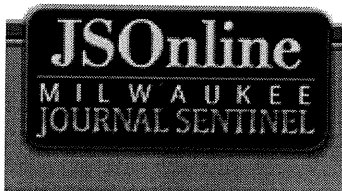


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6-foot crack found in other half of Hoan

Officials hope it won't prevent partial reopening

By LARRY SANDLER of the Journal Sentinel staff

Last Updated: Jan. 11, 2001

Authorities found a new crack Thursday on the closed Hoan Bridge, but they held out hope that the troubled bridge over the Milwaukee harbor might still partly reopen for traffic this spring.

News of the fresh crack came less than an hour after state Department of Transportation officials told lawmakers that repairing the already-damaged bridge could cost \$19 million to \$41 million. And the news increased the odds that the price tag could hit the top end of that range.

The new fault is a hairline crack - too narrow to see from the ground - but it extends six feet along a 10-foot-wide girder, said Leslie Fafard, director of the DOT's southeastern district. The crack appeared in the section of the southbound lanes right next to the failed northbound section of the bridge that was demolished last month, he said.

When DOT officials first learned of

Hoan Bridge

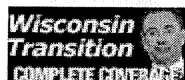


Photo/Jack Orton Department of Transportation workers prepare to inspect the underside of the Hoan Bridge's southbound lanes Thursday. A hairline crack turned up in one of three girders supporting those lanes - near where a section of northbound lanes had to be demolished after girders failed.



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the crack - in the middle of a legislative hearing on the earlier bridge failure - Fafard called it "an extreme setback" and "very bad news for us."

But by midafternoon, after closer inspection, DOT bridge engineer Finn Hubbard said the crack was "not that big a deal" and could be repaired easily, without blowing up another bridge section.

Hubbard and Fafard said the new crack would not necessarily scrap plans to run two-way traffic in the southbound lanes. But those plans will depend on whether further inspections turn up any more cracks and on whether the DOT can assure motorists that the bridge is safe, they said.

Fafard said it could take a year to 15 months to fully reopen the bridge, including the time needed to investigate the failure and to renovate the bridge according to investigators' recommendations.

The bridge has been closed to traffic since Dec. 13, when cracks in a pair of girders in the northbound span buckled the I-794 roadway. Authorities blew up a 130-foot-long piece of the damaged section Dec. 28 to prevent it from falling on its own. Meanwhile, drivers have been struggling to find new ways to travel between Bay View and downtown.

As recently as Wednesday, DOT officials had hoped they could start running two-way traffic in the southbound lanes before another key link to the south side, the 6th St. viaduct, closes for reconstruction. City officials have delayed the viaduct's closing by one month, to May 1.

Politicians dismayed

The latest fracture dismayed south side and south suburban politicians who had pinned their hopes of eased traffic on the reopening of the southbound lanes, although they held out hope that engineers could control the damage. They also said they would oppose closing the 6th St. viaduct as long as the Hoan was unusable.

"I am adamantly opposed to closing the viaduct until we have thought of another way for people to travel," said Milwaukee Ald. Sue Breier, who represents Bay View.

Closing the viaduct "would leave the south shore in a real bind," Breier said. "Traffic isn't the greatest now."

However, Mariano Schifalacqua, city commissioner of public works, said Wednesday that a major delay in the viaduct project could drive up the cost and extend the time the viaduct is closed. Limiting the closing to 15 months - a high priority for south side businesses - will be possible only if those 15 months include just one winter, he said.



Photo/Gary Porter
Aerial view of the damaged section of the northbound span being demolished Dec. 28.

RELATED LINKS:

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St. Francis Mayor Lawrence Burazin said he worried that the Hoan's problems would delay development projects in his city, which is linked to downtown by the combination of the bridge and the new Lake Parkway.

"If the whole thing is going to be closed down for a long period of time, then that's a chilling effect on everything that's going on in the south suburbs," he said.

MMSD employees evacuated

Engineers were examining the southbound lanes when they discovered the new crack about 11:30 a.m. Thursday, Fafard and Hubbard said. The inspectors left immediately - and ordered Milwaukee Metropolitan Sewerage District employees out from underneath the bridge - before cautiously returning to check further, Fafard said.

The evacuation was brief, and the treatment plant on Jones Island continued to operate after the crack was discovered, said Mark Kass, a spokesman for the sewerage district. Kass and other district officials rushed out of the legislative hearing as soon as they learned of the crack.

At the hearing, a joint session of the Assembly and Senate transportation committees, state Sen. Margaret Farrow (R-Pewaukee) asked whether the Dec. 28 explosion could have caused the new damage. But the crack turned out to be in the middle girder of the southbound section, not the one closest to the blast, and it's unlikely that the explosion was to blame, Hubbard and DOT spokesman Don Rhodes said.

Still, this is the fourth girder to crack in the same spot on the same bridge, an occurrence so rare that Fafard said federal officials think it "could rewrite the way we do (bridge) inspections in the nation."

Last summer, inspectors found two cracks, one 36 inches long and one 21 inches long, in the westernmost of the three girders holding up the northbound section. The DOT drilled holes at each end of each crack to stop them from spreading. Authorities were considering additional measures when major cracks developed in the other two girders of the same section.

Repair Estimates

Some costs to repair or replace sections of the Hoan Bridge:

\$12 million to \$15 million to bolster the two 1,660-foot-long, three-girder sections on each side of the bridge's arch. That would include the cost of temporarily rigging the southbound lanes for two-way traffic.

\$25 million to \$30 million to replace the two sections instead.

\$5 million to \$8 million for the emergency response, including the demolition, minor repairs to sewerage district property, and expanded Milwaukee County Transit System bus service while the bridge is closed.

\$2 million to \$3 million for investigating the cause of the failure and inspecting the rest of the bridge. That does not include the cost of inspecting similar bridges around the state.

Total price tag: **\$19 million to \$41 million.**

6 feet

Length of hairline crack found in southbound lanes of Hoan Bridge

10 feet

Width of the girder that's cracked

Hubbard said the discovery of the latest crack was not as troubling as its size - twice the length of the first fractures.

Engineers drilled holes at each end of the new crack to contain it Thursday afternoon, Hubbard said. A metal plate will be attached to support the cracked girder within a week or two, he said.

Bob Cook, executive assistant to state Transportation Secretary Terry Mulcahy, was the first to announce the new crack, at the legislative hearing at the War Memorial Center.

Mulcahy himself was in Washington, D.C., lobbying for federal aid to cover the bridge repair costs while his aides outlined those expenses for legislators.

If federal money is not available, the state could shift money from other parts of the transportation budget, but it's too early to tell what other projects could be affected, DOT officials said.

Bolstering the two 1,660-foot-long, three-girder sections on each side of the Hoan's arch - both the damaged sections south of the arch and the undamaged sections on the north end - would cost \$12 million to \$15 million, Fafard said. That would include the cost of temporarily rigging the southbound lanes to carry two-way traffic this spring, he said.

