PROFILE OF AN ORGANIZATION

The Virginia Highway & Transportation Research Council

Howard Newlon, Jr., Director of the Virginia Highway & Transportation Research Council.

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The following is the first in a new, occasional series of articles in TRNews *profiling various transportation research organizations. In this article, Howard Newlon, Jr., Director of the Virginia Highway & Transportation Research Council, discusses the establishment, goals, and administration of the Council, the composition of its staff, past research activities, and the current research program.*

Working session of the Virginia Highway & Transportation Research Council's Environmental Research Advisory Committee.

FORMATION AND MISSION

The Virginia Highway & Transportation Research Council was formed in November 1948 under an agreement between the Virginia Department of Highways and the University of Virginia. According to *HRB Special Report 15: Highway Research Organizations*, published in 1953, the Research Council was the fourth such joint research effort. The oldest, the Joint Highway Project formed at Purdue University in 1936, in many ways served as the model for the Virginia organization. The Research Council's first director, Tilton E. Shelburne, who served until his death in 1968, was a Purdue graduate and had been a member of the Joint Highway Project staff. The other two joint efforts established before the formation of the Research Council are no longer active.

The administrators of the Highway Department recognized the benefits to research of access to faculty and graduate students, library facilities, and an academic environment, and thus decided to enter into the agreement locating the Research Council at the University of Virginia in Charlottesville. As stated in the language of the agreement, the cosponsors were "to establish and operate [the Council] by joint effort and for the mutual benefit . . .".

The Virginia Highway & Transportation Research Council also operates under a written policy approved by the Virginia Highway and Transportation Commission, which states that "the Department will provide highway and transportation research, and management and operational leadership by keeping abreast of and applying the latest developments in improved techniques through encouragement and financial support of research activities . . .". From its inception the stated goal of the Research Council has been to encourage innovation within the Virginia Department of Highways and Transportation. This mission is very significant because it includes not only the conduct of research, but also all of the tangible and intangible efforts required for the implementation of research findings.

ADMINISTRATION

The initial agreement created a Research Administration Board to provide overall policy and coordinate the interests of the two cooperating agencies. The Department administrator to whom the research director reports serves as permanent chairman of the Board. Currently, the chairman is Deputy Commissioner Oscar K. Mabry; Commissioner Harold C. King serves as the other Department representative. The other two members, representing the University of Virginia, are Dean Edgar A. Starke, the School of Engineering and Applied

Science; and Lester A. Hoel, chairman of the Department of Civil Engineering. It is significant to note that two of the members, King and Hoel, are currently serving on the TRB Executive Committee. Except for minor modifications reflecting changes in the Department's organizational structure, the Board has functioned continuously since the Research Council's formation.

The other body created by the original agreement was a Research Advisory Committee to advise on the technical aspects of the research program. This single, 8-person committee functioned from 1948 to 1968 with representatives from the Department, the University of Virginia, Virginia Polytechnic Institute, and Virginia Military Institute. As the research program grew in size and complexity, the work load of the committee and the need for advice from individuals more immediately involved in the various technologies resulted in the creation of the present Research Advisory Committees in the Council's various emphasis areas, including pavement management, bituminous, bridge, concrete, environmental, maintenance, safety, traffic, transportation planning, and administration and finance.

These committees vary in size from 10 to 21 members and include as appropriate middle-level managers from the Department's central and field organizations, representatives of the Federal Highway Administration, the faculty from the universities in the Commonwealth, and representatives from other state agencies. In addition to these 10 standing committees, task forces are formed for limited periods as needed for special projects, such as studies on energy, roadside vegetation, and teleconferencing.

Next to its research staff the members of these advisory groups are the Research Council's most valuable resource in terms of providing guidance and input to the research activities. Currently, 99 of the 140 members serving in this capacity are from various units of the Department. An extremely important function of these individuals is to assist in implementing the research results and transferring the technology from the research activities to operational units.

STAFF

Although the Research Council shares many common features with current joint research efforts, it differs significantly in that the members of its full-time research staff are employees of the Virginia Department of Highways and Transportation, are included in the Department's approved staffing levels along with its operating personnel, and are "state employees" as opposed to university employees. Currently there are 28 permanent professional research staff members. Sixteen are engineers, while the remaining 12 represent a variety of disciplines such as economics, chemistry, public administration, and psychology. These staff members have an average length of service of 19 years with the Research Council. All members of the professional staff are required to hold advanced degrees.

University faculty and students are utilized by the Council on a part-time basis, and when working with the Council are also included in the Department's authorized staffing levels. The university is reimbursed for the time that faculty and graduate students devote to Council projects.

