

# 100th Anniversary - An Evolving Partnership

Series: FHWA Highway History Website Articles

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## Public Roads - September/October 2014

**Date:** September/October 2014

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## Celebrating A Century of Cooperation

by Richard F. Weingroff

*In honor of AASHTO's 100th anniversary, FHWA examines the historic State-Federal partnership that transformed U.S. transportation. A two-part series starts here.*



Here is where it all started 100 years ago, when State highway officials met on December 12, 1914, in the Raleigh Hotel (to the immediate left of the Capitol) to found the American Association of State Highway Officials (AASHO), the original name of the American Association of State Highway and Transportation Officials (AASHTO). The hotel was on the northeast corner of Pennsylvania Avenue and 12th Street, NW, in Washington, DC. The hotel building was torn down in 1964 and replaced with a 14-story office building at 1111 Pennsylvania Avenue.

On December 12, 2014, the American Association of

State Highway and Transportation Officials (AASHTO) will be 100 years old. Since 1914, the association has helped shape highway legislation, policy, and standards to build the U.S. transportation network. Born in the good roads era of the early 20<sup>th</sup> century, AASHTO plays a vital role in the multimodal 21<sup>st</sup> century.



**When State highway officials decided to form an association, they consulted Logan W. Page. He was the director of the U.S. Office of Public Roads, the precursor of the Federal Highway Administration. Page suggested restricting the group to top officials “...thus making the organization strictly official and enabling full and frank consideration of questions....”**

Despite its outsized impacts, AASHTO is little known outside of the transportation community. Even within that community, AASHTO's origins and accomplishments are far from common knowledge. Yet, at 100 years old, AASHTO continues its historic impact on the daily life of every U.S. citizen.

## How It Started

Beginning in the late 19th century, private associations took the lead in promoting good roads. After its founding in 1880, the League of American Wheelmen was a leading advocate. Its successes included convincing Congress to appropriate \$10,000 that the U.S. Department of Agriculture used to launch the U.S. Office of Road Inquiry on October 3, 1893. As the first incarnation of the Federal Highway Administration (FHWA), the office's mission was "to make investigations in regard to the best methods of road-making."

The American Automobile Association (AAA, 1902), the American Road Makers (1902, later the American Road Builders Association), and many good roads associations in individual States were among the early leaders. By the mid-1910s, many associations had identified roads, given them names such as the Lincoln Highway (New York City to San Francisco) and the National Old Trails Road (Baltimore to Los Angeles), and encouraged their improvement and use.



Photo courtesy of AASHTO

**The founding fathers of AASHO sat for a portrait during the organizational meeting on December 12, 1914. First row (seated, left to right): Lamar Cobb (AZ), Henry G. Shirley (MD, AASHO's first president), Joseph Hyde Pratt (NC), and P. St. J. Wilson (assistant director, OPR). Second row (seated): R. C. Terrell (KY), W. E. Keller (AL), George P. Coleman (VA), E. A. Stevens (NJ), Paul D. Sargent (ME), James R. Marker**

**(OH). Back row (standing): Logan W. Page (director, OPR), A. D. Williams (WV), Signey Suggs (OK), George A. Ricker (NY), Charles M. Kerr (LA), T. Warren Allen (NY), James H. MacDonald (CT), Senator John Craf (AL), W. D. Sohier (MA), S. Percy Hooker (NH), J. E. Pennypacker (OPR), S. E. Bradt (IL).**

In 1910, Logan W. Page, director of the U.S. Office of Public Roads (OPR, formerly the U.S. Office of Road Inquiry), created the American Association for Highway Improvement (renamed the American Highway Association in 1912). He saw the organization as an umbrella group representing the entire highway community, including good roads associations, railroads, equipment manufacturers, and the highway agencies — at that time, few in number — established by State governments.

State highway officials, however, believed that they needed their own organization. Page approached Commissioner of Highways George P. Coleman of Virginia to suggest limiting the new group to the heads of State highway agencies and their immediate staff, “. . . thus making the organization strictly official and enabling full and frank consideration of questions, particularly those of a technical character untrammelled by commercialism or popular prejudices.”

On December 12, 1914, at the Raleigh Hotel in Washington, DC, highway officials representing 16 States formed the American Association of State Highway Officials (AASHO), with Page and two of his top officials in attendance. The participants selected Henry G. Shirley, chief engineer of the Maryland State Roads Commission, to be president of AASHO, a post he held for two terms (1914–1915 and 1915–1916).



Photo courtesy of AASHTO

**AASHO's founding fathers met with President Woodrow Wilson at the White House on December 12, 1914, then posed for a commemorative photograph. First row (left to right): John Craft (AL), F. M. Kerr (LA), R. C. Terrell (KY), Henry G. Shirley (MD, AASHO's first president), W. S. Keller (AL), A. D. Williams (WV), and James H. MacDonald (CT). Second row: James R. Marker (OH), P. St. J. Wilson (assistant director, OPR), Logan W. Page (director, OPR), S. Percy Hooker (NH), George P. Coleman (VA), Sidney Suggs (OK), S. E. Bradt (IL), and E.A. Stevens (NJ). Back row: Joseph Hyde Pratt (NC), Lamar Cobb (AZ), W. D. Sohier (MA), and George A. Ricker (NY).**

Afterwards, Page and AASHO's founders visited the White House to meet President Woodrow Wilson, an avid motorist. Back at the Raleigh, the members instructed their executive committee to prepare a highway bill representing AASHO's plan for Federal cooperation and to present it to Congress.

