Island and the District of Columbia are tied for last place, with 62% each.

*Rick Barrett, Tom Kertscher and Steve Schultze of the Journal Sentinel staff contributed to this report.*

Appeared in the Milwaukee Journal Sentinel on Dec. 24, 2000.

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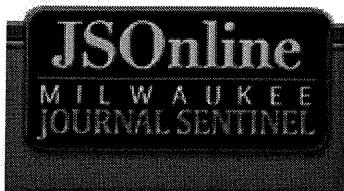
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# Lab work seeks clue to failure of Hoan

## Public confidence hangs on research into bridge buckling

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: Dec. 30, 2000

It won't be as dramatic or as quick as the televised explosion of the Hoan Bridge, but the long months of quiet laboratory work ahead are likely to be far more important for millions of drivers who use bridges nationwide.

The Hoan Bridge failed in a way that veteran engineers haven't seen before. And before officials can reassure the public that dozens of similar bridges are safe, they have to answer one perplexing question:

Why did two bridge girders crack at the same time and in the same place that authorities were trying to fix a crack in the third of the three girders holding up that section?

That kind of multiple failure hasn't happened on any other U.S. bridge that experts are aware of, said Bala Sivakumar, chief engineer for Lichtenstein Consulting Engineers.

Determining the cause is critical because at least 26 other bridges across

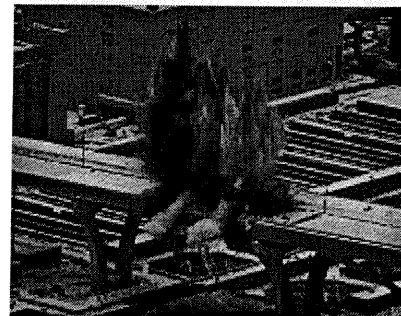
### Hoan Bridge



Photo/David Joles



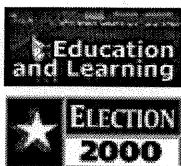
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Wisconsin - including Milwaukee's heavily traveled High Rise Bridge on I-43/94 and Door County's popular Bay Bridge in Sturgeon Bay - and many others nationwide were built during the same time and with the same design and welding techniques as the Hoan Bridge.

Sivakumar's New Jersey company is part of a team that the state Department of Transportation has assembled to investigate the cause of the cracks that buckled a piece of the northbound lanes Dec. 13 and ultimately led authorities to blow up that section of the bridge on Thursday.

Researchers from the Federal Highway Administration, Northwestern University in Evanston, Ill., and Lehigh University in Bethlehem, Pa., also are working on the investigation.

Pieces of the damaged girders are being shipped to the federal agency's Turner-Fairbank Highway Research Center in McLean, Va., for testing, said Bruce Karow, the state's chief bridge maintenance engineer.

Those girders will be examined under an electron microscope and subjected to chemical and mechanical tests.

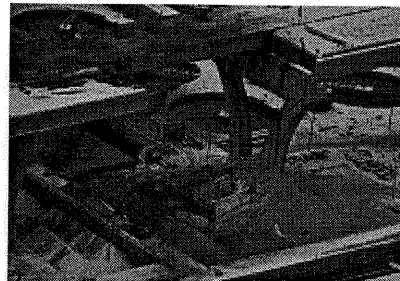
With those and other tests, investigators hope to settle on one of several possible causes, then use that information to rebuild the Hoan Bridge and perhaps improve techniques for inspecting similar bridges, said Leslie Fafard, DOT southeastern district director, and Phil Fish, state bridge inspection supervisor.

### Was it the welding?

Preliminary examination suggests the girders cracked at or near the intersection of two welds, Karow said. But looking at the girders under an electron microscope will let engineers determine the exact spot the cracks started to form, he said.

The Hoan was built in the early 1970s. Bridges built from the early 1960s to the mid-1980s were designed to be welded together entirely on site, without the rivets used in earlier bridges or the bolts common in later bridges. The state is

Photo/Gary Porter



Photo/Gary Porter



Photo/David Joles  
 Five views of the Hoan Bridge blast and the rubble afterward.

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inspecting all 26 other state-owned Wisconsin bridges built with similar designs and welding techniques.

Bridge engineers both inside and outside the DOT have identified the welding as a leading suspect in the girder cracks.

### **Was it the steel?**

The parts of the girders that cracked were made of A-36 steel, a generally reliable variety that is commonly used in bridge construction.

However, it's possible to get a bad batch of even the best steel, said Mike Koob, senior consultant at Wiss Janney Elstner Associates Inc., a Northbrook, Ill., engineering firm that advises officials on bridge repairs. Ray McCabe, senior vice president of HNTB Corp., the firm that designed the bridge, has said the steel quality should be a major issue in the investigation.

### **Was it the cold?**

Temperatures dipped to 4 below zero the night before the bridge cracked. But the bridge had endured many days of subzero temperatures in three decades of Wisconsin winters.

Still, the cold has been identified as a possible contributing factor by Al Ghorbanpoor, chairman of the civil engineering department at the University of Wisconsin-Milwaukee, and Mark Loizeaux, president of the demolition company that blew up the damaged section.

Sivakumar said the girders appeared to have cracked from "distortion-induced stress" - which he defined as "being subjected to forces not properly accounted for in the design." Extreme cold can be one type of such stress.

In the federal laboratory, investigators will test how the damaged girders react to different temperatures, and whether they become more brittle in the cold.

### **Was it the traffic?**

The Hoan carried an average of 21,800 cars a day in 1998, before the Lake Parkway opened, and an average of 32,190 a day this year, with higher numbers on weekdays.

It was also a major route for trucks hauling salt north from the Port of Milwaukee to city and county facilities. Two days before the girders cracked, more than 700 trucks carried about 15,000 tons of salt over the bridge.

Ghorbanpoor and Loizeaux have said the combination of heavy loads and extreme cold could have helped turn a minor fault into a major crack.

After inspectors determine that other parts of the bridge are safe, investigators will attach strain gauges to the remaining girders and drive trucks over them to



see how the steel reacts to different loads, Karow said.

### Was it the soil?

In some bridges, erosion of the ground beneath can weaken the base and destabilize the bridge.

Investigators will check the piers supporting the Hoan to see whether that happened in this case, Karow said. But it's not a strong possibility, said Karow and Mike Oliva, associate professor of civil engineering at UW-Madison.

Overall, the investigation could take up to six months, Fafard said. Renovating the bridge according to investigators' recommendations could take another six months, meaning all lanes of the Hoan may not be back in service until the end of 2001, he said.


Appeared in the Milwaukee Journal Sentinel on Dec. 31, 2000.

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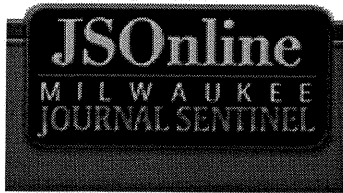


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# Audit of bridge inspections proposed

## State senator contends public would be reassured

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By LARRY SANDLER  
of the Journal Sentinel staff

Last Updated: Jan. 3, 2001

In the wake of the Hoan Bridge failure, a state senator called Wednesday for a legislative audit of state bridge inspections.