Another option is to completely replace those sections, at a cost of \$25 million to \$30 million, Fafard said. The new crack makes replacement more attractive than renovation, Fafard said, but authorities won't be able to reach a decision until they finish investigating the cause of the failure.

According to Fafard, other costs would be:

- \$5 million to \$8 million for the emergency response, including the demolition, minor repairs to sewerage district property, and expanded Milwaukee County Transit System bus service while the bridge is closed.
- \$2 million to \$3 million for investigating the cause of the failure and inspecting the rest of the bridge. That does not include the cost of inspecting similar bridges around the state.

The total price tag of \$19 million to \$41 million is far higher than Fafard's original estimate of \$1 million to \$2 million. He said the earlier estimate was based only on the cost of replacing the 217-foot-long piece of the northbound lanes that originally failed.

Despite DOT officials' reassurances that the latest problem isn't serious, some people said the more the bridge fractures, the more drivers' confidence in the structure fractures.

"It's very, very spooky news," said state Rep. Jon Richards (D-Milwaukee), who used to drive over the bridge regularly. "I've got to say, this whole thing has been very creepy to me."

"Now if they've found cracks on the other side, do you think anybody's ever going over that bridge again?" asked Sage Schwarm, owner of Hi-Fi Cafe,

2640 S. Kinnickinnic Ave. "I would do it, but I'm a daredevil."

Nahal Toosi and Tom Held of the Journal Sentinel staff contributed to this report.

Appeared in the Milwaukee Journal Sentinel on Jan. 12, 2001.

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Briefing Information on the Failure to the Hoan Bridge Legislative Hearing January 11, 2001

OVERVIEW

On the morning of December 13, 2000, a section of the Hoan Bridge in Milwaukee failed. The Wisconsin Department of Transportation (WisDOT) is not proud of the fact that it failed, however, it is proud of the way WisDOT staff handled the event.

The department is also grateful for the quick response, cooperation and assistance it received from many other agencies, contractors and consultants, especially the Milwaukee County Sheriff's Department and Milwaukee Metropolitan Sewerage District (MMSD).

No one was hurt because of the failure and there have been no injuries to citizens or workers throughout the process to mitigate the damage to the bridge structure and surrounding facilities and investigate the cause of the failure.

Safety will continue to be WisDOT's top priority. The department is currently taking precautionary steps to inspect other bridges throughout Wisconsin. The department is confident that no one will be hurt on any state bridge due to infrastructure failure.

The Hoan Bridge is a complex structure. It involves three sections with distinct engineering characteristics. The failure involves one, 217-foot span that is supported by three steel girders. Two of the three support girders on this span separated, causing the northbound roadway to sag several feet.

The information for this legislative hearing focuses on the specific bridge span that failed – to discuss what WisDOT knows about the failure and present options for restoring the bridge.

THE HOAN FAILURE

Location and Bridge Configuration

The Hoan Bridge, which opened on November 5, 1977, has three lanes in each direction. It parallels Milwaukee Harbor from Maier Festival Park to Carferry Drive. The bridge is 10,229 feet long. The center span, where the arches are, is 1,140 feet. The 3-girder configuration of the south approach is 1,666 feet. The 3-girder configuration of the north approach is 1,654 feet. The remaining multi-girder section of the bridge is 5,769 feet.

Materials

The bridge consists of 61,350,764 pounds of structural steel and 30,269,894 pounds of reinforcing steel. It took 1,400,000 hours of labor to complete at a cost of \$75,100,000. (Per Thomas J. Makel, Special projects engineer for Milwaukee County 1977.)

Traffic Count

A recent traffic count showed that 36,596 vehicles used the bridge each weekday and that 6% of those vehicles are large trucks. The traffic count is up from 25,355 in 1999 before the Lake Parkway opened.

Construction and Steel

WisDOT records show that US Steel Corporation and Bethlehem Steel Corporation supplied the steel for the girders, Inland-Ryerson was the fabricator and Wisconsin Bridge & Iron Company was the erecting sub-contractor for the failed span.

Design

The 3-girder section was designed by Howard, Needles, Tammen and Bregendoff (HNTB) for the Milwaukee County Expressway Commission. All details, materials and fabrication conformed to the Standard Specifications for Road and Bridge Construction of the State of Wisconsin, Division of Highways (1969) Design Specifications, American Association of State Highway Officials (AASHO) specifications of 1965 and interim 1965 – 1967. The design drawings are dated 1969 and 1961.

Inspections

The structures have been subject to on-going annual and in-depth inspections. Since July of 2000, the bridge has undergone additional inspections. When two unusual cracks were discovered, the department "mouse-holed" them (description of this process is on page 10) to prevent further cracking and sent samples in for testing. Based on results, WisDOT decided to hire Lichtenstein to study the bridge, deny permits for some overweight vehicles and to take corrective action. A detailed construction and inspection chronology of the Hoan Bridge is included as Attachment A.

Consultation with Experts After the Failure

WisDOT consulted with experts on site after the failure of the bridge and prior to the demolition to begin analyzing the failure. They included Federal Highway Administration (FHWA), Dave Pine of Northwestern University, Dr. John Fisher of Lehigh University, Lichtenstein Consulting Engineers and others.

Failure on December 13th

The failure in the northbound lanes of the Hoan Bridge was detected around 7:00 a.m. on December 13. Motorists reported a dip in the roadway; workers at the treatment facility reported hearing loud cracking or popping sounds. The Milwaukee County Sheriff's Department closed the highway after receiving several 911 calls. WisDOT is very grateful for this quick response.

WisDOT's maintenance staff went to the scene and performed inspections of surface and support structures. They determined that the two exterior steel girders on a 217-foot section of the northbound three-lane roadway south of the arch had vertical cracks completely through them. There was a depressed area approximately 4-feet deep by 25-feet long, by about 50-feet wide across the roadway. The depression sloped out toward the outside lane.

A WisDOT team went to the United Water Services Facility and set up an Emergency Management Center. A preliminary status meeting was held with contractors, WisDOT engineers and consultants. A similar meeting was held with staff of MMSD and the United Water Services Facility.

Primary and on-going concern was the safety of the public and workers in the area. The entire work area was cordoned off and secured. Staff worked to keep public and elected officials informed on what was being done to deal with crisis, to ensure continued operation of the treatment facility and to reopen the roadway to traffic as soon as possible.

Regular meetings were held with sheriff, fire, police, Coast Guard, public works, and emergency personnel. Frequent briefings were held with the news media. Legislators and members of the Congressional delegation were also kept apprised of on-going events. The Federal Aviation Administration (FAA) was contacted on a regular basis after it was determined explosives would be used to demolish the section of the bridge.

Damage to the 3rd Girder Changed Plans

The initial plan developed with consultants from Lichtenstein and contractors from Zenith Tech and Lunda was to shore-up or support the failing section, with the possibility of repairing it later. However, a new 18-inch tear on the third girder, or inside girder, was discovered creating the need to look at other choices to guarantee safety.