RESEARCH PROGRAM

Since 1982 an annual research program has been prepared in which the levels of effort proposed for each research emphasis area are presented to the Virginia Department of Highways and Transportation for input and review by the Executive Committee, which consists of the Commissioner and his staff. The research activities are identified as (a) applied research, (b) conceptual research, (c) technical assistance, and (d) technology transfer. For the current fiscal year, the program calls for 61 percent of the effort to be devoted to applied research, 1 percent to conceptual research, 22 percent to technical assistance, and 16 percent to technology transfer. Among the four major emphasis areas, the distribution of effort is as follows: pavement materials, pavement maintenance, and environmental, 27 percent; concrete and bridge, 20 percent; traffic operations and transportation systems, 21 percent; safety, 15 percent; and the remainder to general support (library, machine shop, accounting, and administration). The first three of these emphasis areas are funded by the Virginia Department of Highways and Transportation, using either state or federal (HPR) funds. The safety research activities are funded by the Transportation Safety Administration of the Virginia Division of Motor Vehicles, for whom the Council has served as the research arm since 1969. For fiscal 1985 the distribution of funds is 55 percent state and 45 percent federal.

The current research program comprises approximately 100 projects, and about 70 or 80 formal research reports are issued annually, along with numerous internal reports on technical assistance efforts. Some appreciation of the Council's program can be gained from considering several major areas in which efforts have continued over a significant period of time.

In 1947 a project titled "Skid Resistance Measurements of Virginia Pavements" was reported. This and other projects that followed led the Virginia Department of Highways, in 1957, to modify its pavement design policy to prohibit the use of aggregate susceptible to polishing on pavements expected to carry heavy traffic and to overlay pavements containing such aggregates. The research on skid resistance led the Council to sponsor, along with the University of Virginia and 34 other agencies, the First International Skid Resistance Conference, which was held at the university in 1958. A significant outgrowth of this conference was the creation of Committee E-17 on Skid

The Council has conducted evaluations of photographic equipment for underwater inspection.

Resistance by the American Society of Testing and Materials under whose auspices skid-testing equipment is studied and standardized. Two of the six chairmen of this committee have come from the Council, as did the committee's first secretary. Three major multiagency skid correlation studies were conducted in Virginia between 1958 and 1962, the last being an international effort.

The Virginia Highway & Transportation Research Council, under the leadership of its second director, J.H. Dillard, was one of the leaders in exploring and applying statistically oriented specifications for quality assurance of construction. In 1966 the Council hosted the National Conference on Statistical Quality Control Methodology in Highway and Airfield Construction, which was attended by approximately 300 people. In 1965 members of the Council staff began a series of short courses for the Department's operating personnel, which evolved into courses that were offered to administrative and operating staff in highway departments and industry across the country. From 1977 to 1982 Council staff members conducted similar courses throughout the country under the sponsorship of the Federal Highway Administration.

Paralleling the attention directed toward statistically based specifications has been a variety of studies on testing methods and inspections procedures, including the determination of density by nuclear methods, a practice adopted by the Virginia Department of Highways in 1966. Current studies of this type include the use of ground-penetrating radar for evaluating the condition of pavements and bridge decks, and the development of procedures and evaluation of equipment for assuring the quality inspection of underwater portions of bridges, most of which are conducted by contract.

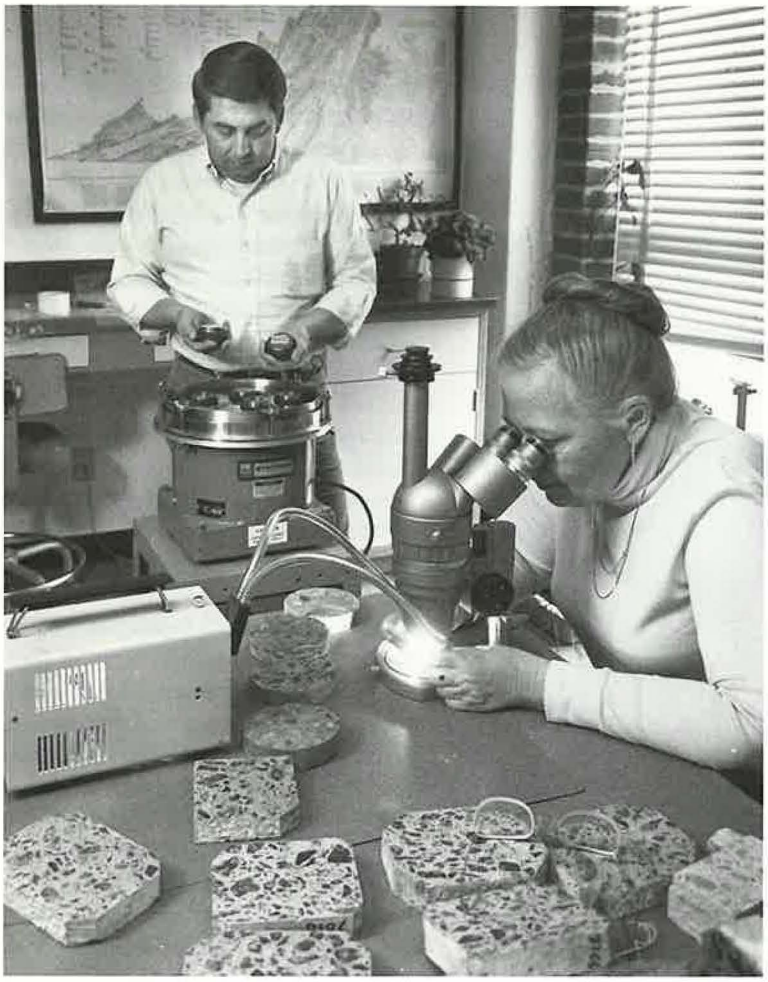
Since its creation, the Council has directed a considerable portion of its efforts toward improving the performance of materials, pavements, and structures. One of the Council's first reports, issued in 1948, covered the performance of Virginia's pavements as related to soils and design parameters. A variety of projects relating to design, to the influence of stabilization and admixtures, and to other means of improving the durability and performance of pavements and structures has followed.

