

MODERN TRANSPORTATION IN MARYLAND, 1900-1960

The twentieth century continued the transformation of Maryland's transportation network by the forces of industrialization. While railroads such as the B&O and Northern Central were connecting more and more of the state to markets and supply centers, their major modern rivals, automobiles and trucks, effected a near-total, dramatic improvement of Maryland's highways and county roads. Under the aegis of the Maryland Geological Survey and the State Roads Commission, old roads were upgraded, numerous new roads and bridges were built, and scientific standardization of design and construction was no longer the province of the railroads only. From a technological perspective, the state agencies, and increasingly throughout the century, professional county engineering departments, introduced and popularized the building of modern bridge types such as reinforced concrete spans and steel truss bridges. By 1960, through arterial planning studies, beltway and expressway construction, statewide road surveys, and major special programs such as the 1938-1952 Primary Bridge Program, the state possessed a highway system able to convey freight from the Eastern Shore to western Maryland in little more than half a day.

State Aid and Creation of the State Roads Commission

The rapid development and spread of automobiles and trucks in the United States during the first decades of the twentieth century presented Maryland's road planners with the imperative necessity of upgrading the 13,118 miles of dirt roads in the state as of 1900. Only 1,365 miles of the road mileage total of 14,483 were already "improved" in any way; improved roads included 890 miles of stone-surfaced roads, 225 miles surfaced with gravel, and 250 miles of oyster shell roads. The stone-surfaced total encompassed 497 miles of operating turnpikes or toll roads, but 130 miles of former turnpikes had been abandoned by 1900. The remainder of 263 miles of stone roads constituted the state's entire total of route mileage surfaced with stone by the counties and Baltimore City (Leviness 1958:39).

As in the case of the B&O and other railroads, the strong scientific influence of professional engineering served to modernize Maryland's roads, with periodic legislative assistance from the General Assembly. Between 1898 and 1905, the Highway Division of the Maryland Geological Survey was headed by Arthur N. Johnson, later dean of the University of Maryland School of Engineering. Although it had fallen into considerable disrepair, Johnson lauded the old National Road for its carefully planned engineered avoidance of grades steeper than eight percent. The Geological Survey recommended passage of a state aid road law and creation of a professionally staffed state roads commission, a goal supported by many farmers who had seen demonstrations and models of properly surfaced

stone roads. The initial response to these concerns was the State Aid Act of 1904 (or Shoemaker Act). This act offered \$200,000 annually in state money for macadamizing county roads provided the counties gave matching funds and permitted state supervision of the work (Leviness 1958:46-47).

In 1908, Governor Austin Crothers, leader of the Good Roads movement in Maryland, persuaded the legislature to take the next significant step. Five million dollars was appropriated for state-sponsored improvement and construction of roads. A new State Roads Commission was formed, headed by former Baltimore County Chief Engineer Walter W. Crosby (Leviness 1958:55). Maryland's roadway modernizing efforts reflected the nationwide pattern; in 1905, only 14 states had highway departments (5 of these were founded in either 1904 or 1905), but by December 1914, when the American Association of State Highway Officials (AASHO) was founded, 33 states had set up highway commissions or divisions (Armstrong 1976:74-75). A strong incentive for formation of state highway agencies was soon provided by the landmark 1916 Federal Aid Road Act, which released United States government funds for state road construction and anticipated the growth of an interstate highway system (American Association of State Highway Officials 1953a:112).

In 1912, the State Roads Commission under prominent transportation engineer Henry G. Shirley instituted district engineer offices throughout Maryland (Leviness 1958). Another key move toward greater organizational efficiency within the Maryland State Roads Commission was taken between 1916 and 1919, when the state was divided into seven subdivisions, or "residencies of from two to six counties each, with a Resident Engineer living at a central point in each residency, responsible for all work therein" (Maryland State Roads Commission 1920b:15). The residencies were Cumberland, Frederick, Hyattsville, Baltimore City, Baltimore County, Chestertown, and Salisbury (Maryland State Roads Commission 1920b:15-16).