On December 15, it was determined that demolition of the failing section of the Hoan Bridge would be the best approach. After a telephone interview with Mark Loizeaux, president of Controlled Demolition Incorporated (CDI), WisDOT asked him to come to the site from Maryland to analyze the failing section of the bridge and make recommendations for the demolition. He arrived about four hours after being contacted.

Demolition by Explosives Chosen

After reviewing the failed sections of the bridge and consulting with the experts, WisDOT determined that the most effective way to remove the failing section of the bridge would be by demolition using explosives. This approach would minimize damage to the treatment facility, reduce the probability to damage to the remainder of the bridge and greatly reduce the potential of harm to workers. Three days later, on December 18, the Governor proclaimed an emergency because of the failure of the bridge.

After WisDOT chose to demolish the structure, plans were put into effect to insure the continued operation of the United Water Services Facility. This included rerouting utilities and continuing the operation of at least a portion of the facility in the event the failed bridge collapsed prior to the planned demolition.

Cushioning material of crushed limestone was placed under the area of the demolition to reduce shock vibrations to the treatment facility and to the other portions of the bridge. Wooden beams were placed against the piers to protect them. Snow fences were installed on the bridge and protective material was placed between the good and failing sections of the roadway for protection during the explosion.

Seismographs were taken before and after the blast, as were surveys of buildings. Ongoing readings of elevation changes in the failed section were conducted using both prism and laser technology. A tower was placed in the section of the bridge immediately south of the failed section to protect that southern section from the wave action caused by the demolition and to prevent damage to other sections of the bridge.

Two independent safety officers were brought in and worked closely with the safety officer of the treatment facility. Police guarded the explosives. Representatives of WEPCO were contacted on a regular basis.

Heavy snowfall, cold and wind delayed the demolition. There were serious safety issues about people working on lifting devices in the high wind, 100-feet high under the failing section of the bridge.

On December 28 at 1:00 p.m., explosives brought down a 130-foot, 520-ton section of the failed portion of the bridge. No significant structural damage was caused to the treatment facility. Some ponds were drained to remove debris from the blast. Approximately four wheelbarrow loads of debris were removed from each tank.

Post Demolition

Immediately after the demolition, review of the bridge structure was performed to determine if the structure was safe enough for people to work beneath it. The treatment facility began a review of its facilities. Workers removed debris and prepared to move the girders to a location near the airport. This process is expected to be completed next week.

The treatment facility is now completely back to full capacity. Only the temporary electric service needs to be replaced with a permanent service. Those arrangements are being made. Thorough analysis of the failed section of the Hoan Bridge is underway. The review will include:

- Visual inspection and in-depth inspection of the southbound structures. This will include spot paint removal, magnetic particle and dye penetrant testing of potential micro cracks.
- Metallurgical analysis.
- Failure analysis in the lab and field and three-dimensional modeling of system.
- Strain gage and load testing.
- In-depth inspection of the southbound roadway.

WisDOT is working on a plan to open the west side of the Hoan Bridge to two-way car traffic. This may involve drilling additional mouse holes and reaming to eliminate the potential of further significant cracks developing.

At this time, the department does not have answers to the exact cause of the failure. That determination requires a thorough analysis and is likely to take until sometime this Summer. Once WisDOT has determined why the section of the Hoan Bridge failed, a decision will be made as to whether the section will be retrofit or rebuilt.

This has been an unfortunate experience. It was very fortunate that no one was injured or killed during the failure of the bridge span or subsequent demolition.

Wisconsin and the nation will benefit from this experience. New inspection techniques and construction standards will be developed that will help WisDOT continue to ensure the safety of the traveling public.

PRELIMINARY COST ESTIMATES AND PAYMENT OPTIONS

The costs associated with the Hoan Bridge are significant. The department expects the costs for emergency response, including demolition, transit subsidies and reimbursement for the costs to MMSD, to total \$5-8 million.

The costs for visual and in-depth inspection and testing of the bridge approaches and the arch span are expected to total \$2-3 million.

At this time, preliminary estimates for the costs to permanently retrofit the south and northbound lanes to service is between \$12-15 million. To replace both south and northbound approaches could cost \$25-30 million.

The payment options depend on whether or not the department is able to obtain additional federal funds. WisDOT is aggressively pursuing federal funding to offset the costs. WisDOT Secretary Mulcahy has been in Washington, D.C. during the past few days and has met with federal officials about funding.

Additional Federal Funds

1. Emergency Relief Funding Request

Funding under the Emergency Relief Program (ER Program) is made available under Title 23 U.S.C., section 125. This program is for damage on all federal aid highways resulting from catastrophic failure or natural disaster. WisDOT has applied for ER Program reimbursement because it believes the cold weather prior to the bridge failure constitutes a catastrophic event.

WisDOT forwarded the ER Program funding request to the Wisconsin Federal Highway Administration (FHWA) office on December 18, 2000 (Attachment B). On December 19, 2000, the entire Wisconsin Congressional delegation sent a letter to US DOT Secretary Rodney Slater asking him to consider Wisconsin's request (Attachment C). In addition, several members of the delegation phoned the US DOT Secretary about the incident. The department has asked federal officials for a fast and favorable decision, hopefully in the next few weeks.

It is important to note that ER Program funding is reimbursement for costs associated with the physical damage, debris removal and emergency protective measures such as traffic control and detour signing. The protection of the Milwaukee sewage treatment plant during the demolition of the bridge may or may not be eligible. The ER Manual does not address this particular topic and a ruling would be needed from FHWA.

The ER Program provides 100 percent reimbursement for qualified activities incurred in the first 180 days of the incident and 90 percent reimbursement for activities after the first 180 days for highways on the Interstate-system.

2. Other Federal Funding Opportunities

There are other federal funding programs for which WisDOT could apply if ER Program funding is not available, including the Discretionary Bridge Program, Interstate Maintenance Discretionary Program and earmarked funds through the federal budget process. WisDOT will evaluate these options after learning about the status of the ER Program request. All programs would be Federal Fiscal Year (FFY) 2002 applications since funding has been distributed for current FFY 2001 (October 1, 2000 through September 30, 2001).

Discretionary Bridge Program: Funding is available for this program on a national competitive basis. FFY 2002 authorized funding is \$100 million. The funding split is 80 percent federal and 20 percent state.

Interstate Maintenance Discretionary: Funding is available for this program on a national competitive basis. FFY 2002 authorized funding is \$100 million. The funding split is 80 percent federal and 20 percent state.

Federal Earmarks: Wisconsin may also work with the Wisconsin Congressional delegation to obtain earmarked funds for the project through the federal budget process.

Without Additional Federal Funds

If additional federal funding is inadequate to cover all the costs associated with the repair and reopening of the bridge, the department will utilize the combination of existing federal and state dollars available in the State Highway Rehabilitation (SHR) Program.