With the founding of AASHO, all of the pieces were in place to create the Federal-aid highway program.

### **Federal Aid Road Act of 1916**

The executive committee, dominated by members from heavily populated States with well-developed highway networks, collaborated with AAA's A. G. Batchelder on a bill supporting a national system of highways. AASHO members from States with less developed networks objected to the plan and to the fact that they had not been consulted before it was



submitted to Congress.

## The Purpose of AASHO

From the AASHO constitution adopted December 12, 1914: "The purpose for which the association is organized and for which it shall be perpetuated is to 'study the various materials, methods of construction and maintenance, and other highway problems of the United States; to exchange ideas; to promote a closer relationship between State highway departments with a view of establishing uniform system of administration, construction and maintenance, and legislation for the purpose of conserving the capital invested in highway construction and maintenance by producing the highest possible efficiency; and to cooperate in every way possible with the United States Office of Public Roads or similar Federal organization in the consideration of road problems.'"

To settle the dispute, an AASHO committee met on September 11, 1915, in Oakland, CA, just before a conference of the Pan-American Road Congress sponsored by the American Highway Association and the American Road Builders Association. The committee consisted of Chairman George P. Coleman, VA; W. D. Sohler, MA; E. A. Stevens, NJ; Lamar Cobb, AZ; Joseph Hyde Pratt, NC; James R. Marker, OH; Henry G. Shirley, MD; and Thomas H. MacDonald, IA.

With MacDonald representing Page's views in his absence, the committee drafted a Federal-aid bill that provided for Federal funds to be apportioned among the States for improvement of



"Rural Post Roads, Military Roads, and Roads used for interstate commerce." To be eligible for these Federal-aid funds, a State would have to establish a highway agency capable of carrying out the provisions of the law. The State highway agency would select projects, provided the cost did not exceed \$10,000 per

mile, and develop them. The State agency would be responsible for maintenance of the projects, subject to oversight by the Office of Public Roads. After reviewing the text during its second annual meeting in December 1915, AASHO forwarded the bill to Congress, where it was referred to the Committee on Post Offices and Post Roads headed by Senator John H. Bankhead (D-AL).

The House of Representatives had passed a different bill in January 1916, sponsored by Representative Dorsey W. Shackleford (D-MO), chairman of the House Committee on Roads, and forwarded it to the Senate for action. Chairman Bankhead strengthened the AASHO bill based on Page's advice and substituted it for the Shackleford bill. On May 8, the Senate approved the Bankhead bill, with some amendments, notably adding a section appropriating funds (\$1 million a year for 10 years) for National Forest roads and trails.

A House-Senate conference committee reported a combined bill, with the Senate version, based on the AASHO bill, largely intact. The House and Senate approved the Federal Aid Road Act of 1916 on June 27.

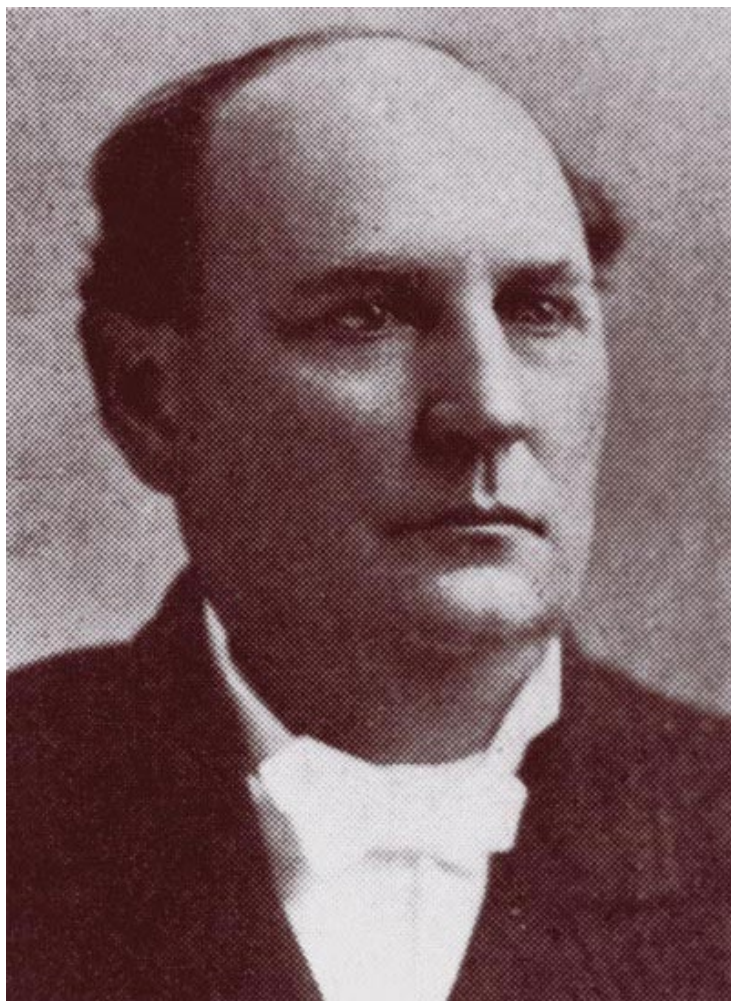
About 2 weeks later, on July 11, President Wilson signed the bill in a White House ceremony attended by members of Congress and representatives of AAA, AASHO, and farmers organizations. He told them: "I take a great deal of pleasure in signing this bill . . . particularly because it tends to thread the various parts of the country together and assists the farmer in his intercourse with others."

