

EVERYONE INTERESTED IS INVITED: A Short History of TRB



Photo: Risdon Photography

SARAH JO PETERSON

The author is Principal, 23 Urban Strategies, Washington, D.C. This article is adapted from *The Transportation Research Board, 1920–2020: Everyone Interested Is Invited*, to be published by the National Academies Press in January 2020.

Above: TRB's Annual Meeting draws transportation researchers, practitioners, policy-makers, and others from around the world. hen setting out to write a history of TRB in honor of its centennial, I quickly learned that TRB is many things to many people.

More than once, I heard people refer to the parable of the blindfolded men and the elephant: gleaning only what they can detect through briefly touching the animal, each person describes something completely different. TRB, of course, is the elephant.

For some, TRB is an annual professional conference: a great event for networking and keeping up-to-date in their fields and a healthy environment to invite others

TRB's committees and panels convene transportation experts from a range of backgrounds and professions. to engage with their research. For others, TRB is their standing technical committee: a community for support and contribution to the advancement of the field through research needs statements, calls for papers, or specialty conferences.

For practitioners, TRB is the unseen force behind reports and webinars that seem to just appear, ready to assist with a new task or a problem to solve. For those in search of policy-related advice, TRB is



TABLE 1 Key Events in TRB's History

1863	Congress charters the National Academy of Sciences (NAS)
1916	NAS organizes the National Research Council (NRC) to serve the federal government during World War I
1920	Nov. 11: NRC's Division of Engineering and the federal Bureau of Public Roads (BPR) convene the organizing meeting for the Advisory Board on Highway Research
1921	William K. Hatt becomes the Board's first director
1922	First Annual Meeting of the Board is held in January
1924	Charles M. Upham becomes the Board's second director
1925	Jan. 1: Board changes its name to the Highway Research Board (HRB)
1928	Roy W. Crum becomes HRB's third director
1935	HRB organizes its technical committees into departments
1936	Congress funds studies of highway safety, co-managed by HRB and BPR
1944	Federal-Aid Highway Act authorizes a National System of Interstate Highways and authorizes states to spend federal aid on research
1945	HRB launches the Research Correlation Service, funded by the states
1948	American Association of State Highway Officials (AASHO) adopts procedures for states to pool funds for research projects to be administered by HRB
1951	Fred Burggraf becomes HRB's fourth director
1955	AASHO requests that HRB administer the AASHO Road Test
1956	Federal-Aid Highway Act accelerates funding for the National System of Interstate and Defense Highways and expands the AASHO Road Test
1956	HRB launches the Highway Laws Project, with funding from the Automotive Safety Foundation and AASHO
1962	National Cooperative Highway Research Program is established by agreement with AASHO, BPR, and NAS
1964	National Academy of Engineering is organized
1964	D. Grant Mickle becomes HRB's fifth executive director
1966	William N. Carey becomes HRB's sixth executive director
1967	HRB rebrands the Research Correlation Service as the Technical Activities Division
1969	NRC approves a new purpose and scope for HRB that officially includes urban transportation
1970	HRB reorganizes its technical committees into groups defined by transportation system phases
1971	Urban Mass Transportation Administration becomes an HRB sponsor
1974	March 9: Highway Research Board dissolves and the Transportation Research Board (TRB) is born
1977	New TRB sponsors include the Maritime Administration, the Association of American Railroads, and the U.S. DOT's Office of the Secretary, Federal Railroad Administration, Federal Aviation Administration (FAA), and National Highway Traffic Safety Administration
1980	Thomas B. Deen becomes TRB's seventh executive director
1982	TRB takes on the responsibility for policy (consensus) studies
1987	Congress authorizes the Strategic Highway Research Program
1991	Congress authorizes the Transit Cooperative Research Program, to be sponsored by the Federal Transit Administration
1994	Robert E. Skinner, Jr., becomes TRB's eighth executive director
1999	Marine Board joins TRB
2003	Congress authorizes the Airport Cooperative Research Program, to be sponsored by FAA
2003	TRB's standing technical committees reorganize into 11 groups representing modes and system functions
2005	Congress authorizes the second Strategic Highway Research Program
2015	Neil J. Pedersen becomes TRB's ninth executive director
2021	Jan. 24–28: TRB celebrates its 100th Annual Meeting

one of many areas of expertise within the National Academies of Sciences, Engineering, and Medicine that can provide service via consensus study.