Without an increase to the transportation program, projects currently being developed may need to be delayed to provide the necessary funding. Statewide, over 4,000 projects are currently under development for implementation through the Six Year Highway Improvement Program, financed from the SHR appropriation.

Every effort would be made to minimize the impact of the delays on any one project and it is impossible to say which projects might be impacted at this time. The department anticipates delays in projects only if additional federal funding is unavailable.

BRIDGE INSPECTIONS

General Program Information

Wisconsin has a total of 13,423 bridges, of which 4,815 (36%) are the responsibility of the state and 8,605 (64%) are the responsibility of local governments or railroads. While WisDOT has responsibility for only 36% of the bridges, 60% of all traffic uses those highways under the department's responsibility.

Bridge inspectors in Wisconsin are well trained. In order to be a bridge inspector in this state, a person needs to be either a registered professional engineer or have five years of experience under the guidance of a registered professional engineer and complete a two-week federal bridge inspection class. Other states simply require that you be a registered professional engineer or complete the federal bridge inspection class – Wisconsin requires both.

As new issues evolve, the state trains inspectors on those issues. Scour, where water changes the bottom of a riverbed at footings, was one of those issues that new training was provided on a few years ago. Inspectors from the department, as well as those responsible for local bridges, all receive the same training.

Bridges are required to be inspected at least every two years by federal rule and Wisconsin Administrative Code. Some bridges are inspected more frequently than every two years if concerns are identified. In the past, WisDOT inspected bridges every year, but decided it made more sense to inspect bridges with concerns more often than bridges with no concerns. The department decided to concentrate more on bridges that have problems. There are seven types of bridge inspections:

- Inventory – right after bridge is constructed
- Routine – every two years to record any observed changes, if any
- Interim – more frequently than every two years to monitor a known or suspected condition that may affect bridge condition
- Specific (3) – depending on structure type and location
 - Fracture critical – detailed inspection of components whose failure could result in the collapse of a bridge – usually every five years
 - In-depth – detailed inspection of certain bridges with special components – usually every five years
 - Underwater – visual, probing and sounding inspection of a bridge's underwater components every two years; an underwater diving inspection every five years
 - Damage – an unscheduled inspection following damage after environmental (excessive rain) or human causes (hit by truck)

In general, inspectors look at all elements of a bridge, which include deck, girds, bearings, piers and abutments. If the inspection indicates anything of concern, the department can take any of the following actions:

- inspect more frequently
- analyze and repair
- post at a lower vehicle weight
- close

WisDOT takes its responsibility very seriously and picks the option that is most appropriate and ensures the safety of the traveling public. In addition, the department never stops trying to learn. Organizations like FHWA and the American Association of State Highway and Transportation Officials (AASHTO) help state inspectors get together with peers across the US and the world to keep up-to-date. Representatives of the department recently attended a best practices seminar on bridge inspection sponsored by the FHWA to learn from peers. WisDOT has a representative on a committee to revise the national recorded and guide for bridges.

Wisconsin's bridge inspection program is very similar to those in the other 49 states. The department has a well-thought-out bridge inspection program and is committed to keeping it good. While the department occasionally posts or closes a bridge, there have been very few failed bridges in Wisconsin over the last 30 years and none of those has resulted in an injury or a death.

The Department commits substantial resources to the bridge inspection program and bridge maintenance on the state highway system.

- Ten staff in the central office develop policy and are experts in inspection, maintenance and repair.
- Twenty five staff in the districts do hands-on inspection and schedule maintenance or recommend improvements.
- Consultant contracts, because of workload or the need for special expertise, averaged about \$1.25 million over the last two years.
- One million dollars in routine preventive bridge maintenance.

Hoan Bridge Inspections After the Failure

After the demolition of the failed span, WisDOT had eight teams of inspectors doing visual inspections. The inspectors looked for loose concrete caused by the blast and cracks in girders and worked to determine if it was safe to do further inspections. This process is complete. No loose concrete or cracks in girders were detected. These recent visual inspections of the Hoan Bridge have not identified any further major concerns due to the blast. Before the department can consider opening the southbound lanes of the Hoan Bridge to traffic, it needs to do some more testing.

First, inspectors will do some non-destructive testing at all the connections similar to the failed connection. Non-destructive testing places electrical current through the connection and applies metal filings. If the metal filings stick in a random pattern, there are no cracks. If the metal filings stick along a particular line, there is a crack that needs more inspection.

The additional inspection will also include dye penetration testing. Inspectors spray on dye at all the connections and wipe it off. The dye penetrates any cracks and shows inspectors the extent of the cracks.

If everything goes all right with the non-destructive testing and dye penetration testing, inspectors will also do a load test. The load test involves placing strain gauges at critical points on the bridge and driving a truck with a standard design loading onto the bridge. The truck will not be loaded to the point where the bridge will fail. The weight will, however, be able to tell us whether the strain in the girders is within acceptable ranges. While this is going on, inspectors will also be drilling mouse holes at all of the appropriate connections.

Drilling more holes in girders help in the following way. When there is a crack in a girder, all of the stress is concentrated at a very small point which can extend the crack to failure of the girder if the stresses become great enough. When a hole is drilled at the end of a crack, the stresses are spread out along the entire diameter of the hole, diminishing the stress at any one point and greatly reducing the potential for failure. This is an internationally accepted procedure.

Once all of the testing – non-destructive testing, dye penetration testing, load testing and mouse hole drilling - are completed, the bridge could be ready to be open. The Department will not open the southbound lanes on the Hoan Bridge until the necessary testing and retrofits can ensure the safety of the traveling public.

In order for investigators to determine exactly what caused the failure, pieces will be cut from both the failed girder and places where there was no failure. These portions will be sent to FHWA's laboratory in Virginia. FHWA, Lehigh University, and Northwestern University will be testing material properties welding connections, as well as the design of the connections.

All of the testing will probably take up to six months before we know the cause of the failure of the Hoan Bridge. There is a chance we might not find a specific cause.

Other Bridge Inspections

WisDOT is diligently inspecting bridges similar to the Hoan Bridge and has found no similar problems. WisDOT reviewed its files for bridges that had characteristics similar to the Hoan, such as similar floor systems that hold up the deck, welded girders with similar weld details and similar steel properties.

This review produced 26 other bridges that were constructed between 1961 and 1985. The design of the Hoan Bridge and these other 26 bridges utilized nationally acceptable design practices at the time of their design. It wasn't until some time later that concerns were raised about certain combinations of designs and materials.

Since the department did its initial identification of the 26 bridges, five were eliminated for further review because the connections were not welded, but were either bolted or riveted. Of the remaining 21 bridges, inspections have been completed on eight of them. Inspectors found no problems with the eight bridges. Of the remaining 13, all inspections are scheduled to begin in the next week and a half.

