

# Engineer: Bridge can be restored

Expert estimates that rehabilitation would cost about half of price for new span

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The patient has a heavy cold—not cancer—and a good shot of something should prolong its useful life for 30 to 50 years.

At the risk of practicing medicine without a license, Abba G. Lichtenstein—whose degrees are all in engineering—used those words earlier this week to pronounce a long, healthy diagnosis for his patient: the Michigan Street Bridge in downtown Sturgeon Bay.

Lichtenstein suggested some ways in which the bridge, which has been declared functionally obsolete by the state Department of Transportation, could benefit from long-term repairs rather than simple patches to problems as they occur.

To illustrate his credentials as a bridge expert, Lichtenstein said that at one point in his career he was on a New York Times list of



Nationally renowned bridge engineer Abba G. Lichtenstein (right) gives his evaluation of the Michigan Street Bridge to a gathering of about 75 people at the Door County Maritime Museum Monday night.

people to call for instant analysis when a reporter needed a technical source.

"If a bridge fell down in India, (the Times) would call me at 3 o'clock in the morning and ask me what happened," he said.

Lichtenstein founded a bridge engineering

firm in New Jersey in the 1960s but sold it in 1986. He currently works on a contract basis with the National Trust for Historic Preservation.



Even before the Michigan Street Bridge is rehabilitated, if it ever is, the state could make truck travel on the span safer by removing the 'portals,' according to bridge engineer Abba Lichtenstein. Portals are diagonal steel brackets (shown here marked with a striped warning sign) that connect the sides to the overhead beams. They serve no structural purpose, Lichtenstein said.

Restoring the bridge could cost about half the \$21 million the DOT has estimated for tearing it down and replacing it with a modern structure, he said.

Lichtenstein's estimate of \$10 million to \$13 million mirrored the \$13.3 million price tag from a 1997 study that prompted the DOT to decide restoration was too expensive an option to study further. Although cheaper than replacement, the DOT thought restoration would not bring nearly as many long-term benefits—as much bang for the buck—as a new bridge would provide.

Lichtenstein, who has more than 40 years of building and restoring bridges under his belt, spoke Monday night at a forum sponsored by the local group Citizens for Our Bridge and the National Trust for Historic Preservation. About 75 people—including preservation activists, DOT staff and local officials—crammed into the Door County Maritime Museum at the west end of the aging bridge to hear the presentation.

Lichtenstein's medical analogy in one way paralleled previous descriptions used by DOT engineers. The DOT said the bridge, completed in 1931, could be compared to a 70-year-old man who has a variety of medical problems and deteriorating parts, any of which could prove fatal.

Unlike the DOT, however, Lichtenstein was not predisposed to solve the problems by removing the entire bridge.

"I never met an old bridge I didn't like. I haven't found a bridge yet that didn't perform better than expected," said Lichtenstein at the start of a slide presentation that showed restored bridges.

His slides depicted seven dilapidated bridges around the country that were deemed important enough for someone to pay him to restore to useful shape.

Each of the bridges by comparison appeared to be in much worse shape than the Michigan Street Bridge.

After a two-day inspection of the bridge, Lichtenstein pronounced the bridge to be "wonderfully designed" and well-maintained.

He toured the bridge with DOT engineers Sunday and Monday, and the state even stopped traffic for about 15 minutes Monday morning to raise and lower the draw to show Lichtenstein the corrosion that is spreading under the spans.

The Michigan Street Bridge is "historically significant as an excellent example and Wisconsin's only overhead-truss, Scherzer-type, double-leaf, rolling-lift bascule" bridge, according to the DOT's 1996 survey of the state's historic bridges.

The description refers to the overhead steel beams that support the highway deck of the bridge and the rocking-chair action of the steel roadway draw, which opens near its center to permit ships to pass through.

The design, based on the 1893 patents of Chicago engineer William Scherzer, includes large overhead spans resting on curved supports, known as segmental girders. When the girders located on either side of the draw roll backward and forward, they raise and lower the bridge with help from a concrete counterweight, which acts like a person on the opposite end of a teeter-totter.

The segmental girders, parts of which already have been repaired, could be beefed up with more steel for a longer life, Lichtenstein said.

The DOT was "paying attention, doing the work" of maintaining the bridge over the years, Lichtenstein added. But in the last five years the agency was doing "only a patch job" to keep the bridge operating for the time needed to plan a replacement, he said.

In Lichtenstein's opinion, the rivets look strong and the steel generally looks good. The only areas showing corrosion and cracking are in the gears and the movable lift spans, which encompass about 160 feet of the entire 1,413-foot-long bridge.

The DOT could make truck travel on the bridge safer by removing its portals, also called knee braces, Lichtenstein said.

The braces are diagonal steel brackets that connect the sides and overhead beams of the bridge. The angle of the brackets forces vehicles taller than 12 feet to move toward the center of the bridge, where the clearance extends to 14 feet.

The braces are "in there for the beauty, not strength. They can be removed," Lichtenstein said.

Currently no trucks are allowed on the bridge because the weight limit has been reduced to 5 tons to help preserve the corroding lift spans. Without much cost, the spans could be rebuilt or reinforced

to carry a load of 15 tons, or more than adequate for typical semi-trailer trucks and some heavy equipment, Lichtenstein said.

If properly repaired, the bridge could last at least 25 years with good maintenance, he added. Most of the steel and concrete work could be done by businesses in the state, but the Scherzer section—that is, the rolling lift girders—may need the attention of a specialist from Alabama, he said.

"Add it all up and it's very inexpensive to repair in comparison to building a brand new bridge," Lichtenstein said.

By building another bridge in a corridor to the south between

Maple Street and Oregon Street, Lichtenstein said, the city could take as much time as necessary to restore deteriorating segments of the Michigan Street Bridge. The restoration could be accomplished in two seasons to avoid interfering with peak vehicle traffic in the summer, he said.

Two bridges—a new structure in the Maple-Oregon corridor and a restored Michigan Street Bridge—also would satisfy federal requirements for four lanes to accommodate projected vehicle traffic needs, Lichtenstein said.

Building a new two-lane bridge and restoring the Michigan Street Bridge would be "the least expensive way to get four lanes with a reasonable cost and minimal expense to the public," he said.

A written report of Lichtenstein's analysis will be prepared for the National Trust for Historic Preservation, said Elizabeth Merritt, a lawyer for the Washington, D.C.-based organization. The trust, she explained, is an advocate that aims "to assure that preservation is fully and thoroughly considered" as an option by the DOT.

Federal laws make historic preservation a required part of an environmental assessment that is being prepared by Wisconsin's DOT for the downtown bridge. The assessment must be accepted by the Federal Highway Administration in order for the state to obtain federal money that will pay for 80 percent of the cost of replacing or restoring the bridge, Merritt said.

In Merritt's opinion, Lichtenstein's analysis gave DOT some "creative, cost-effective" ideas for preserving the bridge.