Road Improvements, 1900-1960

The Maryland State Roads Commission in its early years continued on the progressive path set by the Highway Division of the Maryland Geological Survey under Johnson, offering road design review services, state aid, and promotion of proper concrete bridge construction. Selection of a "state roads system," composed of about 1,300 miles of existing roads due for direct improvement by the state, was completed in 1909. By the end of 1911, starting with a one-mile section of road from Federalsburg to the Dorchester County line, the commission had built 168 miles of road, and an additional 176 miles was under construction (Leviness 1958:56). Between 1906 and 1915, the geological survey and the roads commission also completed the Baltimore-Washington Boulevard (Route 1), reconstructing and paving 30 miles of the old turnpike between the two cities. The

boulevard was later widened and further improved to handle heavy World War I and World War II traffic to such installations as Fort Meade (Leviness 1958).

Highway development in Maryland after the World War I era was characterized by increasing growth of the state-owned and state-aided systems, and highlighted by construction of notable through roads, parkways, and expressways by state or federal authorities. All private toll roads or turnpikes in the state were purchased by 1915 (Hollifield 1978), and the passage of the Federal Aid law in 1916 greatly benefited Maryland. Limited access, high-speed expressways in the United States were to a great extent pioneered by the Pennsylvania Turnpike, built in 1939-1940 as the first such route designed to carry a high volume of automotive and heavy trailer truck traffic (Pennsylvania Historical and Museum Commission, and Pennsylvania Department of Transportation 1986:5).

The Maryland State Roads Commission, and eventually individual counties led by the professionally staffed Baltimore County Roads Department, reacted to the 1930s advent of tractor-trailers by increasing the emphasis on proper, standardized design and construction of right-of-way structures including bridges and culverts. The following major highway projects were completed by the State Roads Commission, or by federal authorities, in cooperation with local officials, between 1910 and 1960 (lists compiled from all available sources):

Baltimore-Washington Boulevard (1906-1915; 1918-1919 rebuilding with concrete, including first American use of concrete shoulders; 1928-1930 widening and straightening).

Crain Highway, later U.S. 301 (1922-1927; first major new road constructed on entirely new location by the State Roads Commission).

State Route 416, Upper Marlboro to Sunderland (1920s; connected Washington with resorts in Calvert County).

Salisbury-Snow Hill Road, or State Route 12 (1920s).

Westminster-Mt. Airy Road, or State Route 27 (1920s).

Defense Highway, or U.S. 50, between Washington and Annapolis (1920-1926).

"Eastern Shore Boulevard," or parts of U.S. 50 and State Route 404 (linking ferry slip on bay at Mattapeake with Queenstown, Wye Mills, Hillsboro, and Denton; 1930s-1940s).

U.S. 40, or "new" Philadelphia Road (major 1930s project, Baltimore to Aberdeen, opened as Pulaski Highway).

U.S. 40 west of Baltimore to Frederick (1935-1940; dual lanes added 1955).

Annapolis Boulevard, or Ritchie Highway (1934-1938).

Access roads to wartime facilities (1940-1945; including Martin Boulevard, State Route 235 to Patuxent Naval Air Test Center, and numerous others).

John Hanson Highway, U.S. 50, Washington-Annapolis (1955 highway replacing Defense Highway of 1926).

Federally sponsored road construction in Maryland during the 1910-1960 period included a series of parkways notable for their significant design, and during the 1950s several important expressways and "beltways" around Washington and Baltimore, a recognition of the advancing suburbanization spurred by the family car near the area's biggest cities. In addition to wartime access routes, major federal highway or parkway projects of the early and middle twentieth century were the following (lists compiled from all available sources):

Rock Creek and Potomac Parkway (1920s-1935; first parkway system in Maryland directly influenced by Bronx River Parkway of 1923, pioneering parkway in the United States).

George Washington Memorial Parkway (1930s-1950s).

Suitland Parkway (partially opened 1942, primarily as wartime access route to communities in vicinity of Camp Springs (later Andrews) airfield).

Baltimore-Washington Parkway (opened 1954; section from near Jessup to Baltimore constructed by State Roads Commission).

I-70, Baltimore-Frederick (1956; extended and improved U.S. 40 as first project of Interstate Highway Act in Maryland).

I-270, Washington-Frederick (1957).

Baltimore Harbor Tunnel and approach routes (1957).

I-83, Baltimore-Harrisburg (1959; linked to Jones Falls Expressway in 1962).

Baltimore Beltway (1950s-1962).