Sen. Peggy Rosenzweig (R-Wauwatosa) said the probe was needed to "reassure the Legislature and the public" and avoid "a loss of public confidence in the statewide bridge system."

Also Wednesday, bridge inspectors said they had dropped four northeastern Wisconsin bridges from the list of 26 bridges originally thought to be similar to the Hoan, and that two others on the list had passed new inspections.

A review of architectural plans found Door County's Bay Bridge and three others were bolted together, not built with the now-discredited welding techniques used on the Hoan Bridge, said Bruce Karow, chief bridge maintenance engineer for the state Department of Transportation. The Bay Bridge carries State Highway 42/57 in Sturgeon Bay.

The Hoan Bridge's northbound lanes sagged Dec. 13, after major cracks developed in two of the three girders

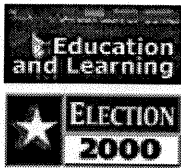
### Hoan Bridge



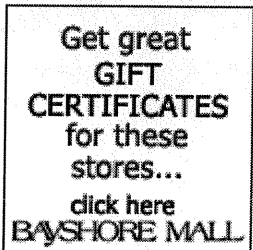
Photo/Gary Porter  
Judy Grzegorski, safety manager with United Water Services, walks Friday on a pile of gravel that was used to absorb the shock when a 130-foot, 520-ton damaged section of the Hoan Bridge was dropped with the use of explosives Thursday near the Milwaukee Metropolitan Sewerage District plant.

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holding up one section. With a crack forming in the third girder as well, authorities destroyed the section with a controlled explosion last week to prevent it from falling on its own.

Previous inspections found the crack in the third girder, but not in the two that actually failed. Repair efforts on the third girder were under way when the other two gave out.

Because the inspection process didn't find the problems in the two girders, Rosenzweig said, it's important to understand how the inspections work and how they can be improved.

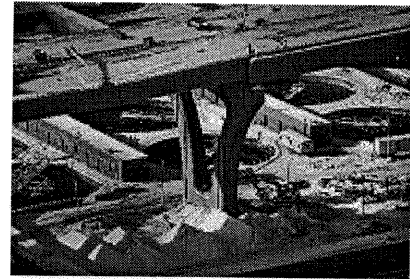
If the Joint Legislative Audit Committee agrees, the audit would be the second legislative probe into the bridge failure. However, Rosenzweig said the audit would not duplicate the efforts of the Assembly and Senate transportation committees, which will hold a joint hearing on the issue at 10 a.m. next Thursday at the War Memorial Center.

Rosenzweig stressed she was not attacking the DOT, which she praised for its response to the bridge failure. She said she appreciated the department's moves to launch its own investigation into why the bridge failed, and to inspect other state-owned bridges built with the same welding techniques and design drawbacks as the Hoan Bridge.

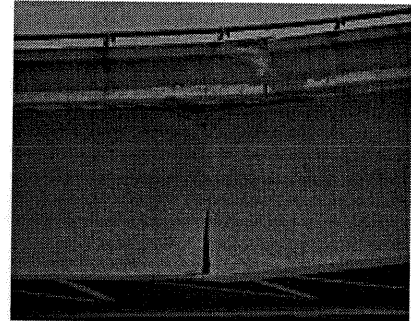
Inspections started last week with a review of bridge plans, Karow said. In addition to the Bay Bridge, inspectors crossed off lift bridges in Green Bay, Oshkosh and Marinette, he said.

Among the remaining 22 bridges, new inspections have been completed on one of the two Highway 18 bridges over the Mississippi River at Prairie du Chien and on the Highway 64 bridge over the Chippewa River at Cornell, Karow said. Inspectors found no problems on either bridge, he said.

The Hoan Bridge also will be intensively inspected before any part of it returns to service. Transportation officials say the bridge will stay closed for at least three months. They are studying a plan to run two-way traffic in the southbound lanes, starting this spring, when the 6th St. Viaduct closes for reconstruction.



Photo/Jeffrey Phelps  
Aerial view of the damaged portion of the Hoan Bridge.



Photo/Ronald Overdahl  
The crack in the girder and the buckling of the road are clearly visible.

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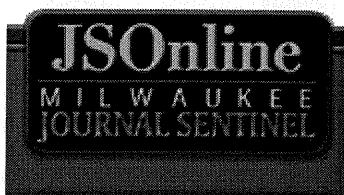


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# Hoan steel provider has ties to university

## DOT sees no conflict for Lehigh expert

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: Jan. 7, 2001

The steel in the Hoan Bridge's flawed girders has been traced to a company with long-standing ties to one of the universities investigating the bridge failure.

But both state and university officials say they see no conflict of interest for the nation's leading bridge-failure expert, an engineering professor at Lehigh University in Bethlehem, Pa.

A search of state Department of Transportation records found that Bethlehem Steel Corp. - also based in Bethlehem, Pa. - produced the steel in the parts of the girders that failed Dec. 13, said Bruce Karow, the DOT's chief bridge maintenance engineer.

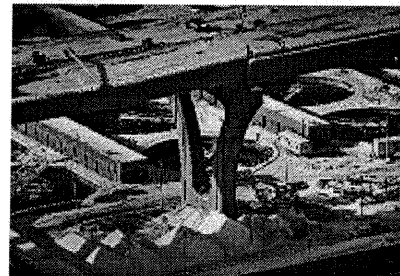
The company, however, has not been able to confirm that it had any role in supplying steel for the Hoan Bridge, Bethlehem Steel spokeswoman Bette Kovach said. And as of late Friday afternoon, she said, no one from the DOT had contacted Bethlehem Steel about the state records, which Karow

### Hoan Bridge



Photo/Gary Porter

Judy Grzegorski, safety manager with United Water Services, walks Friday on a pile of gravel that was used to absorb the shock when a 130-foot, 520-ton damaged section of the Hoan Bridge was dropped with the use of explosives Thursday near the Milwaukee Metropolitan Sewerage District plant.



Photo/Jeffrey Phelps

Aerial view of the damaged portion of the Hoan Bridge.

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said were not discovered until Friday morning.

The connection turned up more than three weeks after the DOT put together a team of consultants to investigate why cracks developed in the girders holding up a section of the bridge's northbound lanes.

Lehigh's Engineering Research Center for Advanced Technology for Large Structural Systems, led by Professor John Fisher, is part of the team. Also involved in the probe are the Federal Highway Administration's Turner-Fairbank Highway Research Center in McLean, Va.; Northwestern University's Infrastructure Technology Institute in Evanston, Ill.; and Lichtenstein Consulting Engineers, in Paramus, N.J.

Both the quality of the steel and the way it was welded together are under investigation.

Bethlehem Steel and its executives have been major supporters of Lehigh University for many years, according to information available on Lehigh's Web site.

A building on Lehigh's campus, Grace Hall, is named for a former Bethlehem Steel chairman who also served as president of Lehigh's board and donated the money to build the student center. A retired company executive currently sits on the university's board, and another is listed as a trustee emeritus.

