

CROSSROADS



WISCONSIN TRANSPORTATION INFORMATION CENTER – LTAP at the University of Wisconsin–Madison

Bridge replacement solution saves money and time

The county needed an effective fix at a reasonable cost that put the bridge back in service soon. They found one in an aluminum box culvert.

WALWORTH COUNTY replaced a bridge well past its prime last November with a low-cost solution that took only seven days to build. Budgeted for replacement in 2012, the Depression-era span north of the Town of Delavan moved to the top of the list in late summer when a chunk of concrete from the bridge deck fell into the creek. The County Highway Department inspected and reduced the load limit to five tons.

Road users, including a school bus company, emergency services and county snowplow operators raised concerns about many vehicles having to bypass the road for an extended period. The pressure was on. The county needed to find an effective fix at a reasonable cost so they could put the bridge safely back in service soon. Assistant Superintendent Dale Poggensee researched alternatives to the planned reconstruction and found one in an aluminum box culvert from Contech Engineered Solutions.

Fast tracked

Working with the manufacturer and its own crews, the county installed the culvert two months later at a total cost of \$110,000, including materials, equipment rental and all force account costs. County Operations Director Larry Price says they originally budgeted \$400,000 for a concrete cast-in-place bridge, a project that would have taken from three-to-five-months to complete. Deterioration of the bridge and the load posting



Plans to replace a 73-year-old bridge near Delavan ABOVE took on greater urgency after a portion of the bridge deck broke away, prompting Walworth County to restrict use by most vehicles. A shiny aluminum box culvert RIGHT, built on site and installed in one week by county crews, replaces the old bridge.



made replacing it a priority so the project was fast tracked as an emergency, exempting it from the usual bid process.

The Walworth County case illustrates how important regular inspections are for local bridges

Bridge deterioration and the load posting made replacement a priority so the project was fast tracked as an emergency, exempting it from the usual bid process.

with spans of less than 20 feet. In good condition, they keep roads passable and protect water resources. Price notes the situation also gave his department a chance to try something new that could save money and time.

The county received necessary permits from the Wisconsin Department of Natural Resources and good advice about diverting the stream during installation using a water bladder to filter out silt. They also talked to the local land resource management division of the U.S. Army Corps of Engineers

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about erosion control. Poggensee says the response from the state and federal agencies was timely and helpful. "They understood the tight spot we were in and did their part to expedite matters."

Controlling the timeline

Handling construction on the project with their own employees gave the county control over the timeline and the freedom to move ahead without delay. The fast turnaround time on the project still astounds Poggensee and Price. But thanks to good weather and a capable crew, they beat their projected 10-day timeline by three days.

County workers began removal of the old bridge deck and one abutment on a Friday while crews from Contech delivered the structure to the site in pieces. Contech assembled the culvert over the weekend and on Monday, local crews were back to start pumping out the streambed, continue the tear down and haul away debris.

After another day of excavating the site and putting in a new base for the structure, the county brought in a rented crane on Wednesday to lift the new box culvert into place. Poggensee says they then backfilled around the abutments with a slurry mix, compacted the materials, spread riprap on the stream bank and, by that afternoon, were driving across the new structure. Workers placed the asphalt on Thursday and they opened the road to traffic the next morning.

Price says public feedback was immediate and positive. "People were impressed that the traffic detour lasted such a short time."



TOP: Local crews remove the old bridge deck and one abutment at the start of the one-week project. **CENTER:** Crews assemble the culvert on site. No individual piece was bigger than 4' by 6' and all weighed less than 100 lbs. **BOTTOM:** A crane lifts the new box culvert into place.



LEFT: The new bridge takes shape on day six with abutments in place and a rebuilt stream bank below. **TOP RIGHT:** The completed aluminum culvert bridge seen from below with stream flow restored and new guardrail in place. **BOTTOM RIGHT:** A view from the bridge approach to the new asphalt pavement.

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Good fit

The pre-assembled product proved a good fit for the short county trunk road bridge. The old bridge measured 19 feet, 11½ inches, half an inch shy of the Federal Highway Administration's 20-ft bridge span definition. The Contech box culvert replaces spans from 8 feet to 25 feet.

Todd Riebau, the Regional Sales Engineer with Contech who worked with Poggensee, explains the culvert Walworth County used is an old product in a new low-rise shape ideal for small bridges. It meets industry specifications covering corrugated aluminum alloy structural plate for field-bolted pipes and arches (AASHTO M219) used in highway bridges. It is a good option on roads with little room for big equipment. As with Walworth County's project, he says it lends itself to the many water crossings that exist in Wisconsin.

An important consideration, Poggensee says, was to replace the worn-out bridge with a

structure sufficient to withstand a 100-year flood event. The results from a hydrology study helped determine what size structure they needed to achieve adequate flow.

Poggensee also looked for examples of the culvert solution in use and learned Rock and Kenosha counties had experience replacing small streambed bridges with the Contech product.

Rock County has installed half a dozen of the box culverts on low-volume town roads over several years, according to the county's Highway Commissioner, Benjamin Coopman. Among advantages, Coopman notes the approach does not require sophisticated engineering or the need to detour traffic for long. "It's a solution that meets a need and works well with available resources," he says.

A great job

Visually, Walworth County's new aluminum bridge is striking. And Poggensee notes that it is

structurally strong. Having seen the installation close up, he is confident about the integrity of the new span and expects it to meet or exceed its 75-year expected life. Along with routine road maintenance on the bridge, the county also will monitor the streambed closely.

Poggensee and Price take obvious pride in the success of a project that came together quickly and made effective use of county resources on a tight timeline. Poggensee says that replacing the bridge themselves also energized county workers who welcomed the chance to test their construction know-how.

"This one was special," he says. "It was a good project to work on and everyone did a great job. We had the manpower, the skills and the time to put a stretch of road back in service that makes a big difference to the community." ■

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Resources

Link on Contech Engineered Solutions website with information about the company's aluminum box culvert product. www.conteches.com/Products/Bridges-and-Structures/Plate/Aluminum-Box-Culvert.aspx