Completion of the inspections are dependent on the weather. For the safety of the workers and the public, inspections will take place where there is bare pavement to support the inspection equipment, temperatures are above 25 degrees, and winds are no more than 10 miles per hour.

Based on the analysis of the Hoan Bridge, the department may need to do more testing on the 21 bridges that are welded. A grid showing the status of inspections on other bridges is attached as Attachment D.

Overall Bridge Program

Bridges are given ratings after inspections based on a complicated formula. In the November issue of 'Better Roads', Wisconsin's bridges were rated the seventh best in the country. This comes about because the department understands not only how important bridges are for the safety of the traveling public, but how to manage improvement and maintenance funds.

The department's bridge management system optimizes the state's investments in bridges. WisDOT has a very good bridge inspection, bridge maintenance and bridge improvement program.

FOR ADDITIONAL INFORMATION

General Information	Bob Cook WisDOT Executive Assistant 608-266-1113
Hoan Failure	Les Fafard District 2 Transportation Director 262-548-5682
Cost Estimates/ Payment Options	Ruben Anthony, Jr. Administrator Division of Transportation Investment Management 608-267-5254
Bridge Inspections	Mike Cass Administrator Division of Transportation Infrastructure Development 608-267-7673

Attachments:

- A. Chronology of the Hoan
- B. ER Program Funding Request to FHWA
- C. Congressional Delegation Letter
- D. Status of Statewide Bridge Inspections

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COMMITTEE MEETING/AGENDA

WAR MEMORIAL CENTER, ROOM 409

MILWAUKEE, WISCONSIN

January 11, 2001

I. CALL TO ORDER

"The hour of 10AM having arrived, I will call this meeting of the Senate Insurance, Tourism and Transportation Committee to order. The clerk will take the role."

II. INTRODUCTIONS

III. OPENING REMARKS

"I'm glad to be here today. Almost immediately after the failure of the Hoan Bridge Senator Grobschmidt was in my office to make sure that we got on top of the situation. It is at his request that we are here today. I look forward to working with him to address the needs of his constituents."

**IV. *Representative Stone*
SUMMARY BY WISDOT REPRESENTATIVE**

V. PUBLIC TESTIMONY

V. ADJOURN

/s/ ~~Sen~~ Grobschmidt
/s/ Sen Baumgardt
/s/ " Farrow

What do you mean

DECEMBER						
S	M	T	W	T	F	S
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Appointments

pm Health Insurance Q&A Session [MultiMedia Theater]
 pm Info Ctr Holiday Party [Bradley Rooms]

166-ARY Lincoln Rd
 RW4-356 Chrysler
 KZN-200 Ford Truck
 FEB 1992 White Oak
 35287 Silver Anniversary

Roll

~~SECRET~~



Date: January 5, 2001
To: Anne Spray Kinney
Copy: Mark Kass
Kevin Shafer
Michael McCabe
Mark Kaminski
From: Sylvan Leabman
Subject: Post Hoan Bridge Demolition Status Report

The failed section of the Hoan Bridge was successfully demolished using controlled blasting techniques on December 28, 2000 with no apparent major damage to MMSD facilities at the Jones Island Wastewater Treatment Plant. The demolition went according to plan missing the East Plant Utility Gallery Building by several feet (see attached photographs). Precision blasting techniques coupled with the strategic placement of tons of gravel to "cushion" the fall of the steel and concrete bridge section appeared to be quite effective. Preliminary damage assessments conducted by United Water Services (UWS) have identified the following items and estimated repair schedules:

- Flying debris including some small pieces of concrete and other demolition material landed on top of the Gallery Roof and in the East Plant Secondary Clarifiers. Foreign debris will be cleared from rooftops and any damage to building roofs will be repaired. This work is underway. Six clarifiers will be drained and cleaned to prevent damage to clarifier mechanisms and plugging of sludge draw off piping. UWS maintenance crews should be able to complete 2 clarifiers per week weather dependent.
- One exterior lighting standard and pole and one fire hydrant were damaged and will need to be replaced. Repair will commence in spring after the ground thaws.
- Damage to asphalt roadways, due to heavy volume of truck traffic hauling gravel to the demolition site, will need to be repaired in spring.
- Gravel will be cleared from plant drain lines and storm sewers, cleaning will commence after the Department of Transportation vacates the site and will take approximately 2-6 weeks, weather dependent, to complete.
- Several broken windowpanes in the Sludge Pumping Facility will be replaced

- Spare filter plates for the aeration tanks, stored outside near the demolition site were damaged and must be replaced prior to aeration basin maintenance during May-September 2001.

The Department of Transportation is currently removing gravel and the fallen bridge section, damage assessment and repair will continue as the DOT's progress allows. The DOT estimates that two weeks time is needed to clear the site. In addition to property damage assessment, post blast inspections will include settlement surveys and review of seismic recordings.

Disconnection and removal of temporary utility lines and reconnection of permanent utilities has begun. Temporary utility lines were installed and routed around the so called "hot zone" directly beneath the failed bridge section as a precautionary measure and at the direction of the DOT. Specifically,

- Process air pipe - installation of the 60" stainless steel spool pieces to fill in the sections that were removed prior to the demolition of the bridge. UWS will coordinate short term East Plant airflow outages to permit the welding on these fittings.
- Small diameter utility piping – potable water, flushing water, high-pressure air, instrument air and natural gas are presently being put back into service.
- Demolition of the temporary flood protection bulkhead installed prior to the demolition of the bridge is proceeding and will be completed in a couple of days.
- UWS's mechanical subcontractor is working with piping suppliers to return unused sections of 54" process air piping. This pipe was purchased and installed as part of the contingency plan in the event felled portions of bridge demolished the Utility Gallery. Information in regards to this piping will be forwarded to UWS upon receipt. UWS to discuss disposition of welded pipe and fittings with MMSD and DOT to help determine whether to retain or scrap.
- High voltage electrical lines need to be spliced and placed back in service in order to return to the plant electrical power grid to the normal level of redundancy and reliability. The estimated duration of this task is 3 weeks.
- Rented equipment including pumps, standby generators and heaters will be returned when no longer needed to support plant operation and maintenance.

The Hoan Bridge crisis required UWS to implement various changes to the operation of the system, while these changes contributed to the successful completion of the bridge demolition, there are potential cost implications currently undefined.