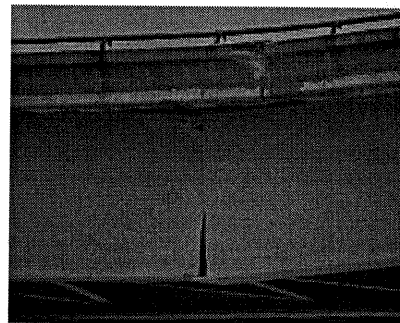
However, in recent years, the relationship has changed as Bethlehem Steel has closed its manufacturing operations in town, Lehigh spokesman Bill Johnson said. Now the company and the university work together on community development projects to reuse the former foundry facilities, he said.

In 1985, Lehigh bought the company's Homer Research Laboratories for use as a satellite campus, although the company still leases some of the buildings, Johnson said.

Johnson said he was not aware of any recent donations or grants from Bethlehem Steel. However, the university's Web site indicates that the company is underwriting at least one engineering fellowship and is a sponsor of the university's Manufacturing Logistics Institute.

Fisher said none of that would have any effect on his work.

"We report the facts, whatever they are," Fisher said.



Photo/Ronald Overdahl  
 The crack in the girder and the buckling of the road are clearly visible.

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Karow said he was unaware of the relationship between Bethlehem Steel and Lehigh. But he said that did not diminish his confidence in Fisher.

"John Fisher is the acknowledged expert in this sort of thing," Karow said.

Indeed, Fisher literally wrote the book on bridge failures. He is the author of "Fatigue and Fracture in Steel Bridges: Case Studies," a major work on the subject, and has investigated most of the major bridge failures in the United States over the past 30 years.

### **Probed other disasters**

Fisher also has been involved in probing other disasters, such as the 1981 collapse of a walkway at the Hyatt Regency Hotel in Kansas City. His laboratory even has the capacity to simulate the effect of an earthquake on a building, Johnson said.

For the Hoan probe, Fisher said his role will be to write a failure analysis, which he compared to an autopsy. He said the material analysis of the steel would be handled primarily by the Turner-Fairbank center.

Authorities removed the damaged section of the bridge with a controlled explosion Dec. 28 to prevent it from falling on its own. Workers are now hauling away the girders, which eventually will be cut into pieces, Karow said. Some of those pieces will be sent to the federal research center and some to Lehigh, Fisher said.

The Hoan Bridge was built by a number of contractors between 1970 and 1972, and DOT officials have had some difficulty determining each company's role from records three decades old.

Until Friday, the DOT believed all of the steel in the girders was produced by U.S. Steel Group of Pittsburgh, now part of USX Corp. But further review showed U.S. Steel produced only steel for parts of the girders that didn't crack, said Karow and U.S. Steel spokesman John Armstrong.

Steel produced by both U.S. Steel and Bethlehem Steel was welded together in the girders by Inland Ryerson Construction Co., the general contractor on that section of the bridge, Karow said.

Armstrong and Bethlehem Steel's Kovach said they couldn't understand why Inland Ryerson would have used steel from their companies, instead of from its corporate parent, Inland Steel.

No one from either Inland Steel or Inland Ryerson was available to answer that question, because those companies apparently no longer exist. Most of the pieces of Inland Steel were acquired by either Ryerson Tull Inc., of Chicago, or Ispat Inland, an East Chicago, Ind., unit of Dutch-owned Ispat International N.V.

But Inland Ryerson, later called INRYCO, discontinued operations in 1985, and Ryerson Tull records don't show who - if anyone - acquired INRYCO's assets, Ryerson Tull spokeswoman Evelyn Kupec said. It's possible the business simply shut down, Ispat Inland spokesman David Allen said.

In any event, neither Ryerson Tull nor Ispat Inland is still in the business of building bridges themselves, Kupec and Allen said. American steel companies have gotten out of that business altogether, Kovach said.

State Rep. Jeff Stone (R-Greenfield), chairman of the Assembly Transportation Committee, has raised the possibility of legal action against any companies found to be responsible for the bridge failure. Stone's panel and its Senate counterpart will hold a joint hearing on the Hoan failure at 10 a.m. Thursday at the War Memorial Center.

Appeared in the Milwaukee Journal Sentinel on Jan. 8, 2001.

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### **State to conduct inspection of bridges similar to Hoan**

**December 25, 2000**

Bridges throughout Wisconsin that have characteristics similar to the Hoan Bridge in Milwaukee, which suffered cracks in support beams requiring removal of the defective sections, will be inspected over the next several weeks.

"Wisconsin has an excellent bridge inspection program," Governor Tommy Thompson said. "The safety of the public is paramount. The Wisconsin Department of Transportation will inspect bridges with segments like the Hoan to make sure they aren't exhibiting signs of flaws similar to those identified in the Hoan."

Wisconsin Department of Transportation Secretary Mulcahy noted that all 13,423 bridges in the state are inspected at least biennially. Bridges are inspected more frequently if there are concerns.

The Wisconsin Department of Transportation has identified some 27 bridges that were built about the same time as the Hoan that have welded girders with a floor system and used similar construction techniques and materials. (See attached map for location of bridges to be inspected.)

Beginning December 27<sup>th</sup>, weather permitting, WisDOT will disperse four three-person inspection teams to begin detailed inspections of the bridges in question using the four bridge inspection vehicles available in the state. WisDOT will also request assistance from Minnesota to inspect a bridge over the Mississippi River. It is hoped that if the weather cooperates, the inspections can be completed by the end of January. For the safety of the workers and the public, inspections will only take place when there is bare pavement to support the inspection equipment, temperatures are above 25 degrees and winds are no more than 10 miles per hour.

Secretary Mulcahy said bridges to be inspected are those built between 1961 and 1985. Prior to 1961, bridges were riveted together. After 1961, many bridges were assembled using a variety of welding techniques. After 1985, more stringent steel specifications and construction techniques were developed and implemented for bridge use.

"A failure like the one on the Hoan is extremely rare," Secretary Mulcahy noted. "We are only aware of two other incidents of failures like the Hoan: the Nevil Island Bridge in Pittsburgh in 1979 and the LaFayette Avenue Bridge over the Mississippi River in the Twin Cities in 1975. While we don't expect to find any problems, we're taking the extra step to ensure the public's safety by focusing our bridge inspection efforts on those with characteristics

similar to the Hoan.”

He explained that a team of experts has been assembled to help analyze the factors that may have contributed to the Hoan’s failure. While tests on the materials taken from the Hoan Bridge are being conducted, eight teams of inspectors will immediately inspect all the other spans of the bridge to ensure the structure is safe.

The Wisconsin Department of Transportation has established seven bridge inspection categories:

- **Inventory** - First time a bridge is added to the system.
- **Routine** - Annual inspection to record observed changes, if any.
- **In depth** - detailed “hands-on” inspection of certain bridges with special components done once every five years.
- **Fracture critical** - A detailed “hands on” inspection of components whose failure could result in the collapse of a bridge - done every five years.
- **Underwater** - Visual, probing and sounding inspections of a bridge’s underwater components are done every two years; A diving inspection every five years.
- **Damage** - An unscheduled high-level inspection following structural damage caused by environmental or human causes.
- **Interim** - Monitoring a known or suspected condition that may affect bridge performance. The inspections to be performed on the 27 bridges will be “interim” inspections.

The bridges and their locations are listed (number indicates position) on [map](#).

