

Design catches up to bridge The Post~Crescent – Thursday, August 14, 2008



Peter Isherwood carries a street lamp Tuesday as he and Elmstar Electric Corp. co-worker Larry Van Den Heuvel work on the College Avenue bridge in Appleton. Preparations are under way for the structure's demolition beginning Monday. Post-Crescent photo by M.P. King

APPLETON — The College Avenue bridge wasn't crumbling into the Fox River when crews set up barricades Monday and set forth its final days.

Actually, the bridge's most notable flaw was there before the first car crossed it in 1959, said engineer Dale Weber.

It was drawn into the blueprint.

That's no reflection on those who designed the bridge but, rather, a sign of the times in which it was built. The standards have changed since then.

"It's not up to current standards in how bridges are designed," Weber said.

Two steel girders support the 1,383-foot-long bridge — not an uncommon design for its time.

A 2003 report prepared by the state Department of Transportation didn't couch language in laying out the potential consequence should one of its two main girders fail.

"A fracture of one of the main structure members, the welded plate girder in this case, would most likely cause a catastrophic failure," the report read. "Collapse of the bridge structure."

That risk is no more. The College Avenue bridge soon will succumb to demolition after nearly 49 years as a key route across the Fox River. The replacement project is expected to be complete in November 2009.

Weber, a bridge maintenance and inspection engineer for the DOT's northeast region, said the bridge didn't present a danger to motorists and pedestrians in its final years. Though its design, coupled with decades of wear, would have brought the need for ever increasing attention to maintain its safety had it remained open to traffic any longer.

Weber said bridges are designed to last from 50 to 75 years.

The College Avenue bridge lasted 49 years.

Brian Chlopek, project manager for the bridge reconstruction, said there's no specific age at which officials set a date for demolition and reconstruction.

"Really, it all depends on the structure," Chlopek said. "There are different life spans for different bridges."

Appleton's W. Prospect Avenue bridge, for instance, was 44 years old when the College Avenue span was completed.

The 60-foot bridge over Jackman Street is scheduled for replacement in three years.

On the other end of the spectrum sits the State 22 bridge over the Pigeon River in Clintonville.

It was built in 1982 and is scheduled for replacement in 2012.

Safety issues raised the College Avenue bridge's priority level.

The bridge had been inspected annually given its two-girder design. Most bridges are inspected every two years.

Cracks in the welding of the support structure only added to the concern of state officials.

In 2002, crews reinforced the bridge by installing steel plates over cracked welds to sustain the bridge until replacement. It further minimized safety issues, but didn't eliminate them.

Weber said the probability of collapse was low, though the possibility couldn't be ignored.

The new bridge will use multiple prestressed concrete girders.

"Should anything happen, other girders could take the load and there's no danger of anything collapsing," Weber said.

The current bridge's maintenance history included replacement of its concrete deck in 1980. The project closed the bridge for much of that year.

In 2001, the DOT limited weight loads to 40 tons to slow further deterioration based on weld flaws that were found during a 2000 inspection.

"Fracture critical" was the terminology the DOT used to describe its structure.

It's the same term that was used to describe Minnesota's Interstate 35W, the deck truss bridge that collapsed last year, killing 13 people and injuring 144 more.

The designation means the bridge could collapse should one of its load-carrying components fail. Two-girder and most truss bridges meet that description, according to the DOT.

That doesn't mean that collapse along College Avenue was imminent.

Just how long could the bridge have lasted?

The 2003 DOT report suggested that additional fatigue-related cracking would have been discovered as years passed had officials decided to do nothing.

It would have created the need for more frequent monitoring and its accompanying traffic disruptions.

Load limits on the bridge would have continued to decrease.

A semitrailer prohibition could have been necessary by 2008, according to the report. That didn't happen.

But it would have — eventually.

Load limits would have continued to decrease until the bridge was deemed unfit for vehicle travel. It's possible the bridge would have closed before that based on costly demand for monitoring and maintenance, according to the report.

Officials chose construction over renovation or the option of doing nothing at all.

"It's low maintenance and it's a much better design," Weber said of the new span.

As the familiar bridge becomes a part of Appleton's history, so too will safety concerns along the route for a half-century or more to come.

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