- Electrical power costs for pumping diverted flow to Inline Tunnel System

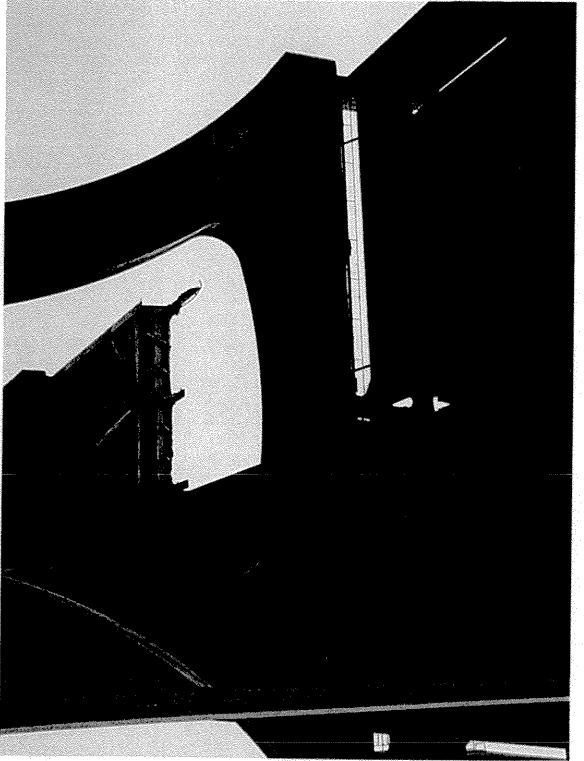
- Flow diversions to SSWTP required a change to the sludge blend used for Milorganite production that resulted in the production of off spec product. This product may have to be sold at a reduced price.
- Capital projects at the Jones Island and South Shore Wastewater Treatment Plants were shutdown. This may result in schedule delays and cost increases.

The Hoan Bridge failure has had an adverse impact on treatment plant effluent quality. The impact is related to the virtual unavailability of the Jones Island East Plant for the treatment of wastewater. In addition, in planning for what appeared to be the imminent collapse of the bridge and probable damage from the demolition, various utility lines previously mentioned in this report had to be severed in order to minimize damage. These utility lines were also disconnected in an orderly fashion to allow a relatively quick restoration after the collapse or demolition. All of the utilities are essential to the biological treatment of wastewater, with "air" perhaps being the most critical to the treatment process. Since the East Plant normally treats 2/3 of the wastewater at Jones Island, its loss was serious and required the use of other options. In fact, a combination of three strategies was used: 1. Treat more wastewater in the West Plant; 2. Treat more wastewater at the Shore Shore Plant; 3. Divert wastewater to the Deep Tunnel.

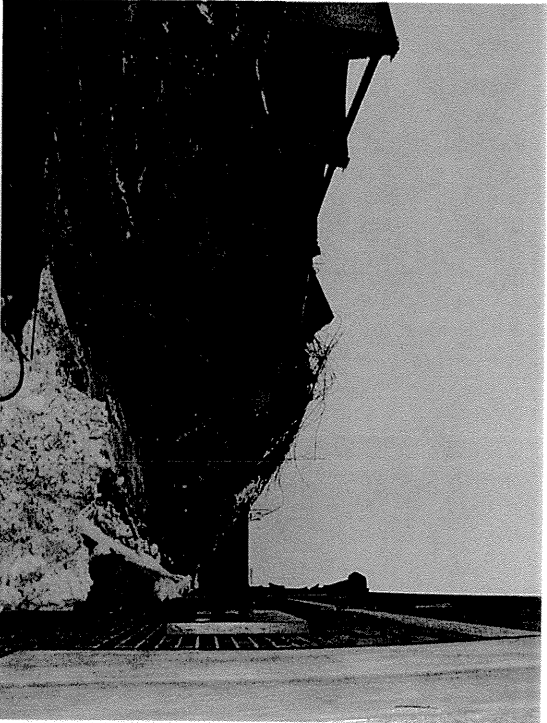
These strategies were successful in getting through the emergency but effluent was of a slightly lower quality than typically produced. Because of the freezing temperature and serious damage that could be caused with water freezing in pipes, wastewater flow could not be completely shut off to the East Plant. A certain amount of flow had to be maintained and this contributed to the lower effluent quality. It is expected that treatment efficiency will return to normal by the middle of January. In terms of the discharge permit issued by the DNR, it appears that all limits will be met with the exception of the Jones Island weekly average biochemical oxygen demand (BOD) limit of 45 mg/l for December 22-28. All of the other 75 effluent standards were met at Jones Island for all of the weeks in December.

Based on the extenuating circumstances and preliminary discussions, the Wisconsin Department of Natural Resources is fully aware of the circumstances surrounding this situation. The operations contract with United Water Services has even more stringent limits than the DNR permit. Although contract limits were exceeded, given the circumstances, we do not anticipate any compliance issues relative to the Agreement for Operations and Maintenance with United Water Services.

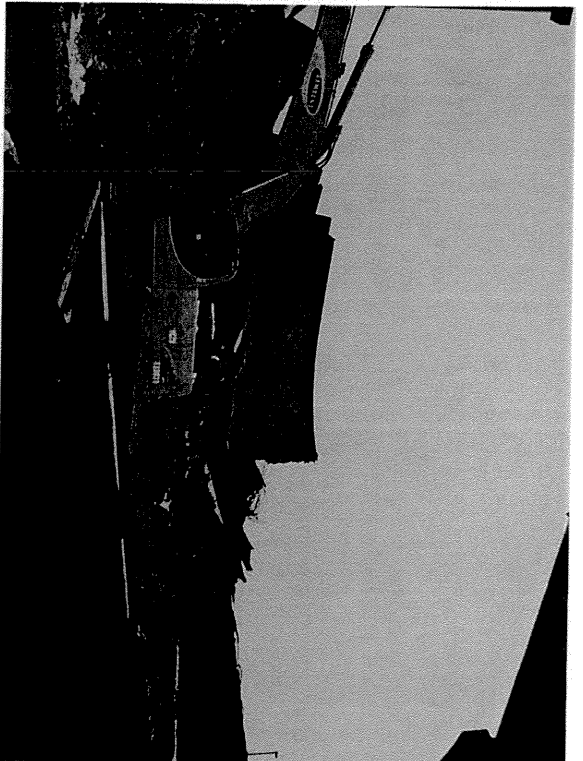
Cost estimates for repairing property damage and utility work are being prepared by United Water Services and MMSD staff; these should be available by mid-January 2001.



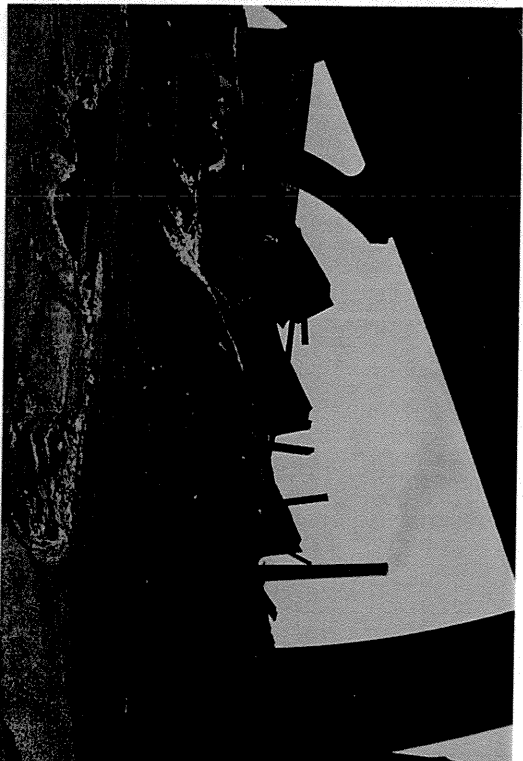
North Bound Bridge Section Demolished



Demolished Bridge Section and MMSD Gallery



Inverted Bridge Girder



Demolished Bridge Section Resting On Gravel Pile



TESTIMONY – HOAN BRIDGE HEARING
War Memorial, Milwaukee, Jan. 11, 2001

Thank you, Mr. Chairman and members, for the opportunity to say a few words today about the urgent matter before us, and an audit request I've made pursuant to that matter. The Audit Bureau is always a skilled and helpful partner when the state faces complex and troubling issues.

