

3.2.1 CONCRETE SLAB

Historical Overview

It is not known when the first slab small structure was erected in Maryland, however, the first reinforced concrete bridge in the state dates to 1903. Consequently, small slab structures were most assuredly built in the first decade of the twentieth century. By 1912, the State included the reinforced concrete slab in their Standard Plans for structures from 6 feet to 16 feet in length. The 1912-15 Report of the State Roads Commission refers to the construction of three “small slab structures” for a cost of \$2,128.70 (Maryland State Roads Commission 1916: 59).

Between 1912 and World War II, the concrete slab was specified as Maryland’s standard structure type for small spans from 6 feet to 18 feet. Consequently, many of these small slab workhorse structures were built on the state’s roadways.

The early slab structures had solid parapet rails. The 1919 and 1924 Standard Plans showed incised rectangular design in the solid rail. The 1924-26 State Roads Commission Report mentions one small (9-foot) reinforced concrete slab structure (Maryland State Roads Commission 1927: 61). In 1928, an open balustrade was introduced in the Standard Plans and this type of rail design was continued in the Standard Plans issued in 1930 and in 1933.

The 1930 and 1933 Standard Plans for the slab bridge show horizontal scoring on the abutments and wingwalls. The 1937-38 Report of the State Roads Commission discussed the design of a number of small slab bridges of varying sizes in connection with replacement or reconstruction of existing highways (Maryland State Roads Commission 1939: 84). The Standard Plans were also available to the counties and municipalities for use on their roadways. It can be assumed the local governments took advantage of the offer of prepared plans in some instances, but in other cases they probably built site-specific simple slab structures that were not according to Standard Plans.

Description

As a small structure, the concrete slab is a single span, composed of a reinforced concrete “part”, commonly referred to as a slab, and generally constructed as a single unit (or less commonly as a series of narrow slabs) placed parallel with the roadway and spanning the space between the supporting abutments. The slab serves as the deck as well as the structural member carrying the stresses between abutments (Figures 3.4 and 3.5). Slab structures are generally fabricated and constructed on-site. Recommended for small structures up to about 20 feet, the slab structure was easily widened and relatively simple to construct. In the earliest phases of development of the slab structure, its use was confined to small structures.

Preliminary research indicates that many small slab structures built according to the Standard Plans are extant on Maryland’s roadways today. This same research indicates that many early slab structures have been altered by the addition of slabs or box culverts for widening and through the replacement of the original rails, abutments or wingwalls. Preliminary research also indicates that slab structures also remain on city and county roads; some appear to have been built according to the state’s Standard Plans.

Some examples of small slab structures on Maryland's roadways are:

15171XO MD 117 over Branch of Seneca Creek, Montgomery County N.D.
4.8-foot concrete slab, 9 feet wide, extended with 10-foot wide box culvert. No parapet, guardrail or wingwalls.

04019XO MD 262 over Chew Creek, Calvert County ca. 1924
19.5-foot concrete slab built according to 1924 Standard Plan for 18 foot slab. Three-paneled parapet rail is identical to Standard Plan, also 24-foot roadway width and other dimensions.

03344XO MD 25 over Black Rock Run, Baltimore County 1927
17.5-foot concrete slab built according to 1924 Standard Plan for 18-foot slab. Three-paneled parapet rail, 24-foot roadway and other dimensions are identical to Standard Plan.

10034XO MD 140 over Branch of Cattail Creek, Frederick County ca. 1930-40
6-foot concrete slab built according to 1930 Standard Plan for 6-foot slab. Open handrail is identical to Standard Plan as is horizontal scoring on wingwalls.

C0014 Stoakley Road over Mill Creek, Calvert County ca. 1930
15.5-foot concrete slab built according to 1930 Standard Plan for 16-foot slab bridge. Open handrail is identical to Standard Plan.

CE2007 Lombard Road in Cecil County 1931
concrete slab with solid parapet rail. According to builder's plaque, this structure was built by Cecil County in 1931.

Tips for Dating Concrete Slab Small Structures

There are numerous known concrete slab small structures on Maryland's roadways today. It is known that many small slab structures were constructed between the first decade of the twentieth century and the present. During the period 1912 to 1933, when Standard Plans were issued by the State, this may have been the most widely used small structure (along with pipes and box culverts) on the State Highway System. (Standard Plans for slab structures are in Appendix A, pages A-2, A-4, A-8-13, A-19-26, and A33-40.)