For governments, TRB is a trusted institution through which to fund largescale and continuing research programs. For researchers, TRB is the manager of contracts for compelling work. For officials and administrators, TRB is a community that supports conferring with the best minds before making decisions affecting the travel of millions.

After examining how people and institutions created today's TRB, I concluded that TRB can be best understood as an infrastructure—one that people purposely designed, carefully constructed, and devotedly maintained to share and strengthen knowledge about transportation.

Deep Foundations

The core missions and structures that underpin today's TRB predate its birth. In 1863, Congress chartered the independent National Academy of Sciences (NAS) to advise government upon request. NAS's founders responded to their first federal requests by forming committees, setting the precedent that the expertise required to advise government is found not in the individual but in a group acting collectively. According to the original charter, appointees to the National Academies' committees serve without payment.

In 1879, following the recommendation of an NAS committee, Congress established the U.S. Geological Survey in the Department of the Interior. After this notable success, advising government on its research programs became a continuing activity, including through longstanding committees administered by TRB.

In the 1880s, NAS members conducted a wrenching internal debate over the centralization of science. In the end, the proponents of decentralization won: the National Academies encourages research in the federal government but also in universities, industry, and state and local governments.

NAS leaders founded the National Research Council (NRC) to support the federal government during World War I,



Photo courtesy Ohio State University

Ohio State University researchers examine driver behavior, circa 1960. Early debates concerned the centralization—or decentralization—of research.

and on May 11, 1918, President Woodrow Wilson issued an executive order establishing a continuing, peacetime mission for the council. NRC's first duty was "to stimulate research" in the sciences and "in the application of these sciences . . . with the object of increasing knowledge, of strengthening the national defense, and of contributing in other ways to the public welfare." By the end of 1919, NRC had launched approximately 80 committees, with more than 1,000 participants, and had approved a proposal for six committees grouped under an Advisory Board for Highway Research.

The Problem of Highways

When the organizing conference for NRC's new board on highways convened on November 11, 1920, attendees saw an immense set of problems. The country had agreed that good roads were important in ameliorating rural isolation, and Congress had funneled \$75 million to state highway agencies in the Federal Aid Road Act of 1916. In 1919, Congress added another \$200 million. Nearly 10 million motor vehicles plied America's roads in 1920, a number that would more than double by 1925.

In addition, World War I had proved that it was feasible to move freight long distances by truck—but to highway builders' dismay, new roads crumbled from the use of heavy vehicles. How were road builders to make decisions about planning, financing, and constructing highways that could withstand the punishing forces of trucks? Should they also ensure that narrow lanes, tight curves, and steep climbs did not inhibit the speed of freight movement? At what cost? The economics of highway building and trucking would be a significant area of concern for decades to come. TRB's founders understood that highways epitomized a central conundrum that affects all types of transportation to some degree. Strictly speaking, highways are not a mode of transport—they are a type of infrastructure. Moreover, highways, motor vehicles, and freight movement—although deeply interdependent—also are three separate industries. Even more decentralized is the use of roads and vehicles for personal travel.

TRB's founders purposely created an organization that brought experts from academia together with the different industries, organizations, and government agencies connected to roads and highways (see box below). The founders believed that a cooperative approach to stimulating research would help them achieve some degree of voluntary coordination. In addition, sharing research gave the interdependent industries a way to see into each other's future.

After embarking on its first research contract—a study of reinforced concrete funded by private industry—the board rechristened itself the Highway Research Board (HRB) in 1925.

Reflecting its cross-industry cooperative approach to research, HRB was originally organized as a federation of member organizations under the NRC umbrella. Although it became a unit formally appointed by NRC in 1962,



Ridge Route Highway cuts through the Tehachapi Mountains, 1920. As trucks began moving freight, road builders had to consider if narrow lanes, steep climbs, and tight curves inhibited freight movement.



Photo: Missouri DO

Because of the interdependent nature of such industries as highways, motor vehicles, and freight, TRB's founders wanted to create an organization with a cooperative research approach.

the Board used its history as a gathering place for all industries, disciplines, and professions related to transportation to great advantage as it transitioned in the 1970s from highways to what was called "total transportation," including urban transportation and rail, aviation, and marine transportation.

