Charlotte Highway Bridge Update (July 2006)

Vern Mesler, Project Manager for the restoration of historic riveted truss bridges for Calhoun County Historic Bridge Park

Lifting a top chord bridge member with the gin pole

Wayne Conklin, Dennis Randolph, Rob Denniston, Vern Mesler

The Charlotte Highway Bridge is beginning to take shape. Its 1886 wrought iron members are again being assembled for the general public's use. Its days as a bridge for vehicular traffic are over. Protected from the winter salted roads, heavy vehicle traffic, and its destruction for being too old, will now be displayed in the Calhoun County Historic Bridge Park.

The Charlotte Highway Bridge was designed by Buckeye Bridge Works and built by H. P. Hepburn Engr. & Contr, Cleveland, Ohio, in 1886. The bridge is a single span wrought iron double intersection Pratt through truss with pinned connections. There are few double intersection Pratt truss bridges left in Michigan. This bridge was well preserved, and the only major restoration required was the replication of ten riveted floor beams. The Charlotte Highway Bridge will be the fifth historic bridge to be erected in the Calhoun County Historic Bridge Park. The assembly began October 17th, 2005. The 180-ft Charlotte Highway Bridge will span the entrance of the park.

The Charlotte Highway Bridge is being assembled with a gin pole that was developed by Frank Hatfield, P.E., Professor Emeritus, Civil and Environmental Engineering, Michigan State University, who also assisted in its fabrication. The gin pole is versatile and simple-to-use. A light-weight My-Te winch with a 2000 pound capacity is used to lift the bridge members.

Sara Hepburn, Wayne Conklin, Rob Denniston, and Judith Hepburn Blank with one of the original Charlotte Highway Bridge plaques.


Harmon Pease Hepburn

The Iron Trade Review March 12, 1914
"Death of H.P. Hepburn"
H. P. Hepburn, railroad builder and manufacturer, died March 4 at the home of his daughter, Mrs. R.K. Beach, in Cleveland. Many years ago, Mr. Hepburn was one of the owners of the Variety Iron Works Company, Cleveland. In 1893, when, as the result of the panic of that year, the Columbus Bridge Co., Columbus, O., became financially embarrassed, Mr. Hepburn was appointed receiver. At a later date, he organized the New Columbus Bridge Co., of which he was the principal owner, and conducted it until it was sold to the American Bridge Co.

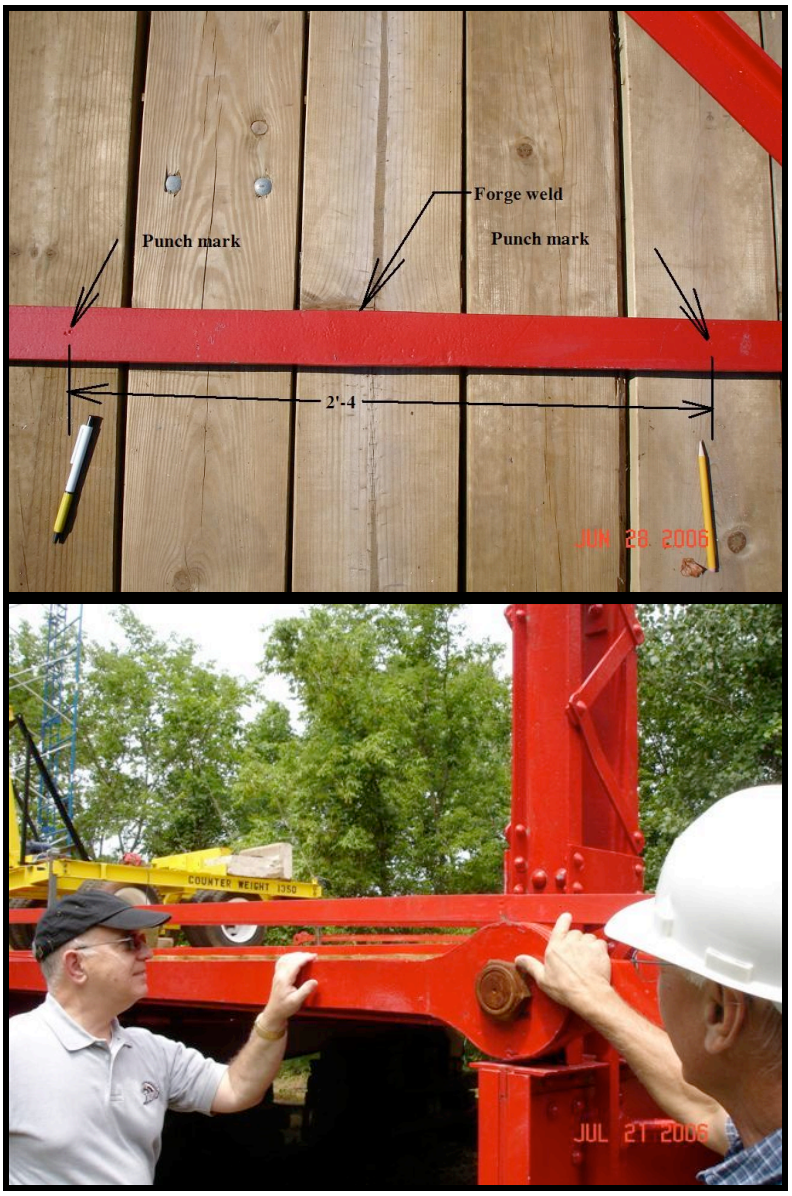
Mr. Hepburn built the Marion division of the Erie Railroad and the Jamestown and Franklin divisions of the Lake Shore. He was the engineer of construction of the first ore and coal docks built in Ashtabula, O. in the early 70's.