For more information contact:

Bruce Karow, [bruce.karow@dot.state.wi.us](mailto:bruce.karow@dot.state.wi.us), 608/266-3722

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Last modified: December 28, 2000  
Posted by Kathy Hegerfeld  
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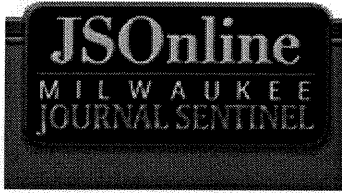
## Wisconsin bridges similar to the Hoan bridge



Bridge No.	County	Location
#1 B-11-22	Columbia Co.	190/94 EB over Wis. River
#2 B-11-23	" " "	WB " "
#3 B-56-47	Sauk Co.	190/94 Mirror Lake
#4 B-56-48	Sauk Co.	" " Mirror Lake
#5 B-40-400	Milw. Co.	1794 Hoan Bridge
#6 B-40-48	"	194 Cemetary Access
#7 B-40-50	"	194 WB Stadium Interchange
#8 B-40-286	"	143/94 6th St/Washington
#9 B-40-457	"	WIS 100 Over railroad tracks
#10 B-40-57	"	194 St. Paul Avenue
#11 B-40-183	"	143 Over Oklahoma
#12 B-40-184	"	" " "
#13 B-40-285	"	194 Menomonee Valley
#14 B-64-86	Walworth Co.	Stone School Rd. Over I 43
#15 B-64-87	"	Miramar Rd. "
#16 B-44-16	Outagamie Co.	College Ave Appleton
#17 B-5-119	Brown Co.	Bus. 41 Over US 41
#18 B-5-134-0013	"	Mason St. Green Bay
#19 B-15-4	Door Co.	WIS 157 Sturgeon Bay
#20 B-38-16	Marinette Co.	Ogden St. Marinette
#21 B-70-56	Winnebago Co.	WIS 45 Main St., Oshkosh
#22 B-70-91	"	WIS 21 Congress St., Oshkosh
#23 B-12-27	Crawford Co.	US 18 Prairie Du Chien
#24 B-12-28	" " "	" " "
#25 B-32-45	LaCrosse Co.	190 Dresbach
#26 B-32-82	LaCrosse Co.	US 14 Pammel Creek
#27 B-9-87	Chippewa Co.	WIS 64 Cornell

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# Lessons from Hoan Bridge

From the Journal Sentinel

Last Updated: Dec. 17, 2000

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The remarkable thing about the troubled Hoan Bridge, a section of which will be brought down later this week in a controlled demolition, is that it was a disaster waiting to happen. That it did not is an incalculable relief - and a reason to begin thinking now about the tragedy lurking out there just down the next road or over the next bridge span.

As the Journal-Sentinel's Larry Sandler reported the other day, the welding techniques used when the Hoan was built in the 1970s were fine for the day but have since been discredited, according to engineers inside and outside the state's Department of Transportation.

The Hoan Bridge, opened 23 years ago, is a relative newcomer here: Milwaukee is an old industrial city with an infrastructure that reflects its history. It has a housing stock that in parts of town dates back to the 19th century, which can be a treasure or a potentially lethal legacy if, for example, an old home has been neglected or repeatedly coated in lead paint.

It is a city with some water mains that are more than a century old. It's a city of aging factory buildings, old bridges and troubled roadways. The deteriorating Marquette Interchange has been targeted for complete rebuilding - a necessary project that may cost as much as \$1 billion and which is bound to test the patience of Milwaukee's driving public.

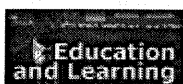
Repairs are made, of course, but in an ad hoc manner dictated by imminent or actual crisis.

It's possible there's a better way.

The University of Wisconsin System recently played host to a three-day conference at the Midwest Express Center on the state's economic future and its place in the so-called new economy. But Wisconsin in general and Milwaukee

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in particular also should think about the old economy and the physical infrastructure that supports it.

The Hoan Bridge reminds everyone of the dangers hidden in strained girders, ancient welds, unsteady factory floors and problematic housing. Given this near-disaster, now would be a fine time for the city and state to borrow a page from the UW System and cooperate in a complete audit of Milwaukee's physical plant - its bridges and roads, water and sewage systems, factories and housing stock. All of us have a stake in spotting problems before they become actual crises, disasters or, worse, human tragedies.

Appeared in the Milwaukee Journal Sentinel on Dec. 18, 2000.

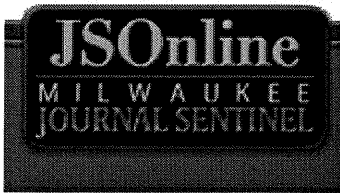
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# Bridge welds, steel in focus

## Many others of Hoan's era have had problems

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: Dec. 15, 2000

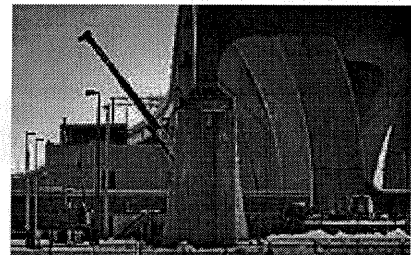
Investigators are focusing on the way steel was welded together in the Hoan Bridge, and the quality of that steel, as they try to figure out why two girders gave way under the bridge, state transportation officials said Thursday.

The Hoan Bridge and many other steel bridges built in the late 1960s and early 1970s were designed with welding techniques that were considered acceptable then, but have since been discredited, said engineers both inside and outside the state Department of Transportation.

Those welding details have been implicated in cracks in thousands of bridges of the same age across the nation, although most of those cracks did not cause the same kind of sudden, dramatic failure seen in the Hoan Bridge Wednesday, experts said.

And while the type of steel used in the Hoan Bridge is generally reliable, it's possible a bad batch of that steel was used for some of the girders, engineers

### Hoan Bridge



Photo/Gary Porter

Workers prepare to inspect and repair the damaged Hoan Bridge. Girders are to be placed across scaffolding towers to support the damaged section and allow it to be raised with jacks and removed, an official said.



Photo/Gary Porter

A ramp closed sign warns motorists that the Hoan Bridge is closed to traffic.

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added.

Until the bridge is shored up enough to inspect more thoroughly, engineers will not be able to determine the cause of the failure, stressed Leslie Fafard, director of the Transportation Department's Waukesha-based southeastern district.

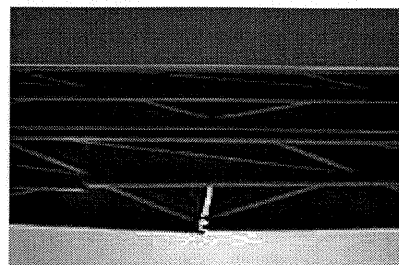
It could take two months to analyze the steel and examine all the other factors that could have contributed to the girder failure, including the loads on the bridge just before the incident, the winds at the time, and the condition of the soil under the bridge, Fafard said at a news conference.

But in separate interviews, engineers said the steel and welding are likely to get serious attention in the probe. The Hoan Bridge was built between 1970 and 1972, an era whose welding techniques have proved questionable.

"In the late '60s and early '70s, we built a lot of bridges that had these types of problems, because our database was not that large," said Mike Koob, senior consultant at Wiss Janney Elstner Associates Inc., a Northbrook, Ill., engineering firm that advises officials on bridge repairs.