Open Invitation

In 1928, HRB's leaders broke with the National Academy's usual procedure of inviting top experts and leaders to attend the annual meeting of the Board and its technical committees and instead invited "everyone interested." Moreover, HRB leaders wrote to state governments and

MEMBER ORGANIZATIONS

ADVISORY BOARD ON HIGHWAY RESEARCH Division of Engineering, National Research Council

First Annual Meeting, January 16, 1922

American Association of State Highway Officials American Concrete Institute American Institute of Consulting Engineers American Society of Civil Engineers American Society of Mechanical Engineers American Society for Municipal Improvements American Society for Testing Materials Association of American State Geologists Bureau of Public Roads (U.S. Dept. of Agriculture) Engineering Foundation National Automobile Chamber of Commerce National Highway Traffic Association Society of Automotive Engineers U.S. Army Corps of Engineers Western Society of Engineers

SOURCE: Minutes, January 16, 1922, TRB Executive Committee Meeting Minutes Record Group, NAS–NRC Archives.



New attendees gather at TRB's 2019 Annual Meeting.

Photo: Risdon Photography

universities asking them to send anyone involved in highway research to the next meeting in Washington, D.C. This invitation built on a culture that already valued a broad definition of expertise and the ability to contribute to research. From the beginning, the Board's technical committees included researchers, practitioners, and administrators from all over the United States.

Today, the meetings of TRB's roughly 200 standing technical committees still are open to everyone who is interested. Although the number of appointed members of standing technical committees are limited to a few dozen, friends of a standing technical committee may range in number from tens to hundreds. Friends an organic innovation prominent enough to have reached TRB's *Annual Report* by 1997—may participate in most of a standing technical committee's activities.

"Everyone" also included students and young researchers. For decades, HRB excitedly tracked how many Annual Meeting attendees were first-time presenters. The number was typically around half of all presenters. By midcentury, the January road trip to Washington—by car, recreation vehicle, or chartered bus—was a well-established rite of passage for young researchers. The Annual Meeting has also become a major gathering for awardees of the Dwight David Eisenhower Transportation Fellowship Program, administered by the Federal Highway Administration (FHWA). In addition, the TRB Minority Student Fellows Program, launched in 2009, encourages students, under the guidance of a faculty mentor, to present their research at the Annual Meeting.

The open invitation in 1928 also set the stage for the modern conference and convention functions at the TRB Annual Meeting—the lectern sessions, poster sessions, receptions, and exhibit halls. The January meeting now regularly tops 13,000 attendees from all over the world.

Partnerships with States

During the 1930s, HRB added the identification of research needs to the responsibilities of its technical committees. This established that the selection and promotion of research priorities should also be a collective, cooperative task.

Although the federal Bureau of Public Roads (BPR) was HRB's largest single financial sponsor during its first two decades, the states stepped up in a big way starting in the 1940s. Frustrated with the limits of an organization essentially run by volunteers, in 1944 the state highway departments, working through the American Association of State Highway Officials (AASHO), arranged for legislation allowing federal-aid dollars to be spent on research. State officials then worked with HRB to develop a sponsorship arrangement for the Research Correlation Service, which funded professional staff for HRB's technical committees and for research communications. The sponsorship model that the states pioneered for highways proved foundational for TRB's modal expansion in the 1970s and 1980s and continues to support sponsor relationships with many



From 1956 to 1962, AASHO conducted a \$27 million road test, pioneering modern methods for researching pavement design.

federal agencies and industry organizations. TRB's Technical Activities Division is a direct descendant of the Research Correlation Service.

In 1948, AASHO and HRB negotiated a cooperative research arrangement that was deployed during the 1950s for a series of road tests, culminating in the \$27 million AASHO Road Test that ran from 1956 to 1962. Although the road tests aimed at optimizing highways for freight movement and tax revenue from trucking, they produced their biggest impacts in pioneering modern statistical methods for researching pavement design.

Broadening the Scope

AASHO and the Automotive Safety Foundation began supporting studies of highway law in the 1950s, bringing legal research under the HRB's purview. The Automotive Safety Foundation also funded early efforts tackling urban transportation. The Board experimented with different models for conducting these studies. For the laws project, HRB hired additional staff but contracted with experts at universities for the urban research.

Innovations from the 1930s to the 1950s prepared the way for the three-party agreement signed by NAS, AASHO, and BPR in 1962 that founded the National Cooperative Highway Research Program (NCHRP).

Congress had provided the urgency for NCHRP in the massive construction boost it gave to the Interstate Highway System in 1956. In response, HRB staff, technical committees, and state highway officials worked together to produce HRB Special Report 55: Highway Research in the United States: Needs, Expenditures and Applications in 1960, which outlined a research program that they then transformed into NCHRP. AASHO selected NCHRP's annual slate of projects, as it had done for the highway laws project; HRB managed research conducted by outside contractors, similarly to its urban research; and states collectively funded the research, as they had done for the AASHO Road Test. In addition to the traditional highway design, materials, construction, finance, management, and maintenance topics, highway



In the 1960s, transportation research expanded from highways to include urban movement.

law and urban transportation were also part of the new research program.