To the dismay of AASHO officials, President Wilson gave the pen he used to sign the bill to AAA, which had supported the earlier bill, instead of AASHO, which had essentially drafted the approved bill.

### **Implementing the New Program**

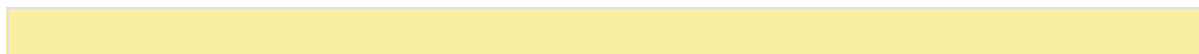
The Office of Public Roads and Rural Engineering, as the Office of Public Roads was called by 1916, began work on a set of regulations. Page invited the heads of

the State highway agencies to review the regulations during a conference in Washington, DC, on August 16.



**U.S. Senator John H. Bankhead of Alabama, chairman of the Committee on Post Office and Post Roads, introduced AASHO's Federal-aid highway bill, which was the basis for the landmark Federal Aid Road Act of 1916. When he died on March 1, 1920, he was the Senate's last survivor of the Civil War.**

The night before, AASHO President Shirley met with State highway officials at the Raleigh Hotel to review the draft and agree on recommendations for revisions. This gathering was also attended by officials from the Office of Public Roads and Rural Engineering.



## The Partnership

Thomas H. MacDonald, chief of the Bureau of Public Roads (formerly the Office of Public Roads), addressed AASHO in November 1944, for the association's 30th anniversary. Of the Federal-aid highway program, he said: "Its success as a policy has depended upon a clear recognition of the predominant State interest and a voluntary restraint of the Federal power within limits defined by the partial interstate concern. Its conspicuously beneficial results have been achieved through a balanced partnership of the executive ability of efficient State highway departments and the capacity of a Federal organization, trained by long experience to observe the trend of changing needs and propose accordant change of policy."

The following day, Page began the conference with representatives from 35 States. Page said his intent was to cooperate with the States as far as practical. Inevitably, he said, a number of points would have to be straightened out. That was why he had invited the States to help craft the rules for the new program.

Secretary of Agriculture David F. Houston also addressed the group, stressing the cooperative principle. His main concern was "whether we shall get a dollar's result for every dollar we expend for roads." If people believe the partners had done so, "they will be willing to put much more money into good roads where they are needed." He pledged that the department would "cooperate heartily with you to give the people of the Nation full value for the money which they have pledged under this act."



When President Woodrow Wilson signed the Federal Aid Road Act on July 11, 1916, *Dependable Highways* magazine published this celebratory display.

Page closed out the plenary session by urging the States to seek Federal aid for the most important roads carrying the greatest loads of farm products and manufactured goods. If the roads selected were too widely scattered, authorities would have a hard time inspecting and maintaining them.





**In September 1916, Secretary of Agriculture David F. Houston (1913–1920) told State highway officials that his main concern about the new Federal-aid highway program was “whether we shall get a dollar’s result for every dollar we expend for roads.”**

In the afternoon, officials from States with forest reserves met with the Forest Service to discuss funds for forest roads.

Page incorporated most of the State highway officials’ recommendations in the final regulations, issued on September 1.

### **Selecting the Chief**

With the program barely underway, the country entered the European war in April 1917. By war’s end

in November 1918, the Federal-aid highway program had little to show for the effort that had gone into its creation. *America's Highways 1776–1976*, FHWA's bicentennial history, summarized the war's impact: "By July 1918, the [Office of Public Roads and Rural Engineering] had approved 572 projects, totaling 6,249 miles [10,057 kilometers] in length, estimated to cost \$42.28 million, of which \$16.05 million was Federal aid. However, only five projects, totaling 17.6 miles [28.3 kilometers], had actually been completed."

Aside from the difficulties of construction during wartime, flaws in the program were clear. The restriction to "rural post roads" often eliminated main highways because the postal service used railroads for long-distance transport of mail. The more populous States found the limitation of \$10,000 per mile burdensome. Moreover, the cooperative spirit had been dampened by the Bureau of Public Roads' (the office was elevated to bureau status in mid-1918) heavy-handed review of State plans. As 1918 came to an end, Page sought support for a rewording that he had prepared, with AASHO's backing, to strengthen the program.





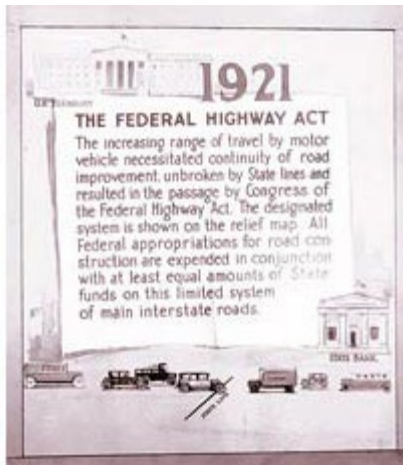
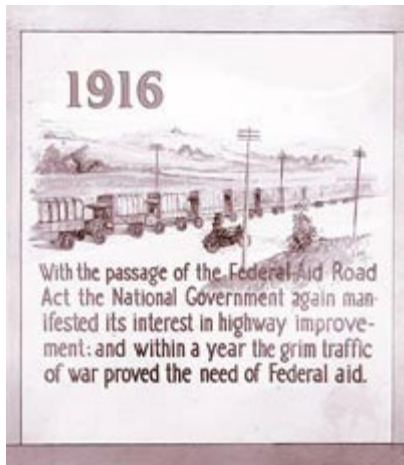
**The first completed Federal-aid highway project was in Contra Costa County, CA, where it went from Albany to Richmond. (See map, above.) Work on the 2.55-mile (4.1-kilometer) project began on September 1, 1916, and was completed on January 30, 1918. The agency artist, Carl Rakeman, painted this image commemorating the first Federal-aid highway project.**

