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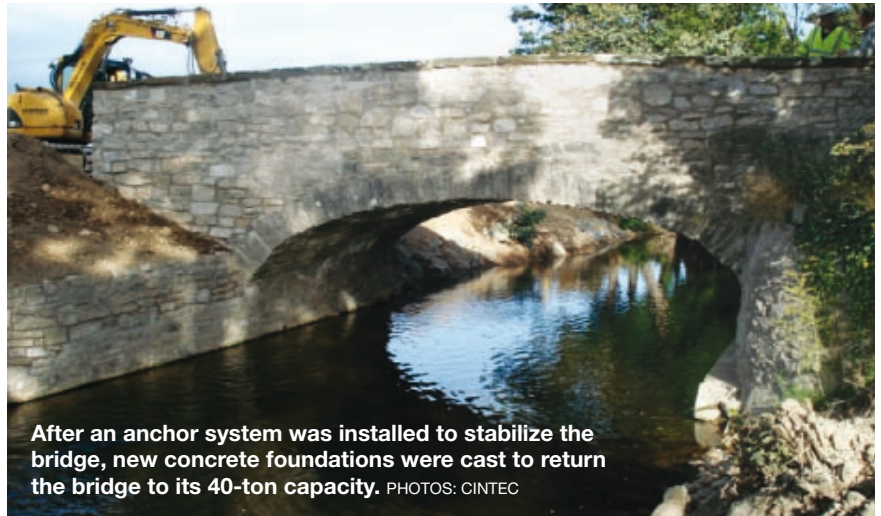
## Anchor System Protects Bridge

**T**he Pont Telpyn Bridge, located in Denbighshire County, Wales, needed serious remediation after severe flood damage nearly collapsed the structure. What remained was a seriously damaged road surface, rotated arch barrel, and cracking throughout the parapet and pandrel. Torrential rainfall delayed the strengthening work in 2006, when the United Kingdom received unprecedented flooding.

The installation of the Archtec anchor system from Cintec America Inc., Baltimore, Md., was a solution to return the bridge to working order. The strengthening structural retrofit system repairs and preserves collapsing bridges, including the Wisconsin Avenue Bridge in Washington, D.C.

For the Pont Telpyn Bridge, the Clwyd river was diverted to a temporary channel to allow for repairs. Anchors were installed into the structure in order to provide stability. To do this, oversized holes were drilled into the arch barrel of the bridge. Noncorrosive structural anchors enclosed in a mesh fabric sleeve were inserted into each hole. Then a pure mineral grout

**The Pont Telpyn Bridge needed major restoration work after major flooding had caused interior and exterior damage to the structure.**



After an anchor system was installed to stabilize the bridge, new concrete foundations were cast to return the bridge to its 40-ton capacity. PHOTOS: CINTEC

with a high viscosity, nonabsorptive properties, and freeze/thaw resistance was injected under low pressure. The flexible, woven polyester sleeve, or sock, acts to restrain the grout and expand in diameter to create a strong mechanical bond.

The Archtec method was ideal for this particular bridge restoration project because it can reduce the amount of steel needed for a project as well as the amount of cement used. This allows the structure's historical features to remain preserved, and minimizes the impact to the natural environment.

The remainder of the restoration project required the arch to be propped underneath in order to remove the parapet walls. New concrete foundations were cast and the training walls were rebuilt. Because the flooding shifted the abutment, the existing structure also was removed and a new foundation and concrete abutment constructed, which then was faced to match the original stone. Gabions, which protect the river bank,

and parapet walls were rebuilt, along with the surrounding landscaping.

A new culvert was installed in order to act as a permanent flood relief system, removing the pressure from the main bridge structure during future floods. The concrete structures will divert any additional water pressure to the east of the main bridge.

"The bridge renovation worked perfectly and the structure easily withstood massive floods this past November," says Robert Lloyd-Rees, COO for Cintec America. "The Pont Telpyn Bridge, which was nearly destroyed during the initial project, went on to be completed and managed to endure some of the worst flooding ever seen."

To complete the project, the roadway was repaved to the original profile. The entire restoration was completed in 2009, when the bridge was returned to its 40-ton capacity. Shortly after construction finished, the bridge was tested by additional rain and the flood system proved to be sound. **CC**