As you know, state inspections deemed the Hoan Bridge sound and safe just one week prior to its collapse. Consequently, I've asked my colleagues on the Audit Committee to approve a state audit of the effectiveness of the Department of Transportation's bridge inspection program.

My aim in requesting the audit is not to punish or criticize the department. In fact, the department deserves accolades for its decisive response to the Hoan failure. I'm particularly pleased with the department's rapid move to inspect other state bridges with similar characteristics.

However, any lingering doubts about the inspection process must be addressed, and if necessary, eliminated if such actions are to recapture public confidence in the safety of all bridges around the state.

The Audit Bureau can complement the efforts of this committee with a careful, detailed and impartial evaluation of the bridge inspection program – including funding, contracting, scheduling, and any other potentially relevant facet of the process.

The Audit Bureau's distinguished track record lends decisive weight to its judgments and recommendations. If the auditors find that there are no problems with the process, a "clean bill of health" from them will go a long way toward answering the question I'm hearing too often from the public: "Is it safe to drive out there?"

If the audit turns up any problems or irregularities – even minor ones – rest assured that the auditors will be ready with ideas for solving those problems with maximum efficiency.

The audit committee co-chairs have assured me this audit request will receive consideration as soon as possible. I look forward to working alongside you to unravel the issues surrounding the collapse of the Hoan, and to prevent similar occurrences in the future.

With that, I'd be happy to entertain any questions or comments you might have.

Question: How can auditors be qualified to review a bridge inspection process? They are auditors, not engineers.

Answer: The auditors are experts at reviewing the programs and processes of state government. They look at the operation of the Medical Assistance program even though they are not physicians – they comment on the workings of the State Investment Board even though they are not stockbrokers – and they can certainly look at the effectiveness and efficiency of the bridge inspection process. In fact, Audit Bureau staff have had considerable experience in looking at the administration of DOT's programs, and I am sure they will call upon that expertise if my request is approved.

City of St. Francis

4235 South Nicholson Avenue
St. Francis, Wisconsin 53235
(414) 481-2300 FAX: (414) 481-6483

MAYOR
Lawrence J. Burazin

Honorable Senators and Representatives;

Thank you for the opportunity to present the concerns of the citizens of St. Francis. I am gratified to hear that the repair of the Hoan Bridge has been given high priority. It is also good to know that the necessary funding and construction assets are available to restore traffic flow over the bridge consistent with safety concerns. The bridge closing and the loss of access to downtown Milwaukee via the John R. Plewa Memorial Lake Parkway are having a substantial negative effect on the City of St. Francis. Restaurants and retail businesses in our community are no longer able to attract and keep customers from the East side of Milwaukee. A major employer has expressed concern over additional transportation costs brought about by the closing. We have noted increased traffic on Kinnickinnic Avenue in St. Francis. Our police department has reported to me that traffic on S. Kinnickinnic Ave. and on Lake Drive through St. Francis has increased dramatically. Traffic on Layton and Howard Avenues has also increased as these roads are used to access alternate routes to and from downtown Milwaukee. We have seen increases in traffic accidents, traffic congestion and traffic violations.

Perhaps the most serious problem St. Francis faces as a result of the closing is the chilling effect it is having on development in our city. The primary example of this is our Lakeshore development. We and the developers are greatly concerned that the closing of the bridge and the interruption of access to downtown Milwaukee via the John R. Plewa Memorial Lake Parkway will affect plans to begin construction of this two hundred million dollar project this year. We fear that a long delay in re-opening the bridge would severely curtail sales of housing units, since a primary incentive to the developers and to eventual residents to locate in St. Francis is the easy access to Downtown Milwaukee via the Parkway. We hope to find ways to keep this very important project on schedule and any good news concerning the Hoan Bridge would be helpful in that regard.

I believe that any delay in re-opening the Hoan Bridge would be extremely harmful to the economic health of St. Francis and of our southeast suburban neighbors. We cannot let this repair be unnecessarily impeded by any person or circumstance. The people we represent deserve no less. Thank you again for this opportunity and for your sincere interest in the future of our community.



Hoan Bridge presentation
1/09/01 LJB/

ROGER BRESKE

STATE SENATOR

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PRESS ADVISORY

FOR IMMEDIATE RELEASE
Contact: Vaughn 608/266-2509

December 28, 2000

JOINT HEARING PLANNED TO INVESTIGATE HOAN BRIDGE FAILURE

MADISON -- State Senator Roger Breske, Chairman of the Senate Committee on Insurance, Tourism, Transportation & Corrections today announced plans to hold a joint legislative hearing with the Assembly Transportation Committee to investigate the recent failure of the Hoan Bridge in Milwaukee.

According to Breske, the hearing, slated for January 11, 2001, will include a briefing by key Department of Transportation personnel. Public testimony will also be taken. Breske indicated that hearing was scheduled at the request of Senator Richard Grobschmidt, who serves as Vice-Chair of the panel and in whose district the bridge is located.

The Hoan Bridge is a six-lane, 3.7 mile bridge which parallels Milwaukee Harbor from Maier Festival Park to Carferry Drive. The bridge has an 1,140 foot arch and cost \$47 million to build when it opened in 1977. Two of three girders supporting a 217 foot, 900 ton span of the northbound roadway failed on December 13, 2000. The bridge was slated for demolition today.

"I look forward to working with Senator Grobschmidt to address the immediate needs of the motorists in his area and to ensure that the failure of this bridge is not repeated elsewhere in the state," noted Breske. "The Committee will investigate the circumstances surrounding the failure, the Department's plans for reconstruction and related public safety issues," according to the official notice released this afternoon.

The hearing will take place on Thursday, January 11, 2001 at 10AM at the War Memorial Center, Room 409 located at 750 North Lincoln Memorial Drive in Milwaukee. The public is encouraged to attend and participate.