These flaws had encouraged supporters of Federal construction of long-distance roads. On December 11–12, 1918, AASHO participated in a Joint Highway Congress in Chicago with supporters of Federal construction. Page was scheduled to speak on “Highway Control by the Federal Government Under War Conditions.” However, while attending a preliminary meeting of AASHO’s executive committee 2 days earlier, he became ill and died a few hours later.

During the congress, AASHO’s Federal-aid supporters were outnumbered by representatives of AAA, the National Automobile Chamber of Commerce, the trucking industry, and urban interests. The Joint Highway Congress approved creation of a Federal highway commission to build and maintain a national highway system of 50,000 miles (80,000 kilometers) consisting of 5 east-west routes and 10 north-south routes. The system would pass through every State and could be built, according to supporters, in 12 to 13 years at a cost of \$100 million annually. Meeting separately from the Joint Highway Congress, AASHO



voted to support the Federal-aid plan.



**In the 1920s, the Bureau of Public Roads prepared panels on highway history for display at road conventions. These two images conveyed the importance of the 1916 and 1921 highway acts.**

As Secretary Houston searched for Page's successor, AASHO recommended Thomas H. MacDonald to head the Bureau of Public Roads (BPR), as the agency was now called. MacDonald was interested, but hesitated because his salary would be the same as in Iowa, \$4,500 a year. After it became clear that Congress would approve a salary of \$6,000 a year, MacDonald wanted one last assurance. He wanted the authority to make changes to address any potential

criticisms by the States. MacDonald's changes included decentralization of responsibilities to BPR's district engineers; increased salaries for the district engineers to retain their services; adoption of the "most liberal policy possible" in interpreting existing laws to get construction underway rapidly; and provision for an advisory committee, to be selected by AASHO, to help improve Federal-State relations.

After agreeing to these provisions, Secretary Houston appointed MacDonald on April 1, 1919, to be "engineer in immediate charge of the work under the Federal-aid road act." When the salary of \$6,000 was confirmed, MacDonald became chief of the Bureau on July 1, 1919.

Contrasting Page and MacDonald, Professor Bruce E. Seely, dean of the College of Sciences and Arts at Michigan Technological University, says, "If Page, with his laboratory background and moral crusader's outlook, had been the perfect choice to head the [Office of Public Roads] in 1905, MacDonald brought traits that were equally well suited for running the [Bureau of Public Roads] in 1919. His years in a State highway department gave him the insights essential for managing a cooperative Federal-aid program."



**Illustrating the need for a national road program, this "horseless carriage" required help from two four-footed friends to move forward on this muddy road along Chopawamsic Creek near Dumfries, VA, in 1917.**

During AASHO's fifth annual meeting in December 1919, MacDonald addressed the organization for the first time as chief. After discussing highway needs, he summarized the relationship between AASHO and the Bureau of Public Roads: "There is now comprised in the 48 State highway departments and the Federal department a very large proportion of the engineers of this country who have had actual highway experience, and these agencies can, through cooperation, provide the most effective administrative organization that it is possible to devise."

The man AASHO had recommended would remain head of the BPR through March 1953. His title and the agency name would change several times, but he would retain the nickname "The Chief."

### **Launching the Golden Age**

Advocates of long-distance roads had dominated the Joint Highway Congress, but Senator Bankhead undermined their efforts by introducing a key change in the 1916 Federal Aid Road Act. When President Wilson approved the Post Office Appropriation Bill for 1920 on February 28, 1919, it included Bankhead's new definition of "rural post road" as "any public road a major portion of which is now used, or can be used, or forms a connecting link not to exceed 10 miles [16 kilometers] in length of any road or roads now or hereafter used for the transportation of the United States mails." The change tipped the balance in favor of the Federal-aid concept. By expanding eligibility to include roads that "can be used" by the postal service, the change incorporated long-distance roads and undermined advocates for construction of a national road network by the Federal Government.



**When Director Logan W. Page of the Office of Public Roads died in December 1918, AASHO recommended Iowa's Thomas H. MacDonald to be the new head of the agency. MacDonald would head the agency for 34 years, from 1919 to 1953.**

With reauthorization of the Federal-aid highway program due in 1921, MacDonald met with several of his fellow members of AASHO's executive committee to find ways to strengthen the Federal-aid program. Their proposal also reached out to supporters of a national highway system by limiting Federal funds to use on 7 percent of the Nation's roads, three-sevenths of which must be "interstate in character." Up to 60 percent of the funds could be expended on this fraction.

## Thomas H. MacDonald Memorial Award

Thomas H. MacDonald, the dominant figure in 20<sup>th</sup> century highway development, left office at the end of March 1953 after 34 years as the head of the Federal road agency. He moved to College Station, TX, where he worked part time to help Texas A&M University, in collaboration with the Texas highway department, develop a transportation institute, now called the Texas A&M Transportation Institute.