"There were a lot of welding problems back then," as builders moved away from riveting metal sections together to widespread use of welding, agreed Dave Prine, chief research engineer at the Infrastructure Technology Institute at Northwestern University in Evanston, Ill. That meant workers were welding virtually entire bridges together outside, "at best a precarious art" amid the vagaries of weather, Prine said. Contractors have since shifted to welding smaller sections together in their plants, then shipping the welded sections to the bridge site to be bolted together, he said.

Also, "as soon as you put a weld on a bridge or any place on steel, the weld



Photo/Ronald M. Overdahl  
 Two separations are visible in the northbound lane girders.

**BRIDGE WORK**

- **1970s:** Workers welded virtually entire bridges together outside. The weather could greatly affect the welds.
- **Now:** Contractors weld smaller sections together in their plants. Those sections are then bolted together at the bridge site.

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**ALTERNATE ROUTES**

The state Department of Transportation suggested these alternate routes for motorists who usually use the Hoan Bridge:

- **Northbound to downtown:** I-43/I-94 High Rise Bridge; 6th St.; 16th St.; or Kinnickinnic Avenue to Water St.
- **Southbound from downtown:** I-43/I-94 High Rise Bridge; 6th St.; 16th St.; or Water St. to Kinnickinnic Ave.

**COVERAGE ARCHIVE**

- **Damage:** Bridge buckles, closes
- **Graphic:** Alternate routes
- **Graphic:** The damage
- **'Bridge to nowhere:'** The history
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actually changes the crystal structure of the metal and the metal becomes more brittle," added Michael Oliva, professor of structural engineering at University of Wisconsin-Madison.

Contractors who used the earlier welding techniques shouldn't be faulted for it, because "that was the common knowledge at the time," said Al Ghorbanpoor, chairman of the civil engineering department at the UW-Milwaukee.

Still, the welding details are responsible for cracks in thousands of bridges across the country.

Ghorbanpoor said he found 240 cracks in the Hoan Bridge's girders alone when he joined the DOT on an inspection last summer. Koob said he knew of a bridge on I-26 in Asheville, N.C., where 90 cracks were discovered in a 100-foot section in the early 1990s.

But most cracks develop slowly enough to be discovered by inspections and fixed before they cause problems, said Al Lindner, a principal in the engineering firm of Graef, Anhalt, Schloemer & Associates, which has conducted Hoan Bridge inspections since 1992.

Inspections found nothing wrong with the two girders that failed, Lindner said. That's the part that's most puzzling - and most frightening, Prine said.

The cracks in the Hoan Bridge girders were "brittle fractures," a type of defect that spreads from a minor fault to a major rupture "at the speed of sound," Prine said. "It just goes like a cannon shot."

Ghorbanpoor said a combination of factors, such as a heavily loaded truck passing over the bridge in extreme cold, could have contributed to the development of the fracture.

Soil conditions are unlikely to be a contributing factor, because if the bridge was settling, it probably would have failed near one of its ends, rather than in the middle, Oliva said.

The quality of the steel used also should be reviewed, said Ray McCabe, senior vice president of HNTB Corp., the firm that designed the bridge. Transportation officials are checking which company supplied the steel.

Even if the steel on those two girders is faulty, it doesn't mean the rest of the bridge is in jeopardy, because several different batches of steel were likely used in building the bridge, Koob said.

HNTB, an 86-year-old firm, has designed thousands of the so-called multi-steel-girder approaches like the one on the Hoan that buckled, said McCabe, who is HNTB's national director of bridge services in Fairfield, N.J.

The fact that two of the three girders on that approach failed - without the bridge collapsing - shows that it was well-designed, McCabe said.



*Whitney Gould, Tom Kertscher and Marie Rohde of the Journal Sentinel staff contributed to this report.*

Appeared in the Milwaukee Journal Sentinel on Dec. 15, 2000.

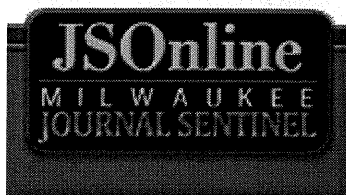
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# Other big projects could be affected

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: Dec. 13, 2000

Until Wednesday, the Hoan Bridge was the only major route into downtown that wasn't scheduled for reconstruction or demolition within the next few years.

But the sudden failure of the lakefront freeway bridge could have an impact on all the other major projects under way or under study: the reconstruction of the Marquette Interchange and the 6th St. Viaduct, the demolition of the Park East Freeway and the eventual rebuilding of all area freeways.

It also means the year-old Lake Parkway will be far less useful to commuters in the near future.

With engineers still assessing the damage to the Hoan Bridge, transportation officials were reluctant to estimate how much time and money they would need to repair the structure.

Leslie Fafard, director of the Waukesha-based southeastern district of the state Department of Transportation, said repairs might take six to nine months. Others suggested that the bridge could be closed a year.

Costs were even less certain, but the repair price tag could exceed \$1 million.

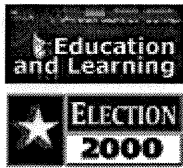
Chief department spokeswoman Linda Thelke said her agency would try to handle the repair costs within its current budget. She said it was too early to speculate on whether additional appropriations would be needed.

Money is budgeted for the Park East Freeway and 6th St. Viaduct projects, so spending on the Hoan Bridge repair would not jeopardize them, Thelke said. And Marquette Interchange reconstruction is so massive - estimated at roughly \$500 million to \$1 billion - that the repair cost on the Hoan Bridge probably

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would be minor in comparison.

Thelke and other officials also said it was premature to talk about the larger impact of the bridge failure on the rest of the downtown transportation system. But sooner or later, it's likely to figure into the debate on several other projects, including:

### **Park East Freeway**

The Hoan Bridge failed just hours before planners opened a public hearing on razing most of the Park East Freeway. That \$25 million project could start early next year.

At the hearing, freeway backer George Watts and his supporters argued that the absence of another major route into downtown provided a reason to delay spur demolition.

City officials don't see it that way. Although the rest of I-794 could be a detour route for traffic that now uses the Park East, little of that traffic would continue on the bridge, said Mariano Schifalacqua, commissioner of public works.

"I don't really see the relation between the two at all. They really serve different traffic patterns," Schifalacqua said.

### **6th St. Viaduct**

Preliminary work has started on the \$55 million job of replacing the 91-year-old viaduct. The viaduct and the Hoan Bridge, which opened in 1977, are key links between downtown and the south side.

City officials had hoped to use S. Kinnickinnic Ave. and S. 1st St. as major detour routes once they shut down traffic on the viaduct this spring. But those streets now are under consideration as detour routes for the Hoan Bridge as well and might not be able to handle the traffic from both bridges, Schifalacqua said.

Authorities have until April to work out the traffic issue, and they should have a better idea of the Hoan Bridge repair timetable by then, he said.

### **Lake Parkway**

Before the Lake Parkway opened last year, the Hoan Bridge had long been derided as the "bridge to nowhere," because it never connected to a freeway once planned at its south end. Now, the \$130 million state highway has suddenly become the "parkway to nowhere."