During the last 10 years increasing emphasis has been placed on maintenance operations and repairs as opposed to new construction. Even though the emphasis has changed, much of what was learned in past research on the relationships among materials, design, and performance is being used in the development of pavement, bridge, and maintenance management systems. In addition to using and developing conventional engineering tests and procedures, the Council has throughout the years utilized complementing disciplines such as chemistry and petrography in its materials studies.

With the increased recognition of environmental issues, in the early 1970s the Council initiated a number of responsive efforts. Most significant among these were the development of an air pollution prediction model, adaptation of national noise pollution prediction models to Virginia conditions, use of geotextiles in siltation prevention, and development of criteria for identifying bridges with potential historic significance. The products of many of the efforts have been used by other agencies as well as the Department.

Although research in traffic operations and transportation systems was not formalized until the mid-1960s, results from work on sign legibility, brightness, and perception conducted by Straub and Allen in the 1950s are still widely used and quoted throughout the world. In recent years studies directed toward traffic control in work zones, sign brightness, and pavement marking materials have continued and a number of studies of public transportation have been accomplished.

Although the emphasis of early Council research was on materials, pave-



Petrography and related disciplines are important elements of the Council's program.

ments, and structures, in 1952 a full-time economist was added to the staff. Thus the Council's program has included research in finance and administration for more than 30 years. Recently emphasis has been placed on the allocation of funds, development of a cash-flow model, and related needs. As an outgrowth of these studies, two short courses are being offered to familiarize the Department's managers with life-cycle costing, cost analysis, and other factors in making decisions on the use of contract maintenance versus state forces.

CONCLUDING COMMENTS

The accomplishments of the Virginia Highway & Transportation Research Council are obviously attributable to its experienced and competent staff, its organizational and advisory committee structures that provide focus on meeting the short- and long-range needs of the Department, the support of research by the Department's management, and access to university staff and facilities. In addition to these influences, which exist in varying degrees in other states, two additional factors that are unique to Virginia should be noted.

The diversity of materials, climate, topography, and demographics, coupled with the fact that 90 percent of all roads in the Commonwealth are under state rather than local jurisdiction, offers opportunities for research that can be utilized outside Virginia, as well as the opportunity to apply results from other states to conditions in Virginia. Thus the Council's program includes studies of the complex traffic management system in the Virginia suburbs of Washington, D.C., as well as methods for controlling dust on low-volume roads. Virginia, in fact, has the third largest state road mileage in the United States, of which approximately 40,000 miles are in its secondary system.

Another important advantage is the proximity of the Council to Washington, which facilitates interactions with TRB, FHWA, and association researchers who are located there. Over the years, Council staff members have greatly benefited from and contributed to the Transportation Research Board, as evidenced by the fact that 11 individuals have served as chairmen of 18 TRB committees and 6 sections. Council staff members have also participated and held significant posts in other professional and technical organizations such as the ASTM, the American Concrete Institute, and the Association of Asphalt Paving Technologists. In 1983-1984, C.S. Hughes served as president of the AAPT, while G.W. Maupin served as chairman of ASTM Committee D-4 on Road and Paving Materials. In addition, many of the nearly 150 graduate students who have been supported by the Council and numerous former researchers currently serve in important capacities in the field of transportation.

Shelburne, the Council's first director, often defined research as "a state of mind." The Council as well as the management and operational units of the Department have benefited throughout the years from a positive state of mind with regard to ensuring a competent and responsive research program. This is a tribute to the vision of those who conceived and established the Council and to those who have served throughout its 35-year history. The past accomplishments also stand as a significant challenge to current and future generations to maintain the "state of mind" that has served Virginia and the nation well.