On April 7, 1957, MacDonald died of a heart attack. He had spent the evening with his family and his friend and associate, Dewitt C. Greer, Texas State highway engineer. Greer described the end: MacDonald “walked over to the cigar counter after a very pleasant dinner with his family and friends and bought a cigar, sat down on a comfortable divan, and passed away.”

Later that year, AASHO established the Thomas H. MacDonald Memorial Award to be given each year to a person who had rendered outstanding service in highway engineering. On November 18, 1957, AASHO presented the first award to Herbert S. Fairbank, MacDonald’s long-time aide.

Support for national highways remained strong but was overwhelmed in Congress by Federal-aid supporters who favored the AASHO bill. President Warren Harding signed the Federal Highway Act of 1921 on November 9. Its limitation of funds to a system of roads remains central to the Federal-aid highway program in the 21<sup>st</sup> century.

During AASHO’s annual meeting in December 1921, MacDonald spoke of designating the Federal-aid system: “Here is an opportunity to do a big, basic work, such as comes to few in the course of a lifetime . . . The individual who fails to vision the importance of the task has no moral right to hold a position of authority in its performance.”

The 1921 Act launched what highway officials often referred to as the golden age of road building, as they began construction of a network of paved two-lane roads connecting States — that is, a highway network that would be “interstate” in nature.

### **Building the State-Federal Partnership**

MacDonald nurtured the State-Federal partnership

throughout his long tenure. He did not want to impose requirements, preferring to have them emerge from a cooperative process. He remained on AASHO's executive committee; in 1919, the Bureau of Public Roads became a "member department" of AASHO. Officials of the Federal bureau chaired AASHO committees through the 1940s, until AASHO adopted a policy that each committee should be headed by a State official, with officials from the Bureau of Public Roads serving as secretaries. (Based on a 1957 change in AASHO's constitution, the bureau became an ex officio member.) In addition, MacDonald retained the Federal-State partnership that AASHO conceived as primary author of the Federal Aid Road Act of 1916.

As a member of the executive committee, MacDonald worked with AASHO to develop legislative proposals for submission to Congress. Professor Seely describes the process: "One important role that . . . AASHO assumed after 1921 was preparation of the biennial Federal-aid bill for Congress. The association prided itself on this function — until 1943 every proposal was accepted — arguing that it 'has never lobbied for an action, but has only expressed opinions and given information upon invitation or request, which has been frequent. The association, through this process, has enjoyed immense prestige and respect on Capitol Hill and many times the executive secretary has been asked to submit legislative language for consideration.'"

### **U.S. Numbered Highway System**

The Nation's interstate roads were known by names, such as the Lincoln Highway, applied by private booster groups. Because of the jumble of more than 200 names, often on overlapping routes, motorists faced the double challenge of the roads themselves and determining which ones to use.





The Joint Board on Interstate Highways, formed at AASHO's request, created the U.S. numbered highway plan as shown in this November 1925 map. The route from Chicago to Los Angeles, for example, was numbered U.S. 60. In November 1926, AASHO approved the new numbering plan, but assigned a different number to one of the most famous highways in the country: U.S. 66.

In 1925, AASHO asked Secretary of Agriculture Howard M. Gore to help find a better way to identify the country's main roads. Gore designated a Joint Board on Interstate Highways consisting of three officials from the Bureau of Public Roads (including MacDonald and E. W. James, who would be the guiding spirit of the enterprise) and 21 State highway officials. As AASHO's outgoing president, Fred R. White of Iowa, said, "As soon as the purpose and work of the proposed board shall become known, the infernal regions will begin popping."

During its initial meeting in April, the joint board conceived the U.S. numbered highway system. In addition, Frank F. Rogers, Michigan's commissioner of highways, doodled the design for a highway marker based on the United States shield, and it became the model for the U.S. sign that the joint board adopted.

During that summer, the joint board held regional conferences to identify the interstate routes to be included. As word of the joint board's work became public, cities of all sizes and the named trail

associations began fighting for inclusion on a U.S. highway. Each trail association wanted its route to retain a single identity.

Before reporting to the new Secretary of Agriculture, William Jardine, on October 30, 1925, the joint board confirmed routes totaling 75,884 miles (122,123 kilometers), a numbering plan, and signs that included not only the U.S. route shield, but signs for STOP, CURVE, SLOW, railroad crossings, speed limits, and other directives. They adopted a unique shape for each sign so motorists who could not read would be able to identify their intent.

Because the States owned and operated the roads, Secretary Jardine asked MacDonald to submit the report to AASHO for consideration and adoption.

Now it was AASHO's turn to experience the popping of the "Infernal regions." The executive committee was flooded by requests and protests. In cooperation with MacDonald and James, AASHO acted on 142 requests, extending the U.S. numbered system to 96,626 miles (155,504 kilometers). AASHO approved the U.S. numbered highway system and associated signs on November 11, 1926.

Some commentators did not like the idea. One critic suggested that if numbering U.S. highways was such a great idea, why not also number rivers, mountains, cities, and Presidents.

Critics notwithstanding, the U.S. numbered highway system and the U.S. shield placed along the roadside quickly became popular. The named trail associations soon disappeared, and the U.S. routes became a fixture of motoring and U.S. culture.