In 1969, HRB formally expanded its scope to include urban transportation, and the federal Urban Mass Transportation Administration (UMTA) became a sponsor in 1971. It was a time of renewed emphasis on engineering and significant activism related to transportation-including many freeway revolts in urban areas. The National Academy of Engineering had formed within NAS in 1964, and Congress had created the U.S. Department of Transportation (DOT) in 1967. Whether the National Academies should also have a unit with the comprehensive perspective of "total transportation" led to considerable-sometimes heated-debate within the National Academies, federal agencies, and state governments.

In the end, the Board followed its state partners. AASHO became the American Association of State Highway and Transportation Officials (AASHTO) in November 1973; subsequently, the National Academies dissolved HRB and formed the Transportation Research Board on March 9, 1974.

As it had done for urban transportation, the new TRB set out to show rail and aviation interests what it had to offer, in hopes of earning their sponsorship too. The National Academies already had a Maritime Transportation Research Board (see sidebar, page 15). TRB created technical committees, recruited participants, and held conferences and workshops dedicated to specific problems or general research needs. It also arranged to include new modes and emerging topics, such as safety and environmental issues, in TRB's transportation research information system. Developed during the 1960s, this cutting-edge computerized database is the origin of today's TRID, an integrated database of 1.2 million records of transportation research.¹

By the end of the 1970s, new sponsors included the Association of American Railroads; the Maritime Administration; and U.S. DOT's Office of the Secretary, Federal Railroad Administration, Federal Aviation Administration (FAA), and National Highway Traffic Safety Administration (NHTSA). In addition, a 3-year grant from the U.S. Agency for International Development enabled TRB to develop its first significant international program, on low-volume roads.

¹ To access TRID, visit https://trid.trb.org.

The Lost History of the Marine Board

When the Marine Board joined TRB in 1999, the National Academies introduced it to TRB audiences with a little history in that year's *Annual Report*: the Marine Board dated back to 1965, to a Committee on Ocean Engineering. Among the Marine Board's prominent studies during the 1990s was a series on ship hull design in the wake of the *Exxon Valdez* disaster and a major study on controlling garbage and plastic waste in the oceans.

This illustrious legacy, however, was really only part of a much longer history that had been lost during organizational shifts inside the National Academies.

In 1982, the Marine Board merged with an older board, the Maritime Transportation Research Board. This latter board, formed in 1961, was itself the culmination of a dozen studies produced during the 1950s and early 1960s under the guidance of the Maritime Cargo Transportation Conference. Under a contract with the Office of Naval Research and at the request of the U.S. Departments of Defense and Commerce, the Conference was dedicated to the study of what they called the "unitization" of cargo in "transporters." Today, we call this containerization.

The Conference formed in 1953, 3 years before the first commercial application of containerization, and focused on economic studies of shipping, including reducing ship turnaround times at ports and safety in the stevedore industry. (At the time, the word "conference" meant a group that meets and coordinates efforts around a problem or issue.)



When the Highway Research Board transformed into the Transportation Research Board, it began to incorporate rail and aviation and, eventually, the Maritime Transportation Research Board, which already was a part of NAS.

One could even argue that the ancestors of today's Marine Board and the Marine Group in TRB's Technical Activities Division date to the founding of the National Academy of Sciences in 1863. Two studies requested by the U.S. Navy that year examined ironclad ships, and a third study set standards for publishing technical information related to nautical charts.

Transportation, it turns out, has always been part of the National Academies.

Consensus Studies

In 1982, TRB formally expanded its capacity to manage the process that the National Academies uses to advise the federal government and others. HRB had produced studies for Congress in earlier decades. In the 1930s, HRB and BPR had co-managed a series of congressionally funded studies on traffic safety. HRB also had integrated directions from Congress into the AASHO Road Test.

During the 1970s, however, the National Academies reformed the process for producing policy advice. They incorporated peer review and adopted rules designed to avoid conflicts of interest and balance biases among committee appointees as well as to ensure appropriate representation of a variety of disciplinary and professional perspectives. Today, these studies are aptly called consensus studies.

