

3.2.3 CONCRETE GIRDER

Historical Overview

The first reinforced concrete girder (beam) bridge was built in 1903 but the design was apparently never widely used for small structures. The State Roads Commission's Standard Plans of 1912 and 1919 specified the use of the girder for the largest of small structures, the 18-foot span. By 1924, the girder had been supplanted by the slab for small structures. Girders were recommended only for structures 20 feet and over. Like the Standard Plans for the slab, the girder plans included solid parapet rails in 1912 and a solid parapet rail with an incised rectangular design in 1919. Concrete girders are rarely, if ever, used for small structure construction today.

Description

In a small structure, a concrete girder is a span composed of a reinforced concrete slab combined with two or more stringers (girders). The stringers or girders are longitudinal structural members, usually rectangular in shape, that are installed under the bridge deck and support the deck between abutments (Figures 3.8 and 3.9). There are several types of girders. Perhaps the most commonly used on small structures is the T-beam girder, which has an integral slab and stringers.

The concrete girder was not widely used for small structures on Maryland's roadways but there are extant girders under 20 feet in length. Some examples are:

13067XO MD 144 over Branch of Middle Patuxent River, Howard County 1919
18-foot concrete girder with solid parapet rail, concrete wingwalls, 24-foot roadway. Resembles 1919 Standard Plan which specified an 18-foot girder structure. Parapet rail and roadway width are consistent with Standard Plans.

21095XO US 40 over Tributary of Potomac River, Washington County N.D.
14-foot concrete girder widened with box culvert in 1964. Unornamented solid parapet and wingwalls, 36-foot roadway width.

21096XO US 40 over Tributary of Potomac River, Washington County N.D.
11-foot concrete girder widened with box culvert in 1964. Unornamented solid parapet with modern guardrail attached to top, 24-foot roadway widened to 36 feet.

Tips for Dating Concrete Girder Small Structures

Most concrete girder small structures pre-date World War II. As stated above, after the adoption of the 1919 Standard Plans, girders were never again included as the standard design for small structures in the state's Standard Plans. A structure 18 feet in length with a 24-foot wide roadway and a solid parapet rail could be an example of a girder built according to the Standard Plans. Standard Plans for small, girder structures are in Appendix A, pages A-2 and A-5-6.)

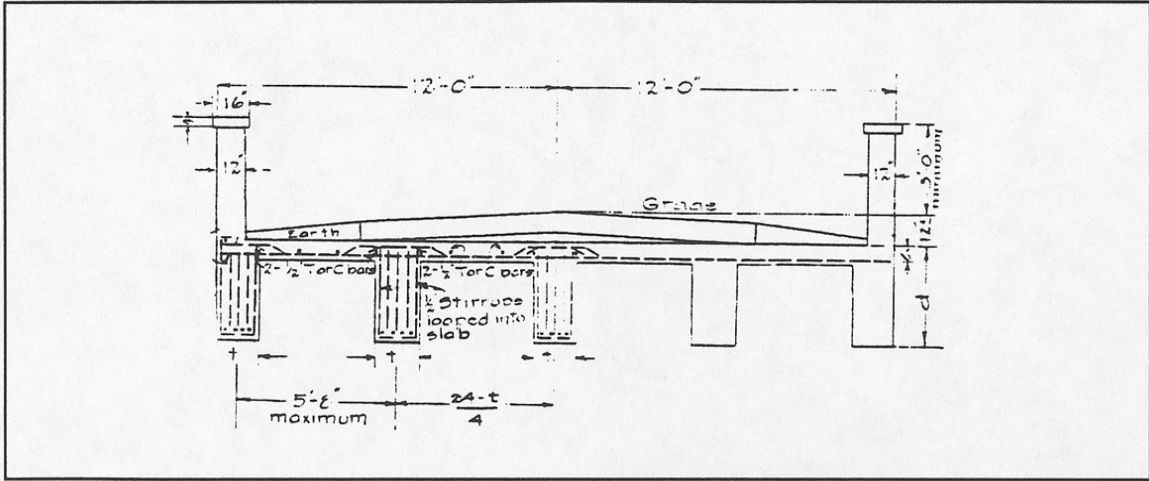


Figure 3.8. Girder Section from 1912 Standard Plans (Source: Maryland State Roads Commission 1912).

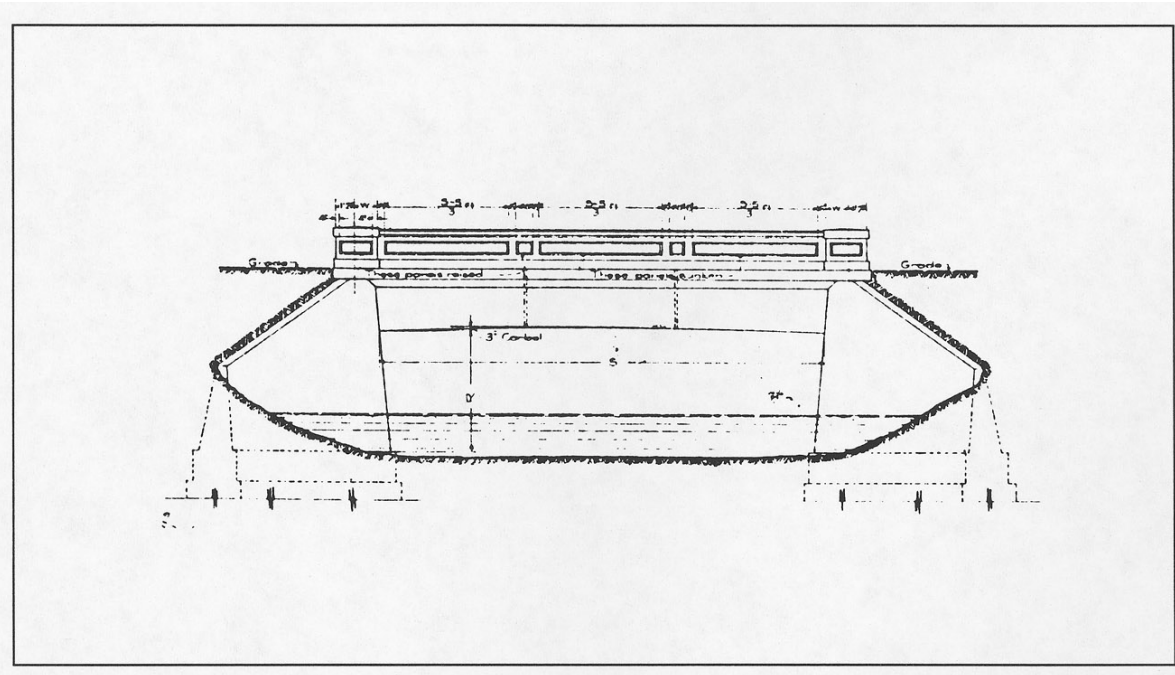


Figure 3.9. "Standard Girder Bridges, General Plan" from 1919 Standard Plans (Source: Maryland State Roads Commission 1919).