From November 1926, AASHO, and its successor, the American Association of State Highway and Transportation Officials (AASHTO), have been solely responsible for the numbering of the U.S. numbered highways.

### **Manual on Uniform Traffic Control Devices**

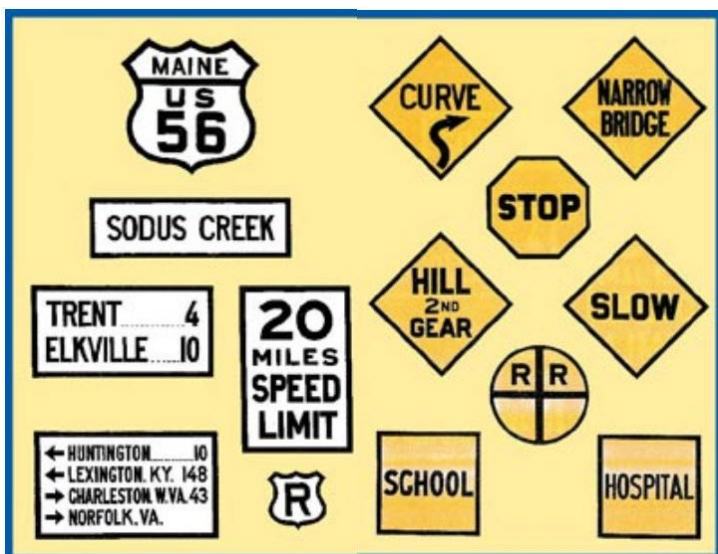
Having adopted highway signs, AASHO released



the *Manual and Specifications for the Manufacture, Display, and Erection of U.S. Standard Road Markers and Signs* in January 1927. The manual described signs for rural roads based on standard shapes, colors, and symbols. The American Engineering Council in 1929 and the National Conference on Street and Highway Safety developed separate manuals in 1930 for signing in urban areas.

The manuals differed in some ways, and the urban manual covered markings, signals, and safety islands that AASHO's manual had not addressed. To develop a single manual, AASHO and the National Conference on Street and Highway Safety formed the Joint Committee on Uniform Traffic Control Devices in 1932. AASHO released the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD, as it became known) in 1935. The Bureau of Public Roads adopted the MUTCD as a national standard for signs, markings, signals, and safety islands. H. Gene Hawkins of the Texas A&M Transportation Institute, who has written about the MUTCD's history, says the 1935 edition "was the first publication to be accepted as a national standard for traffic control devices."

The committee, renamed the National Joint Committee on Uniform Traffic Control Devices and expanded with additional members, continued to update the MUTCD through the 1960s, with AASHO as the publisher.



In 1925, the Joint Board on Interstate Highways

**created uniform road signs like these to replace the hodgepodge of signs created by State and local governments, private associations, and anyone else who had an idea on the subject.**

The Highway Safety Act of 1966 called for uniform traffic control standards for all streets and highways. With the Secretary of Transportation in charge, FHWA assumed responsibility for the MUTCD. The National Joint Committee, which had been working on a new edition since 1964, submitted its draft to FHWA in May 1970. With some changes, FHWA published its first MUTCD in 1971. Its most publicized change was to incorporate now-common symbols in signs to increase international uniformity, but it also was the first edition to define the terms “shall, should, and may.”

In June 1979, Secretary Brock Adams terminated department sponsorship of the National Joint Committee in line with President Jimmy Carter’s initiative to reduce Federal advisory committees. That same year, FHWA adopted procedures to consider MUTCD changes through the *Federal Register* rulemaking process. The National Joint Committee, reformed as the National Committee on Uniform Traffic Control Devices, continues to review MUTCD changes, but its reviews are considered along with all others.

FHWA has published several editions since 1971, most recently in 2009, the 10<sup>th</sup> in the series that AASHTO began in 1935. Today, the MUTCD defines the standards for signs and pavement markings on all public streets, highways, bikeways, and private roads open to public traffic.

As Hawkins puts it, “The MUTCD, first published in 1935, has always been one of the ‘bibles’ of the profession and continues in that capacity today.”

## **Highway Research Board**

By the 1920s, the Bureau of Public Roads was the country’s premier highway research organization. The

States recognized the need for a national research program and wanted the bureau to take the lead. MacDonald agreed about the need for a national program, but wanted it to be based on the cooperative spirit that was at the heart of the Federal-aid highway program.

In October 1919, highway officials met in Chicago with representatives of the Division of Engineering (now called the Division on Engineering and Physical Sciences) of the National Academy of Sciences' National Research Council to discuss such a program. MacDonald and several other officials from the Bureau of Public Roads attended, along with Clifford Older of the Illinois Highway Department. Anson Marston, dean and director of the engineering department at Iowa State College (and MacDonald's mentor), was one of two officials representing the Division of Engineering.

The resulting report advised the division, "There is urgent need for very extensive [and] immediate scientific highway research to establish the fundamental data needed by highway engineers in designing and constructing the highways which are to be built." In October 1919, the division authorized a highway research committee.

During AASHO's 1919 annual meeting, Marston presented a plan to the State highway officials: "The country is about to spend untold billions of dollars in the construction of paved roads. Yet there is a very serious lack of the fundamental scientific data which are absolutely essential to the correct design and construction of paved roads."