Since October 1999, the Lake Parkway - in conjunction with the Hoan Bridge - has provided a quick route from downtown to the south side, south shore suburbs and Mitchell International Airport. Now its traffic is likely to drop sharply.

## Marquette Interchange

State engineers have been arguing for years that bridges are deteriorating on the massive downtown freeway interchange that links I-94, I-43 and I-794. That's a big part of the reason the department is planning to rebuild the interchange, starting in 2004.

Similar arguments are at play in the planned reconstruction of the entire freeway system, a \$4 billion to \$5 billion job that could last 20 years. The dramatic failure of the Hoan Bridge could be seen as a supporting plank in the state argument.

Schifalacqua disagreed. He noted that the Marquette Interchange bridges are concrete and the Hoan Bridge is made of steel. Besides, he pointed out, state officials haven't claimed that the Hoan Bridge is in the same condition as the interchange bridges.


Appeared in the Milwaukee Journal Sentinel on Dec. 14, 2000.

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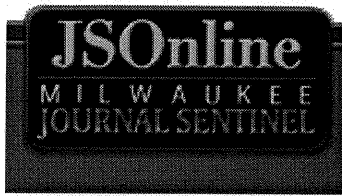


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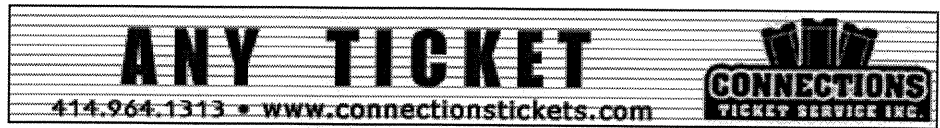
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# From nowhere to somewhere, now back to nowhere

By JO SANDIN  
of the Journal Sentinel staff

Last Updated: Dec. 13, 2000

Once more, it's the "bridge to nowhere."

The Daniel Webster Hoan Bridge - an odd tribute to a mayor so averse to lakefront development that he even questioned the bold, Saarinen-designed War Memorial Center - again leads where so many thought it was destined to go.

It is the strangest kind of civic monument.

- That it was built argues for the irresistible force of cultural lag. Approved by the County Expressway Commission in 1966, work began only in 1970, when public opinion already had hardened against high-speed connecting highways to the north and south.
- That the bridge went nowhere, therefore, is eloquent testimony to the ability of citizens to stop an unwanted project in midair, if necessary.

Midair is exactly where some of the bridge connecting ramps ended in 1972, when bridge construction was complete.

East siders had decided that they wanted no more loss of green space to concrete. South siders refused to entertain the demolition of 500 Bay View homes.

But federal money was available for the bridge. So it became a \$75.1 million fact that remained closed to anything but pedestrian jaunts and public jibes until 1977.

It would be a meeting place for north siders and south siders to get to know each other, we'd say. Matching cul-de-sacs at the crest would let folks turn

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around and drive back to the neighborhoods they loved the best.

Or it would be a Maier Festival Park annex, with a really terrific view of the city as well as Lake Michigan. Actually, part of the Summerfest grounds are sheltered by the bridge.

Some of us grew up calling it the McDonald's Bridge, although its arches were the wrong color and were arranged parallel instead of side by side. Others found the shape suggestive of the world's largest Kohl's Food Store.

To be fair, this *was* the bridge that made Milwaukee famous.

Oh, not for its honors, although the bridge did win awards from the American Institute of Steel and the American Society of Civil Engineers. Or even for the rare peregrine falcons that built a nest there in 1999, the first outside a man-made box since the reintroduction of the species began.



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After all, without the now-demolished connecting ramps that ended in midair, "The Blues Brothers" (the 1980 classic starring the late John Belushi and the ever-droll Dan Aykroyd) might never have come to town. They certainly couldn't have filmed the flying car crashes so vital to the conclusion of Jake and Elwood's mission.

But lately - since October 1999, when the Lake Parkway opened, linking the bridge with southeastern suburbs - it has been the "bridge to somewhere." Until Wednesday.

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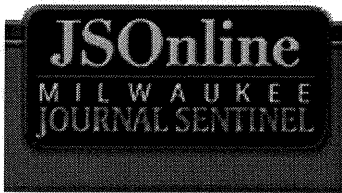


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# Is Wisconsin falling apart?

## Bridges, highways, dams and pipes all showing signs of advanced age

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By WHITNEY GOULD and STEVE SCHULTZE of the Journal Sentinel staff

Last Updated: Dec. 17, 2000

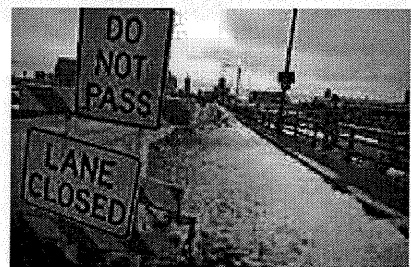
Buckling bridges. Crumbling highways. Deteriorating dams. Is Wisconsin falling apart?

Not exactly. But experts say the failure of two steel girders supporting part of Milwaukee's Hoan Bridge- and cracks in another - are a stark reminder of the perils of neglecting infrastructure, the brick and mortar that holds together everything from our transportation to our water supply.

The Hoan, which has been open just 23 years, was closed indefinitely Wednesday after northbound lanes in one section of the bridgedropped several feet. State officials said it was likely the damaged section would have to be demolished. Replacing it could take a year.

Those who keep an eye on such things said the bridge failure should not have been too much of a surprise. "This bridge had a history of problems," including 240 cracks in its girders that were detected last summer, said Al

### Signs of Age



Photo/Jack Orton Traffic and weather have taken their toll on the 91-year-old 6th St. Viaduct over the Menomonee Valley. The viaduct is scheduled for replacement, but officials have felt compelled to close one of its lanes in the meantime. Much of the rest of the state's infrastructure is also showing signs of deterioration.



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Ghorbanpoor, head of civil engineering at the University of Wisconsin-Milwaukee.

### 10,000 problem bridges

Ghorbanpoor, a nationally known expert on highway bridge evaluation, said there are at least 10,000 spans around the country with similar problems, including some along I-94, I-43 and U.S. Highway 45. While state investigators are looking at the way steel was welded together on the Hoan, Ghorbanpoor said he suspected the girder cracks had more to do with the way the bridges were designed, as well as traffic increases beyond the spans' original capacity.

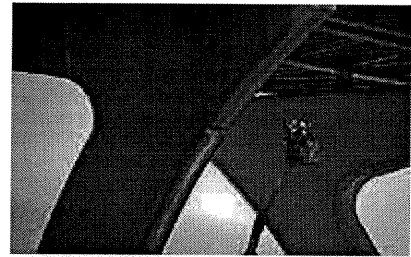
Those problems are compounded, he said, by the use of unreliable visual inspections to monitor bridge conditions. Automated sensors, or gauges, can detect problems earlier, he said.

But it would be prohibitive to install such sophisticated equipment on the more than 13,000 bridges around the state, said Al Lindner, a principal officer of Graef Anhalt Schloemer & Associates, a Milwaukee engineering firm that did visual inspections of the Hoan.

But cost is relative, other experts said, noting that the price of a bridge collapse - in traffic disruption, lost productivity and, in some cases, human lives - can outweigh the burden of improved maintenance and monitoring.

