

Conclusion

The following summary statements regarding structural characteristics for metal arch bridges, key periods of significance for metal arch bridges in Maryland, and the earliest known documented examples of metal arch bridges in the state are based solely on documentary research.

Metal arch bridges (see Figure 17 and Plate 12) consist of two (or more) parallel arches of iron or steel spanning between masonry or concrete piers or abutments. The arch member may be a curved girder or may include a truss system between curved top and bottom chords. Other components include lateral bracing, and columns or hangers for supporting the deck and floor system.

If the deck is suspended from the arch by means of vertical suspenders, the arch is termed a through arch. If the deck is carried atop the arch crown, the bridge is a deck arch structure. The deck may also be suspended or carried at various intermediate levels, allowing for half-through variants. If a tension member (or tie) is included between the ends of the span, the arch thrust is carried through this tie, and the bridge is a tied arch.

Arch bridges may also be grouped according to the degree of articulation of the arch. A fixed arch is a hingeless arch, but hinges may be included in the one-hinged variant (a single hinge at the top center, or crown, of the arch), the two-hinged variant (hinges at the points where the arch joins the abutments), and the three-hinged variant (hinges at crown of arch and at abutments).

As indicated by documentary research, key periods of significance for metal arch bridges in Maryland include *1870-1900*, during which time metal bowstring arch-truss bridges (pony spans as well as through bridges with overhead portals) were built within the state, and Charles Latrobe and Associates designed and constructed several major bowstring arches and deck arch bridges for the Jones' Falls Improvement Commission of the City of Baltimore and *1930-1960*, the period in which Baltimore City authorities built tied, three-hinged steel "Rainbow" arch bridges over the Jones Falls (1936, 1939), and the State Roads Commission constructed metal tied through arches at Chesapeake City (1948) and Cumberland (1955).

The earliest known examples of metal arch bridges in Maryland may be a group of bowstring arch pony truss bridges built on county roads in the state during the 1870s (several examples are known from prior surveys conducted in Frederick and Harford Counties). Field survey alone, however, can reveal whether these structures are primarily metal arch bridges, or pony trusses with arched upper chords, or a combination design. Other known significant examples of metal arch bridge design in Maryland include "Rainbow" arches (metal arch structures with

through bowstring arches featuring overhead bracing), built by Baltimore City and the State Roads Commission between 1930 and 1960.