After outlining the plan, which was adopted at the October meeting, Marston urged AASHO's support, saying, "Many of the researches cannot be made successfully without the active cooperation of the State highway departments."

UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
WASHINGTON, D. C.

IN YOUR REPLY PLEASE  
REFER TO FILE NO. \_\_\_\_\_

March 4, 1935.

This Manual on Uniform Traffic Control Devices for Streets and Highways has been approved as a code of standard practice by the American Association of State Highway Officials and by the Fourth National Conference on Street and Highway Safety.

The signs, signals and markings described in Parts I, II, and III have been approved by the Secretary of Agriculture as modified, in respect to Railroad Grade Crossing Protection Devices, by the Bureau's Memorandum of April 6, 1933 and subsequent memoranda on the same subject. All signs, signals, and markings now or hereafter placed on highways built in whole or in part with Federal funds are required to conform to this code as approved.

This approval does not extend to the recommendations of Part IV in respect to Safety Zones and Traffic Islands.

Very truly yours,

Thos. H. MacDonald

Chief of Bureau.

Chief Thomas H. MacDonald of the Bureau of Public Roads distributed the first Manual on *Uniform Traffic Control Devices for Streets and Highways* (MUTCD) accompanied by this letter in March 1935.

On November 11, 1920, the Division of Engineering established the Advisory Board on Highway Research, with AASHO represented by T. R. Agg of Iowa and Charles J. Bennett of Connecticut (who would be AASHO president, 1922–1923). Marston was the first chairman of the advisory board, with Charles D. Curtiss of the Bureau of Public Roads as secretary.

MacDonald told the inaugural attendees: "The highway engineer has for the first time . . . placed in his hands large sums for highway improvement. Let there be a recognition upon the part of both Federal and State legislative bodies that the expenditure of a reasonable proportion of these funds for highway research and experimental studies will be the best investment that

can possibly be made.”

At first, many State highway agencies did not have the legal authority to fund the research initiative or enter into cooperative agreements with outside organizations. The Bureau of Public Roads provided most of the funding for the advisory committee (\$12,000 of the first year’s budget of \$14,500) for two decades. Nevertheless, AASHO members participated in the organization’s activities, including its leadership, from the start.

The organization changed its name to the Highway Research Board as of January 1, 1925.

On June 19, 1962, AASHO, the National Research Council, and the Bureau of Public Roads approved an agreement to establish the National Cooperative Highway Research Program (NCHRP) with pooled funds from State highway agencies. NCHRP inaugurated systematic, well-designed research into problems facing State highway administrators and engineers, including problems stemming from construction of the interstate system.

In 1974, the Highway Research Board became the Transportation Research Board, with a multimodal portfolio that reflected the growing understanding of the role of highways as one element of the transportation system.

## **Highway Design**

In the early 20<sup>th</sup> century, each State developed its own highway designs. The result was considerable design disparity and little way to identify the best choices.

AASHO’s 1914 constitution called for a Committee on Standards “with a view to assisting in establishing uniform standard methods of construction and maintenance and in standardizing as much as possible the various kinds of construction used in connection with highway development.”

In 1919, the chairman, W. D. Uhler of Pennsylvania, called for a report to help the States design highways, including the width of roads, surfacing materials, and

pavement thickness. The committee initially provided reports to the States, but in 1928, AASHO adopted the first “standards of practice” as technical guidance for all parties to encourage uniformity of design. Under the initial standards, each traffic lane would be 10-feet (3-meters) wide, shoulders at least 8 feet (2.4 meters) when practical, and the crown of a two-lane concrete pavement would be 1 inch (2.5 centimeters).



**Before and After:** In 1913, the old National Road in Ohio was in variable condition, with sections from dust to mud to frozen ruts. The Amsterdam School (dark roof) and the Evangelical United Brethren Church are on the knoll in the background. In 1928, the same stretch of road had been improved with Federal aid. It was 16 feet (4.9 meters) wide, just enough for two-way traffic, with guardrails, cleared shoulders, and a white centerline. The school had been destroyed by fire in 1922, but the church



remained on the knoll.

In February 1937, AASHO established a Special Committee on Administrative Design Policies, initially with 3 officials from the Bureau of Public Roads and 12 State engineers. The committee issued publications on geometric design policies for upgrading existing roads and building new roads:

- A Policy on Highway Classification (1938) — How to classify roads based on traffic volume, character of traffic, and design speed.
- A Policy on Sight Distance for Highways (1940) — A scientific approach on sight distance to ensure safety at curves and crests, as well as for overtaking and passing slower vehicles.
- A Policy on Criteria for Marking and Signing No-Passing Zones for Two and Three-Lane Roads (1940) — Uniform marking of pavements to aid passing.
- A Policy on Highway Types (Geometric) (1940) — Pavement widths and factors of driver behavior and highway design that affect width.
- A Policy on Intersections at Grade (1940) — Intersection designs from a simple crossing to elaborate channelized intersections.
- A Policy on Rotary Intersections (1941) — Guidance on design dimensions such as the radius of the central island, roadway widths, and lengths of weaving sections.
- A Policy on Grade Separations for Intersecting Highways (1944) — Combined the two earlier policies on intersections to cover the design of grade-separated intersections.

