

## **Standardized Types: Concrete Slabs, Beams, Frames, and Culverts**

The versatility of reinforced concrete permitted development of a variety of economical bridges for use on roads crossing small streams and rivers. As the nation's automotive traffic increased in the early twentieth century, local road networks were consolidated and state highway departments were formed to supervise the construction and improvement of state roads. Many state highway departments were formed on the model of New York State, which in 1910, following the recommendations of a board of consulting engineers, divided the state into districts, each of which was the responsibility of a Resident Engineer (Maryland State Roads Commission 1916:8, 9). Without a stock of standard designs to rely upon when site conditions permitted, such decentralization could easily have led to chaos as the need for inexpensive, easily built and maintained small road bridges became more and more pressing.

The concept and practice of standardization was one of the most important developments in engineering of the twentieth century. Conceptually, standardization is the reduction of nearly infinite possibilities to a finite set of variables. In practice, it entails the replacement of the individually designed and crafted object by a set of interchangeable modules which can be combined in different ways to accommodate manifold requirements.

Two national organizations, the American Association of State Highway Officials (AASHO) and the U.S. Bureau of Public Roads, were very instrumental in bringing about standard specifications and designs in the early years of the twentieth century. Although the American Association of State Highway Officials' Subcommittee on Bridges and Structures was not formed until 1921, the Association directed attention in 1904 to developing standard specifications for reinforced concrete construction. The Subcommittee on Bridges and Structures first issued its standard specifications in 1925 and has continued to issue specifications on a regular basis through the present (American Association of State Highway Officials 1953a:103, 104). Providing a great impetus toward the development and adoption of standard designs, the U.S. Bureau of Public Roads was a federal agency which conducted extensive tests on bridge types and promulgated standard designs for concrete highway bridges from 1916 to 1931 (Armstrong 1976:115, 116).