I-95, John F. Kennedy Memorial Highway (1950s-1963).

Washington or Capital Beltway (1950s-1964).

These diverse twentieth century roadway improvements authorized by state and federal authorities were accompanied by the simultaneous professionalization of county roads and bridge administration in Maryland. Baltimore County's engineer, first appointed in 1901, pioneered in this respect, introducing the first reinforced concrete bridge built in Maryland (a 1903 structure carrying York Road over a stream near Cockeysville) and generally promoting construction of concrete bridges and scientifically designed roads (Johnson 1903:169). The 1929 annual report of the Baltimore County engineer proudly noted that no less than 742 "concrete bridges and culverts" had been built by the county since 1902, exclusive of a number of structures built with state aid during the period. How many of the 742 were replacements of earlier concrete spans is unknown (Baltimore County Roads Engineer 1929:68).

Metal truss bridges were still constructed in Maryland well into the twentieth century by the counties and the state (and by the still successful railroads), but reinforced concrete represented the leading edge of ordinary bridge design, and was incorporated into small spans as well as longer, sometimes movable, bridges over the rivers of the Eastern Shore (Maryland State Roads Commission 1912-1960). The trend toward standardization affected much twentieth century bridge building in the state during the 1900-1960 period, but consulting engineers were also often employed. Notable Maryland bridges designed by outside consultants and reported in annual reports of the State Roads Commission included important movable bridges (such as the 1916 Hanover Street Bridge) and the three monumental structures built to cross Maryland's major water bodies between 1940 and 1952. These high, imposing spans—the Thomas J. Hatem Memorial Bridge over the Susquehanna at Havre de Grace (1940), the Governor Harry W. Nice Memorial Bridge carrying U.S. 301 over the Potomac (1940), and the first Chesapeake Bay Bridge (1949-1952)—required consulting engineering design and construction management and rank as significant historic, though fairly recent, bridges in Maryland (J.E. Greiner Company 1938).

Bridge Standardization and Roadway Planning Studies

Two additional characteristic aspects of the growth of Maryland's modern transportation system in the twentieth century have been the development of standardized bridge plans for commonly needed reinforced concrete structures, and the reliance on roadway planning studies, often performed by government agencies or prominent outside consultants. A concise discussion of these two trends, as seen in Maryland between 1900 and 1960, provides greater

understanding of the abundance of small, twentieth century concrete bridges found on Maryland's highways.

In the United States, the use of standard plans for structures such as bridges was pioneered by the railroads during the nineteenth century. By 1900, bridge engineers like Henry G. Tyrrell and J.A.L. Waddell realized that the Good Roads movement and the concurrent automotive revolution would require construction or reconstruction of a large number of ordinary highway bridges. Tyrrell, Waddell, and such writers as Milo S. Ketchum included such plans in their textbooks (Ketchum 1908, 1920; Tyrrell 1911; Waddell 1916), while the U.S. Bureau of Public Roads, the American Association of State Highway Officials (AASHO), and the American Society of Civil Engineers (ASCE) promoted standardization as a cost-saving alternative for county and municipal engineering departments (American Association of State Highway Officials 1953a:103-106; Armstrong 1976:71-85).

The Baltimore County engineer's office, which in 1901 began to construct concrete bridges and culverts, may have led Maryland in joining the movement toward standardization. The earliest standardized bridge plans drafted by the State Roads Commission date to 1909, and offer designs and specifications for a variety of reinforced concrete beam, slab, and girder bridges. In 1912, 1919, 1920, 1924, 1930, and 1933, the State Roads Commission prepared a full series of standard plans and specifications for concrete culverts and bridges ranging from a mere 6 feet in length to 42 feet (Maryland State Roads Commission, Standard Plans 1909, 1912b, 1919, 1920b, 1930b, 1933).

Such plans, used in conjunction with other standardized handbooks such as the June 1931 *Specifications and Contracts for Highway Bridges and Incidental Structures* and the 1932 *Field Manual for Bridge Inspectors* (both issued by the State Roads Commission), offered much guidance to the state's road and bridge builders in the modern era (Maryland State Roads Commission 1932, 1934). Although standardization was encouraged for straightforward crossings without special circumstances, many non-standardized bridges continued to be built. These included the state-built movable bridges on the Eastern Shore and the high concrete ribbed arches erected in Baltimore City between 1910 and 1930. Additionally, certain bridge building firms specialized in reinforced concrete construction, and offered patented designs of their own. This twentieth century trend is illustrated by an array of graceful concrete arch county bridges designed by Daniel B. Luten's significant bridge building company.