In 1950, AASHO combined all of these policies into *Policies on Geometric Highway Design*, but

continued to work on integrating and updating them. The earlier policies were superseded in May 1954 when AASHO published *A Policy on Geometric Design of Rural Highways*, known as the “Blue Book” because of the color of its cover. AASHO would continue to update the Blue Book “to reflect the ever changing data in the dynamic art of highway engineering,” as the 1965 edition put it.

The Blue Book reflected the rural orientation of the State highway agencies. Large cities in the 1930s and 1940s planned their own arterial highway networks, including freeways. By the 1950s, this separation of responsibility began to disappear as the role of roads in cities, suburbs, and regions became ever more intertwined. In 1957, AASHO’s Committee on Planning and Design Policies released *A Policy on Arterial Highways in Urban Areas*, known as the “Red Book.” It covered freeways, still relatively rare, as well as arterial surface streets, and discussed interchange types and configurations.

At the time, State highway agencies and officials of big cities were beginning to develop the urban freeways that would be a signature element of the new interstate system. They discovered that what had seemed like an intriguing exercise in geometric design would be a complex enterprise involving citizens, business pressures, and criticism from others who had never before been part of a highway engineer’s concerns.

By the mid-1960s, the Red Book was partially obsolete “as a result of changing demands placed upon the urban transportation system,” as explained in the preface to the 1973 edition, *A Policy on Design of Urban Highways and Arterial Streets*.

In 1984, the American Association of State Highway and Transportation Officials combined the Blue and Red Books with other geometric design guides into *A Policy on Geometric Design of Highways and Streets*, commonly known as the “Green Book.” This version updated the earlier policies but was, itself, a work in progress that would be updated several times over the



years, most recently in 2011.

In these and many other guides, standards, and policies, AASHO worked with the Bureau of Public Roads and, starting in 1967, with the Federal agency, by then called FHWA, which adopted the policies for use on Federal-aid highway projects. This relationship reflected the States' important stake in ensuring the proper use of Federal-aid and State highway dollars on State-owned roads and bridges.

### **The Big Job in the Future**

In May 1950, MacDonald prepared an article on 50 years of highway development for the Council of State Governments. He began, "The United States has today by far the greatest system of highways of any Nation in the world." The system has "completely changed our way of life."

## **Other Notable Events of AASHO's Year of Birth: 1914**

- In the baseball World Series, the Boston Braves defeated the Philadelphia Athletics with four straight wins.
- On April 22, the Baltimore Orioles sent a 19-year-old pitcher from Baltimore named Babe Ruth to the mound for his first professional game.
- On August 4, just days after declaring war on Russia and 1 day after declaring war on France, Germany invaded Belgium and attacked French troops. These events marked the start of the Great War, known today as World War I.
- The U.S. Office of Public Roads updated the national inventory of rural roads and published the results 3 years later. In 1914, rural roads totaled 2,445,760 miles (3,936,069 kilometers). Only 32,180 miles (51,788 kilometers) were dust-free pavements, such as bituminous macadam, brick, or concrete.
- In December 1914, members of the Lincoln Highway Association took part in a drive of the 3,400-mile (5,472-kilometer) road from New York City to San Francisco. Each participant drove to a given point, then returned, observing road conditions along the way. *The New York Times* reported on December 13, "Every kind of road was negotiated, from the macadam boulevards of New Jersey and Pennsylvania, the cement and brick stretches of Indiana and Ohio, to the smooth,

hard, well-dragged mud roads of Nebraska, the prairie stretches of Wyoming, and the desert flats of Utah and Nevada, where a mile-a-minute speed was made between the ranch houses.”

- Ralph de Palma, in a Mercedes, won the Vanderbilt Cup race and \$3,000 in Santa Monica, CA. Of the 16 cars that started the race, only 5 completed the full course.
- The bestselling novel of 1914 was Harold Bell Wright's *The Eyes of the World*. Other bestsellers included Booth Tarkington's *Penrod* and Eleanor H. Porter's *Pollyanna* (the story of Pollyanna Whittier, whose name entered the language to describe anyone with an optimistic view).
- *The Million Dollar Mystery*, a 23-chapter serial, was the hit movie of the year. Another 1914 serial, *The Perils of Pauline* starring Pearl White, made the National Film Registry. Elsewhere, Charlie Chaplin's first film, *Making a Living*, debuted, followed a week later by his second film, *Kid Auto Races at Venice*, which introduced the character he is best known for, The Little Tramp.
- O. E. Hunt, assistant chief engineer of the Packard Motor Car Company, shattered the St. Louis-to-Detroit touring record by covering the 563 miles (906 kilometers) in 16 hours and 47 minutes. The previous best time was 30 hours.

As he discussed the evolution of the highway network, MacDonald stressed the key role of the Federal Aid Road Act of 1916: “Growth of State highway departments to full stature came as a result of the initiation of Federal aid in 1916. The State highway departments then existing exerted strong influence with committees of Congress in culling from the maze of proposals made to frame a practicable and workable act. In 1914 they formed the American Association of State Highway Officials for uniform and concerted action to get Federal Legislation of suitable character . . .

“It is my firm belief that the principles which characterized that act would not have obtained had it not been for the sober judgment and wise counsel of pioneer State highway officials who then composed the association.”

State highway agencies had been established “to perform a single function.” Their work had expanded in

many ways, but now, in 1950, they were up to the challenges ahead.

MacDonald concluded: “The State highway departments face a big job in the future — one which they are well equipped to perform.”

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