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Meeting in January

Hoan Bridge Briefing Points
Wisconsin Department of Transportation
December 18, 2000

- Safety and security are top priorities as WisDOT continues to work with engineers, consultants, fire and police departments, the Port of Milwaukee and the Coast Guard as plans move forward for the controlled demolition of part of the damaged span of the Hoan Bridge
- Shortly after 7 a.m. last Wednesday, two of three girders supporting a 217-foot, 900-ton span of the northbound roadway failed. The roadway buckled about four feet and is being supported by a single girder with an 18-inch crack - the situation remains highly dangerous.
- The initial approach was to try and prop-up the damaged area with beams or towers and then assess the damage.
- However, after consulting with a variety of experts, concerns arose over whether the span could be secured before it fell. Thus, an internationally-respected team of experts including Controlled Demolition, Inc. was brought in to plan the removal of the span through controlled explosives.
- Contractors are mobilizing equipment and preparing to stack piles of crushed stone under the damaged span to cushion the impact – whether the span is intentionally demolished or should it fall by itself.
- Towers or beams will be used to provide extra support to the span immediately to the south of the damaged span to avoid or minimize further damage from the shock.
- The controlled demolition is planned for later this week to remove an approximately 150-foot, 600-ton section of the damaged span. To ensure the safety of workers and the general public, a public announcement will be made when the date and time is finalized. Planning with local agencies continues to ensure a safe operation and to restrict access to the area.
- WisDOT is continuing to work with the Metropolitan Milwaukee Sewerage District to minimize impacts on its facilities.

- Demolition crews secured to man-lift devices are working to clear the damaged area of snow.
- The six-lane, 3.7 mile Hoan Bridge has an 1,140-foot arch and cost \$47 million to build. The bridge parallels Milwaukee Harbor from Maier Festival Park to Carferry Drive and opened in 1977. The Hoan carries 32,190 vehicles per day, up from about 25,000 per day since the Lake Parkway opened to the south in October, 1999.
- The Hoan Bridge recently received a routine inspection that provided no advance warning in the area of the girders which failed.
- The unexpected damage to the Hoan in no way indicates a danger to the more than 13,000 other bridges along Wisconsin's state and local highway system.
- Suggested alternate routes for commuters and others are: I-94/I-43 (High Rise Bridge), or 6th Street, or 16th Street, or Water St. to Kinnickinnic. Updated alternative route and closure information will be available through WisDOT's construction hotline at 262-548-5684 or 888-468-0037.

The attached Internet sites provide additional details and photos of the Hoan Bridge situation:

<http://www.jsonline.com/news/metro/dec00/hoan18121700a.asp> - Article "Larger chunk of Hoan to be felled"

<http://www.jsonline.com/news/metro/dec00/bridge17121600a.asp> - Article "Blast to fell part of span as early as Tuesday"

<http://www.jsonline.com/news/editorials/dec00/infra-edit121700.asp> - Editorial "Lessons from Hoan Bridge"

<http://www.jsonline.com/news/metro/dec00/steel15121400a.asp> - Article "Bridge welds, steel in focus"

<http://www.jsonline.com/news/metro/dec00/repair14121300a.asp> - Article "Other big projects could be affected"

<http://www.jsonline.com/news/metro/dec00/south14121300a.asp> - Article "Closing worries businesses, drivers."

<http://www.jsonline.com/news/metro/dec00/hoan15121400a.asp> - Article "Officials hope to reopen lanes to south"

SENATE HEARING SLIP

(Please Print Plainly)

DATE: 1/11/00

BILL NO. _____

OR

SUBJECT HOBAN BRIDGE

MARK KASS

(NAME) Sylvan Leubman, John Tankowski

260 W. Seaboth St

(Street Address or Route Number)

Milw 53204

(City and Zip Code)

(Representing) MMS ID (Sewer plant)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

Speaking for information only; Neither for nor against:

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State Capitol - B35 South
P.O. Box 7882
Madison, WI 53707-7882

SENATE HEARING SLIP

(Please Print Plainly)

DATE: 1/11/01

BILL NO. _____

OR

SUBJECT Hoban Bridge

(NAME) Robert B. Ritter MMR

752 N. Milwaukee St.

(Street Address or Route Number)

Milwaukee Wis 53202

(City and Zip Code)

(Representing) MMS (Milw Comm)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

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DATE: 1/11/00

BILL NO. _____

OR

SUBJECT Hoban Bridge

(NAME) John M. Launstein

400 E. Puete Rd

(Street Address or Route Number)

Oak Creek WI 53154

(City and Zip Code)

(Representing) 19th Supervisors Milwaukee County

Speaking in Favor:

Speaking Against:

Registering in Favor:

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Registering Against:

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over

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DATE: 01-11-01

BILL NO. _____

OR

SUBJECT _____

" Linda Ryan

Supervisor Lori Lutzka
(NAME)

901 N. 9th St.

(Street Address or Route Number)

Milwaukee WI 53233
(City and Zip Code)

Milwaukee County
(Representing)

Speaking In Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

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Madison, WI 53707-7882

SENATE HEARING SLIP

(Please Print Plainly)

DATE: _____

BILL NO. _____

OR

SUBJECT _____

Rep. Don Rickman
(NAME)

1 Milwaukee
(Street Address or Route Number)

(City and Zip Code)

(Representing)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

Speaking for information only; Neither for nor against:

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State Capitol - B35 South
P.O. Box 7882
Madison, WI 53707-7882

SENATE HEARING SLIP

(Please Print Plainly)

DATE: *Needs to leave by 11:20

BILL NO. _____

OR

SUBJECT Tom Brice

Rep. Chris Smith
(NAME)

(Street Address or Route Number)

(City and Zip Code)

(Representing)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

Speaking for information only; Neither for nor against:

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Senate Sergeant-At-Arms
State Capitol - B35 South
P.O. Box 7882
Madison, WI 53707-7882

SENATE HEARING SLIP

(Please Print Plainly)

DATE: _____

BILL NO. _____

OR

SUBJECT HOAN BRIDGE

HOAN BRIDGE

President

(NAME)

ALF SWEDBERG, ALPRAI

(Street Address or Route Number)

(City and Zip Code)

(Representing)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

Speaking for information only; Neither for nor against:

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State Capitol - B35 South
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Madison, WI 53707-7882

SENATE HEARING SLIP

(Please Print Plainly)

DATE: 1-11-01

BILL NO. _____

OR

SUBJECT HOAN BRIDGE

Mayor of St. Francis

(NAME)

Lawrence J. Ivanazin

(Street Address or Route Number)

(City and Zip Code)

(Representing)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

Speaking for information only; Neither for nor against:

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SENATE HEARING SLIP

(Please Print Plainly)

DATE: 1-11-01

BILL NO. _____

OR

SUBJECT HOAN BRIDGE

HOAN BRIDGE

(NAME)

MARRA GLOWACKI

(Street Address or Route Number)

(City and Zip Code)

(Representing)

Speaking in Favor:

Speaking Against:

Registering in Favor:

but not speaking:

Registering Against:

but not speaking:

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