"You know the old saying: 'You can pay me now or pay me later,'" said Ed Beimborn, who runs the Center for Transportation Studies at UWM. "An awful lot of our infrastructure is unbelievably old, a lot of it is underground, and you don't see it until something bad happens. We need to do a much better job of managing our infrastructure," taking life-cycle costs into

Photo/Jack Orton  
 The view from underneath the 6th. St. Viaduct reveals rusted and corroding support beams.



Photo/Jack Orton  
 Department of Transportation officials and a representative of Controlled Demolition Inc. of Phoenix, Md., inspect the damaged section of the Hoan Bridge Saturday.

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#### ALTERNATE ROUTES

The state Department of Transportation suggested these alternate routes for motorists who usually use the Hoan Bridge:

- **Northbound to downtown:** I-43/I-94 High Rise Bridge; 6th St.; 16th St.; or Kinnickinnic Avenue to Water St.
- **Southbound from downtown:** I-43/I-94 High Rise Bridge; 6th St.; 16th St.; or Water St. to Kinnickinnic Ave.

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consideration when budgets are prepared.

In its 1998 "Report Card for America's Infrastructure," the American Society of Civil Engineers said that nearly one of every three bridges nationwide was structurally deficient; almost 60% of roadways were in poor, fair or mediocre condition; and a host of other facilities, including schools, aviation, mass transit, drinking water systems, dams and waste disposal, were in bad shape. Total cost to repair: \$1.3 trillion.

Wisconsin fared somewhat better than other states in the rankings - 31% of our roads and 25% of our bridges were considered substandard, compared, for example, with 90% of the roads in Colorado and 49% of the bridges in Rhode Island.

### **State gets good marks**

Overall, Wisconsin does a "good job" in maintaining and inspecting bridges, Lindner said.

A UW-Madison bridge expert agreed. Teresa Adams, a civil and environmental engineering professor, said the state has been a national leader in developing systems to get the most use from its bridges. She said bridge ratings by the federal government sometimes overstate the extent of problems, listing bridges as obsolete when they are still in good shape for their original purpose.

But some bridges are clearly showing their age. In 1995, the 63-year-old Main St. bridge over the Fox River in Green Bay had to be abandoned when inspectors noticed that the supporting piers, which rested on wooden pilings, were shifting. The bridge was rebuilt in 1998 at a cost of \$26.5 million.

In 1989, a highway drawbridge over the Fox River in Menasha collapsed.

In Milwaukee, a southbound lane on the deteriorating, 91-year-old 6th St. Viaduct is closed while the bridge awaits rebuilding next April. And chunks from the underside of the Marquette Interchange have fallen off; the rebuilding of that spaghetti bowl is supposed to start in 2004 and then last for 20 years.

Thomas Wenzel, a professor of civil engineering at Marquette University, likened the deteriorating transportation infrastructure to Florida's obsolete, overstressed election apparatus.

"There won't be an outcry from the public until there are some disasters, I'm afraid," he predicted. "We have been maintaining a patchwork system that needs upgrading."

Former Milwaukee County Executive Dave Schulz agreed. "On the fundamental issue of rehabilitating the Milwaukee freeway system, basically no progress has been made," said Schulz, now director of the Northwestern University Infrastructure Technology Institute. While he sees the Hoan Bridge failure as an anomaly in the state's generally good record of bridge work, he

said it should serve as a wake-up call on infrastructure neglect.

"You've got an aged interstate system that is in need of complete reconstruction," he said, noting that Chicago-style traffic jams are starting to clog Milwaukee freeways.

A different perspective comes from Milwaukee Mayor John O. Norquist and some environmental leaders. They say a big part of the problem is related to sprawl: Wisconsin has overbuilt roads and bridges in far-flung areas, they contend, and the cost of maintaining that spread-out network has taken its toll on cities.

The payments on new highway debt for new roads have grown dramatically, from \$62 million in 1988 to \$102 million for this fiscal year, according to Wisconsin Department of Transportation figures. Money for repair of local roads has increased at a slower rate.

"The major new construction has been the thing driving the action in the state Legislature and the governor's new budget," Norquist said. He also complained that the state fails to plan adequately for replacement of major roads in the Milwaukee area.

### **'Fix . . . before we build'**

"Every time the design life of a major road comes due, it's like it's a big surprise to them," he said, citing the state's failure to set aside money for replacing the Marquette Interchange, a job estimated to cost nearly \$1 billion.

"Today's new highway is tomorrow's tax increase," said Brett Hulsey, Midwest representative for the Sierra Club. "Our mantra is: Let's fix what we have before we build more."

Dave Cieslewicz, executive director of 1000 Friends of Wisconsin, agreed. "When you build infrastructure, you're building a commitment forever," he said. "That's not taken into account."

A better alternative, he said, is the pioneering agreement between Dane County and the Wisconsin Department of Transportation: In exchange for expanding U.S. Highway 12 between Madison and Sauk City, the DOT was required to purchase easements and take other steps to preserve farmland along the corridor. In theory, that should curtail new development and the cost of additional infrastructure.

State Transportation Secretary Terry Mulcahy said that Wisconsin had unmet transportation needs, but he defended the state's record of maintaining roads and bridges. The challenge, he said, is finding new revenue sources to meet expanding needs. One possibility, he suggested, might be an idea endorsed by the state's major road-building lobby: setting aside sales taxes collected on the sale of vehicles to pay for transportation facilities.

### Other systems in trouble, too

But highways and bridges are only part of the challenge. Of the 3,700 dams in Wisconsin, 1,300 were built before 1940 and at least 30 date from the 1800s; about 200 are considered "high hazard" dams, meaning that their failure could cause loss of life and significant property damage. Yet the state has only 13 dam inspectors and they all have other duties, said Meg Galloway, dam safety engineer with the Department of Natural Resources.

"Somehow, the presumption is that a dam that has been here 100 years will always be there," Galloway said. "But it has to be maintained, like anything else."

Water mains, too, are aging. Some of Milwaukee's are 128 years old, said Carrie Lewis, water works superintendent.

"But just because they're old doesn't mean they're bad," she cautioned. In fact, she said, it's the newer mains, those built in the 1960s and '70s, that are breaking more frequently - because of the way they were made.

There were 600 breaks last year, down from 710 the previous year - not bad for an old, cold-climate city, according to Lewis. Water mains are replaced on a regular schedule, with the cost added to water bills, not the property tax.

Still, some observers think that Milwaukee has slipped a bit from the tradition of good housekeeping that started with the "Sewer Socialists" in the early 1900s. Sidewalk replacement, for example, is not as rigorous as it once was, although city officials say it's adequate.

"I have the sense that in these days of fiscal austerity the schedules have been lengthened and maintenance is being deferred," said John Gurda, a local writer and historian.

Milwaukee's sewer system is also showing signs of strain. Northwestern's Schulz recalled that when the Deep Tunnel sewer project was authorized, the public was told it would put an end to "overflows," the dumping of raw sewage into waterways. Instead, billions of gallons of untreated waste has ended up in rivers and Lake Michigan.

Schulz questioned whether the tunnels were large enough to begin with. The Milwaukee Metropolitan Sewerage District says that the tunnels are working as designed but can't be expected to handle huge sewage flows after heavy rainstorms. That problem could be alleviated by curbing some of the rainwater that leaks into sanitary sewers, the district says.