Since 1982, TRB has produced more than 100 consensus studies on all modes and on a broad range of topics, with final reports ranging in length from a short letter to multiple volumes. Major pieces of federal transportation legislation typically contain congressional requests for studies. Federal agencies also have come to TRB for everything from highly technical analyses to broad policy assessments.

TRB also has pursued self-initiated consensus studies. For these, TRB can follow one of three funding paths: external sponsorship alone, pooled sponsorship with TRB funding, or solely TRB-funded. Most self-initiated studies have required at least some TRB funding, and TRB discovered that pooled sponsorship, if possible, was usually the most desirable route for a self-initiated study. Broader sponsorship, especially from those with authority to advance a study's recommendations, maximized the potential for impact.



Superpave® asphalt design was one of the important accomplishments of the Strategic Highway Research Program.

Strategic Approach to Research

TRB's first policy study was self-initiated in partnership with AASHTO and funded by FHWA. Published in 1984, *Special Report* 202: America's Highways—Accelerating the Search for Innovation not only led to the first Strategic Highway Research Program (SHRP) but also created a model that has since been used to outline and develop support for additional major research programs.

America's Highways made the case for a large, highly targeted program of research to improve highways. It also presented different institutional approaches to managing the research. Congress funded the \$150 million, 5-year program in 1987, and the National Academies created a separate unit to manage the program. The Superpave[®] asphalt pavement design system was only one of SHRP's many accomplishments.

Even before SHRP got under way, TRB was leading another consensus study for strategic transportation research. UMTA sponsored the yearlong study that produced Special Report 213: Research for Public Transit—New Directions in 1987. Instead of a big, short-term research program, the report recommended a Transit Cooperative Research Program (TCRP) modeled after NCHRP. Congress authorized TCRP in 1991, and the American Public Transportation Association (APTA) became a TRB sponsor. TRB manages TCRP for the Federal Transit Administration and APTA; annual program budgets have fluctuated between \$5 and \$10 million.

After decades of interest within the aviation industry, Congress requested a consensus study outlining an airport research program in 2000. The legislation specifi-



Photo: Thomas Hawk, Flickr

In 1991, Congress authorized the Transit Cooperative Research Program, a transit-centered program modeled after the highway research program.

cally directed the study to evaluate the applicability of NCHRP and TCRP, and the 2003 Special Report 272: Airport Research Needs—Cooperative Solutions emphasized that airport operators should be directly involved in every phase of such a research program. Congress authorized the Airport Cooperative Research Program (ACRP) in 2003. Sponsored by FAA and funded today



at \$15 million annually, ACRP follows the NCHRP and TCRP model and produces solutions to practical problems.

The cooperative research program model, in which industry members select annual research programs and guide the research process, also has been deployed for shorter-term programs producing practical solutions for freight and hazardous materials transportation and commercial truck and bus safety. A new cooperative research program on behavioral traffic safety launched in 2017.

NCHRP continues too. Celebrating its 50th anniversary in 2012 and currently funded at nearly \$42 million annually, the program remains true to its founders' vision. One of its unanticipated uses, however, has been helping plan and implement the first and second Strategic Highway Research Programs. In 1998, Congress request-

ed a consensus study for a future strategic highway research program. This resulted in the 2001 publication Special Report 260: Strategic Highway Research—Saving Lives, Reducing Congestion, Improving Quality of Life. The report outlined a research program built around four goals: accelerating the renewal of America's highways; making a significant improvement in high-

way safety; providing a highway system with reliable travel times; and providing highway capacity in support of the nation's economic, environmental, and social goals. Congress authorized SHRP 2 in 2005; the legislation referenced the consensus study by name and summarized the four goals. In operation from 2006 to 2015, SHRP 2 received \$217 million in funding and produced 130 promising products.

Leaders, Volunteers, and Staff

I've written this entire brief history of TRB without referring to a single person by name.² This is intentionally ironic because, if anything, the history of TRB reinforces how much individuals matter—people of strong character, commitment, and curiosity, with a willingness to work together.

TRB has always operated with a committed and passionate staff that is small relative to its corps of volunteers. Today, thousands of volunteers populate TRB's standing technical committees, research program panels, and consensus study committees. Over the decades, these volunteers have become more diverse in expertise, backgrounds, and perspectives. At its most successful, TRB has taken the initiative to reach out to new communities of experts and practitioners as demanded by its mission to stimulate research that contributes to the public welfare. The select appointment to its committees is in nearly perfect balance with the open invitation to everyone interested.





17

² The book, however, names names.