Luten's arches, as well as major concrete arch spans in Baltimore City (Clifton Avenue Bridge and Edmondson Avenue Bridge, for example), were greatly influenced by the City Beautiful movement of the early twentieth century, led by civic planners and architects who advocated construction of aesthetically pleasing public structures such as playgrounds, parks, and railroad stations. City Beautiful planners designed municipal plans featuring wide avenues or boulevards, with broad vistas

and an expansive or monumental feel. Open spandrel ribbed arches and simply ornamented concrete bridges were typically chosen for crossings on such boulevards (33rd Street and Loch Raven Boulevard are Baltimore City examples).

Standardization went hand in hand with the rise of roadway planning in Maryland, which also affected patterns of bridge building in the state between 1900 and 1960. The Olmsted Brothers studied park roads for Baltimore and Washington, D.C., between 1900 and 1920 (Olmsted Brothers 1904). Long-range highway survey and planning was aided during the Depression by President Franklin D. Roosevelt's Department of Agriculture, where the Bureau of Public Roads provided funding and personnel for statewide surveys of roads and right-of-way structures (Armstrong 1976:84-85). Reacting to a half century of fatal accidents, federal legislation of 1934 mandated a complete nationwide study of all railroad grade crossings where railroad tracks intersected roads directly at grade. Maryland responded with the January 1935 report *Railroad Grade Crossings in the State of Maryland*, which found a total of 921 such crossings and recommended their elimination via construction of overpasses or underpasses (Maryland State Roads Commission 1935:12). Many such grade crossing elimination structures remain in service on Maryland's roads and railroads.

Other significant state planning studies of the 1930s included the 1935 *Ten-Year Highway Construction Program* report prepared by the Maryland State Planning Commission; the 1937 *Report of the Highway Advisory Committee* (which recommended sweeping additions to the main arterial system of Maryland); the 1938 *Preliminary Report of the Statewide Highway Planning Survey* (the most comprehensive and accurate survey undertaken since the 1899 Maryland Geological Survey report on Maryland highways); and the 1938 detailed Greiner report on Maryland's "Primary Bridge Program," which laid out plans for construction of the Bay Bridge and the long-span Susquehanna and Potomac bridges, and summarized debate (bridge versus tunnel) over what became the Greiner-built Baltimore Harbor Tunnel in 1957 (J.E. Greiner Company 1938; Maryland State Highway Advisory Committee 1937; Maryland State Planning Commission 1935; Maryland State Roads Commission 1938).

Congenial to transportation management and financial goals, the planning approach continued to affect Maryland road and bridge building between 1940 and 1960, with the 1950s witnessing a plethora of long-range forecasts, feasibility studies, and engineering evaluations by prominent consultants including many by Baltimore-based J.E. Greiner Company. Among the more significant planning studies and surveys, constituting benchmarks in the twentieth century development of Maryland's road system, were the 1940 projection study *Maryland Highway Needs, 1941-1960*, which recommended a 26-foot width or more for all rural bridges (but underestimated the coming impact of suburbanization on highway design before 1960); the 1944 Robert Moses study of Baltimore City's arterial routes; the 1952 *Proposed Twelve-Year Program for Road Construction and Reconstruction, 1954-1965* and the Public Administration Service's 1952

Maryland's Highways: A Report on an Administrative Survey (Maryland State Roads Commission 1940a, 1952a; Public Service Administration Service 1952).

The twentieth century spread of standardized designs, and especially the issuance of highway planning studies, marked the practical end of Maryland's traditional system of individual road and bridge petitions and "viewing" of bridge sites by citizens appointed by the county commissioners or courts. Gradually, during the period between the 1930s and the 1950s, the planning concept was built into county and municipal road construction. The old nineteenth century railroads and canals were succeeded by a vastly improved highway network, although the economically useful B&O Railroad and C&D Canal persisted with improvements beyond 1960 (Callcott 1985:39-40, 66-68).