He was Mayor of Ashtabula in 1876, when the breaking of a Lake Shore railroad bridge causing a train to plunge into the river resulted in the death of 50 people. Mr. Hepburn's 80th birthday was celebrated by a spontaneous demonstration by the people of Ashtabula on August 16, 1913. when Mr. Hepburn happened to be visiting the city.

Last year Annette Chapman, RLA, Director, Calhoun County Department of Parks and Recreation, received an email from Judith Hepburn Blank who informed Ms Chapman she was the great grand daughter of H.P. Hepburn, the builder of the Charlotte Highway Bridge. We continued to keep in contact with her, and during our Living History Demonstration this year Judith Hepburn Blank and her sister Sara Hepburn attended.
They brought with them pictures of Harmon Pease Hepburn and his drafting tools.

Ms. Blank also provided us with a short biography of H.P. Hepburn from "The Iron Trade Review" (see excerpt below left).

As it turns out, H. P. Hepburn, the builder of the Charlotte Highway Bridge, was Mayor of Ashtabula, Ohio, and witness to an important event in engineering design and standards. On December 29, 1876 an all-iron Ashtabula railroad bridge collapsed. The bridge was designed by Amasa Stone, and his design methods led to its failure. In the article "Fall From Grace, Amasa Stone and the Ashtabula Bridge Collapse" by David A. Simmons, Editor of Timeline, a publication of the Ohio Historical Society, Mr. Simmons wrote: "The tragedy remained one of the worst American railroad disasters of the nineteenth century. A basic reference point for future engineers, the collapse marked the end of an era of technological experimentation and brought increasing standardization in its aftermath."



Dennis Randolph and Vern Mesler inspect forge welds and punch marks on the Charlotte Highway Bridge.

For more information about the Historic Bridge Park, please contact Annette Chapman, RLA, Director, Calhoun County Department of Parks and Recreation, 269-781-9841 or achapman@cccd.net

We are looking for new sources of funding for the Historic Bridge Park and in particular funding for historic bridge restoration workshops. Please contact Annette Chapman with your suggestions.

The diagonal eyebars for the Charlotte Highway Bridge are long and slender, averaging around 2 1/2 X 5/8" and over 40' in length. In moving the eyebars for assembly I noticed punch marks on the body of the eyebars and in between these punch marks were forge welds. You can detect a forge weld where there is a bulge in the material, or one of the two pieces that are joined is smaller, or hammer marks can be seen on the surface. It may be the fabricator was unable to purchase these 40' bars in stock lengths and had to forge weld three or four lengths of bar stock to obtain the 40' lengths. At first my thought was these punch marks were used by the fabricator in a final fit-up process of the eyebars. I mentioned these punch marks to Dennis Randolph during an office visit, and he thought they may be punch marks used in testing tension. The next day I inspected and measured most of the eyebars and found the dimension that remained consistent was the one with the forge weld in the center of the dimension, and it was either 2'4" on one set of eyebars or 2'-3 1/2 on other sets. Mr. Randolph's suggestion appeared to be the correct. I believe these punch marks were made after the forge welds were made and the eye bar completely fabricated. The eye bar was then placed in a tension machine and pulled to test the forge welded eye bar. If the dimension did not increase, the eye bar passed. I later found an article I'd copied from the Engineering News and American Railway Journal, July 14, 1892 that described testing of full size steel eye-bars and mentioned a powerful machine of the Phoenix Iron Co. that had been illustrated in the Jan. 10, 1891 issue. With the help of J. D. Jackson (Professor Emeritus, Physics Department, U. C. Berkeley), I was able to obtain a copy of the 1891 article. If these dimensional punch marks were used to detect elongation in these tension members and the dimensions are original it could suggest these eye bars did not stretch over their hundred and twenty year life.