All of which leads back to the original question: Is Wisconsin - and the rest of the country, for that matter - falling apart? And the answer may be in how we respond to what some consider an infrastructure crisis.

"We've got to sit back and say: Wait a minute," Schulz said. "If we want to

plug the electric lights in, we've got to have the power plants. If we want to fly when we want to fly, we've got to have airports. If we want to drive where we want to drive, we've got to have the roadways."

Appeared in the Milwaukee Journal Sentinel on Dec. 17, 2000.

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TO: Senator Gary R. George and  
Representative Joseph K. Leibham, Co-chairpersons  
Joint Legislative Audit Committee  
FROM: Janice Mueller  
State Auditor *Janice Mueller*  
SUBJECT: Proposed Audit of the Department of Transportation's  
Bridge Inspection Process—Background Information

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Copy**

At your request, we have gathered some background information the Joint Legislative Audit Committee may find useful in considering a request from Senator Rosenzweig and Representative Walker for an audit of the Department of Transportation's bridge inspection process.

The bridge inspection process, which includes seven types of inspections of the state's 4,815 bridges, is the responsibility of the Department's Division of Transportation Infrastructure Development. Inspections are completed by staff in the Department's eight districts. The Department has identified approximately 35 staff who conduct and support inspections, at an estimated annual salary and fringe benefit expenditure of \$532,000. In addition, the Department contracts with private consulting firms to provide routine and specialized bridge inspection services, at an estimated cost of \$925,000 in fiscal year 1999-2000. The administrative code requires the Department to inspect each bridge at least once every two years.

As a result of the recent structural failure of the Hoan Bridge in Milwaukee, concerns have been raised that the Department's bridge inspection efforts may be insufficient. The two-mile-long Hoan Bridge was designed in 1970, and construction was completed in 1977. On December 13, 2000, a crack in two of three supporting girders led to the structural failure of a 217 foot portion of the bridge, resulting in the bridge's closure to traffic. To date, officials are uncertain why the Hoan Bridge failed. A routine bridge inspection in June 2000 found cracks in the bridge's girders, which resulted in an in-depth inspection that was ongoing when the bridge suffered the structural failure in December. Department officials are uncertain how much it will cost to repair the Hoan Bridge or when the repairs will be complete.

An audit of the Department's bridge inspection process could examine:

- expenditure and staffing trends for bridge inspections;
- the standards and processes the Department uses to guide routine bridge inspections, including the involvement of private consultants;

- the standards and processes the Department uses to conduct special inspections as a result of findings during routine inspections; and
- whether the Department's response to previous inspections of the Hoan Bridge was consistent with industry practice and the Department's procedures.

If you have any additional questions regarding this request, please contact me.

JM/KW/bm

cc: Senator Judith Robson  
Senator Brian Burke  
Senator Peggy Rosenzweig  
Senator Mary Lazich

Representative Samantha Starzyk  
Representative John Gard  
Representative David Cullen  
Representative James Kreuser

Representative Scott Walker

Terrence Mulcahy, Secretary  
Department of Transportation

FOR IMMEDIATE RELEASE  
January 17, 2001

“LEGISLATORS SUPPORT REQUEST FOR FUNDS FOR HOAN BRIDGE”

Madison... The chairmen of the Wisconsin Legislature's transportation committees and a Milwaukee legislator are supporting the state's request for federal funding to help repair the Hoan bridge in Milwaukee. The bridge has been closed to traffic due to cracks in steel girders that caused the structural failure of the bridge in early December.

Senate Committee chairman Roger Breske joined Senator Richard Grobschmidt, and Assembly Transportation Committee chairman Jeffrey Stone in announcing their intention to introduce a resolution that would inform the federal Department of Transportation of the urgency and need for emergency funding from the federal government. The resolution would put the Wisconsin Legislature on record in support of an already submitted request made by the Wisconsin Department of Transportation.

The lawmaker's actions follow a joint legislative hearing in Milwaukee held to review the possible causes of the bridge failure. At the hearing, state transportation officials estimated that the costs to repair the bridge could run between \$19 and \$40 million depending on the department's final evaluation of the soundness of the remaining sections of the bridge.

-MORE-

Senator Grobschmidt noted that Milwaukee's extremely cold December was thought by DOT officials to have played a role in causing the steel girders supporting the bridge to become unusually brittle and crack. "Several bridge experts have identified the very cold weather of the days before the girders cracked as a factor", said Grobschmidt. The emergency request for federal funding seeks assistance from a program meant to address damage caused by weather or natural disasters.

"It's clear that the failure of the Hoan Bridge is a hardship for Milwaukee area commuters and a threat to local commerce" stated Senator Roger Breske (D-Eland) the chairman of the State Senate Transportation Committee.

The initial state request is for Emergency Relief Program funds from the Federal Highway Administration. If emergency relief funding is not made available, the department will pursue other federal funding sources.

Assembly Transportation Committee chairman Jeffrey Stone (R-Greenfield) said that the recent legislative hearing was evidence of the legislature's ability to work together to address the serious problem caused by the bridge failure. "I anticipate that legislators from both parties and both houses will recognize the importance of supporting the state's request," stated Representative Stone.



**MARVIN E. PRATT**  
Alderman, 1<sup>st</sup> District



**COMMON COUNCIL PRESIDENT**  
**CITY OF MILWAUKEE**

City Hall, Room 205  
200 East Wells Street  
Milwaukee, Wisconsin 53202  
Office: (414) 286-2221

January 11, 2001

Sen. Roger Breske, Chair  
Sen. Richard Grobschmidt, Vice-Chair  
Senate Committee on Insurance,  
Tourism, Transportation & Corrections  
P.O. Box 7882  
Madison, WI 53707-7882

Dear Sens. Breske & Grobschmidt:

I am offering the following written statement as my testimony before your Committee's hearing on the issues related to the failure of the Dan Hoan Bridge segment, which was found to have developed structural cracks and was closed to all traffic on December 13, 2000.

The Disaster that befell the Hoan Bridge this past December 28<sup>th</sup> caused great hardship for many citizens of Milwaukee, especially southside residents.

The blizzard-like conditions and deep snow that ensued led to tremendous traffic snarls, requiring motorists to find alternate routes to their homes and other destinations. Often, the alternatives were as bad or worse than the main arterials.

We need to move deliberately but speedily to restore the Hoan Bridge to sound and safe condition.

With the advent of the Lake Parkway tie-in to I-794 and the bridge, this route has become a major connector to and from downtown with the southeast side of our city.

The longer repair of the bridge takes, the more traffic problems will continue, not to mention causing extended travel time for southside residents and other travelers heading in either direction.

Hoan Bridge Testimony  
Ald. Marvin E. Pratt  
January 11, 20001  
Page 2

I urge the members of your committee to take swift and decisive action to restore the Hoan Bridge to safe travel condition.

Sincerely,

A handwritten signature in black ink that reads "Marvin Pratt". The signature is written in a cursive style with a long horizontal stroke at the end.

MARVIN E. PRATT  
1st District Alderman  
Common Council President

MEP:rjb/hoanbridge.stm