Two visible elements can assist in dating slab structures: the parapet/rail and the substructure (wingwalls, abutments). For example, the open rail design (Appendix A, A-15) was not introduced into the Standard Plans until 1928. Although an open rail may have been used prior to that time, it was rarely used before 1920. On the other hand, solid parapet rails with incised designs are also known to have been used on bridges dating after the introduction of the open rail in 1928. Another feature useful in dating slab structures is the horizontal scoring on the abutments and wingwalls that was introduced in the Standard Plans of 1930.

The width of the roadway can also be an indicator of construction dates. The standard width of state highways was 22 feet in 1912, 24 feet from 1919 to 1929 and 27 feet from 1930 to 1932; in the 1993 Standard Plans, the roadway width was increased to 30 feet.

Another indicator of age is the size and spacing of the reinforcing bars on a structure. If the bars are exposed, the dimensions can be compared to the Standard Plans.

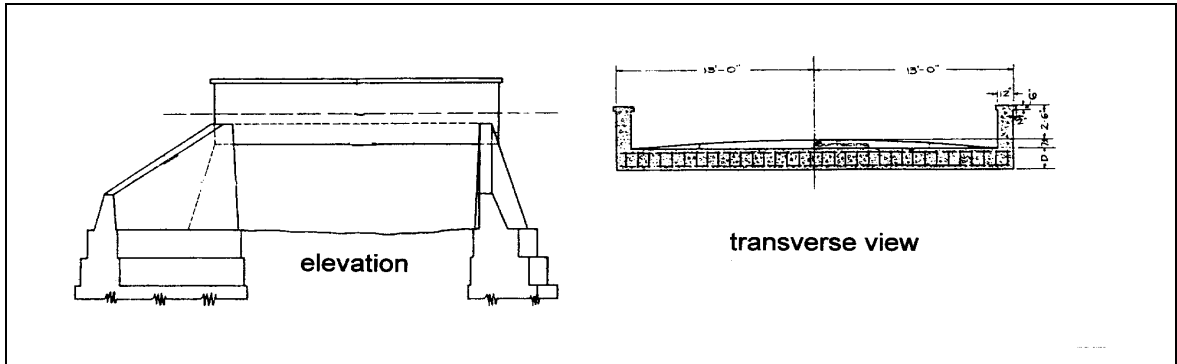


Figure 3.4. Elevation and transverse view of typical slab structure (Source: Maryland State Roads Commission, 1919 Standard Plans).

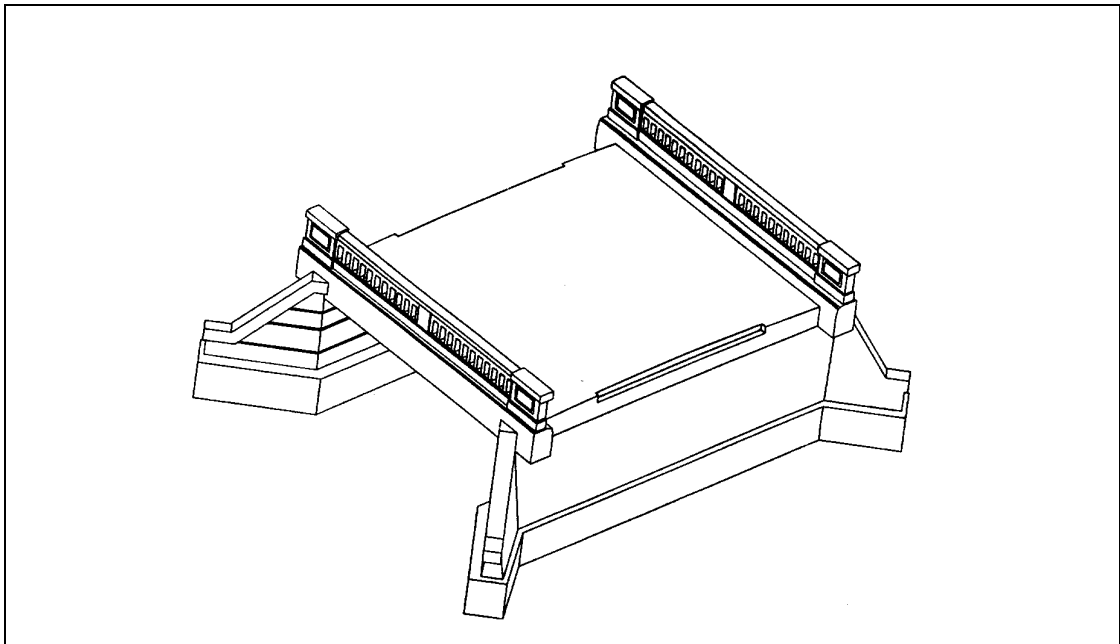


Figure 3.5. Isometric view of slab structure (Source: Maryland State Roads Commission, 1930 Standard Plans).