In McLean, Virginia

FHWA Research Center Sets Sights on Enhancing Highway Safety, Operations

BRENDA J. VUMBACO

Nestled among 44 acres of lush, green countryside in suburban McLean, Virginia, is a "non-government-issue"-looking building that in the eyes and minds of Federal Highway Administration staffers is going to do great things to improve and benefit highway research and development. The expanded Turner-Fairbank Highway Research Center provides FHWA with much needed additional space for laboratory facilities dedicated to research.

BACKGROUND

Back in the 1920s, the then Bureau of Public Roads (BPR) was in dire need of laboratory space and began a search that continued into the 1930s for appropriate sites on which to build a research facility. During this period research was conducted at sites such as Arlington Farms (now the location of the Pentagon Building complex) and Gravelly Point (now more familiar to the general public as Washington National Airport).

Then, in 1938, Congress authorized the purchase of some 600 acres in Langley (McLean), Virginia, and construction on a research facility was begun. But U.S. entry into World War II in December 1941 called a halt to the project—just short of completion of a shop facility and heating plant. Both buildings were finished after the war, but the funds were not available to complete the rest of the facility—a main laboratory and BPR headquarters building.

A lot has happened to the original 600-acre site since the war years. FHWA occupies now only 44 acres; the remaining land was transferred to other government agencies including the National Park Service, the Central Intelligence Agency, and the State of Virginia.

During the 1950s the BPR began limited research testing at the site. In 1963, the facility was named in honor of Herbert S. Fairbank, a pioneer in highway research and Deputy Commissioner for Research of BPR (1944-1945).

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A remodeling program began in 1965 and since then extensive modifications have been made to the two original buildings in an effort to provide laboratory and administrative space. However, even with the remodeling, they could not meet the growing needs of a vigorous national research

Feature

and development program. Planning for expansion began in 1967 and a master plan was completed in 1973. Following a lengthy process of review, approval, funds appropriation, architectural design, and contract negotiation, ground was broken and construction begun on September 17, 1980.

NEW FACILITY

The new facility provides 80,000 ft^2 of laboratory, office, and support service space. It is designed in three separate sections. The first is a three-story office wing, which also houses conference areas and a human factors laboratory. The second is a light laboratory wing, which provides facilities for a highway driving simulator, a pavement components laboratory, an experimental vehicle preparation area, a highway communication and electronics laboratory, and a highway noise laboratory. The third wing of the building contains two major heavy laboratories—a structural laboratory and a highway hydraulics laboratory. The three sections of the building are joined at a central atrium, which provides a visual focal point for molding the sections into a single unit.

The $6.5-million facility, completed in the spring of 1983, was dedicated on May 5, 1983. U.S. Secretary of Transportation Elizabeth H. Dole told the audience then that "we have waited a long time for this excellent and well-equipped facility."

The layout and equipment of the research center attest to the thoroughness with which the facility was designed and constructed. For example, the structural laboratory floor is composed of a four-celled structural box girder that has been fully instrumented to provide information about internal stresses created within the girder when a

An atrium with skylights joins the office wing, light laboratory wing, and heavy laboratory wing. A fluted block wall at the entrance to the light laboratories (left) provides an architectural focal point. (FHWA photo)

Edwin M. Wood, FHWA Associate Administrator for Research, Development, and Technology, welcomed guests at facility's dedication in May 1983. (TRB photo by Herbert A. Pennock)

test specimen is placed under load.

The size of the laboratories allows full-scale testing of the structural components for bridges and pavements. Construction techniques can be developed for cost-effective roadway systems that will absorb the loads and environmental stresses for longer periods of time than present designs.

Capabilities built into the facility make it possible to design, analyze, and evaluate major structural materials and highway components to determine their remaining life expectancy or, in some instances, the mode of failure.

The computer image-generated highway driving simulator and pupilometer allow laboratory observation of driver reactions to simulated highway conditions. In the safety of the laboratory, the researchers can identify dangerous situations and test available countermeasures.

At the rear of the building are entrances to the structures laboratory, experimental vehicle preparation area, and the pavement components laboratory. (FHWA photo)

FRANCIS C. TURNER

The FHWA facility now also honors (in addition to Herbert Fairbank noted earlier) a man whose 43 years of service with BPR and then FHWA prompted significant changes in highway transportation. Francis C. "Frank" Turner was the only chief executive of FHWA and its predecessor BPR who spent his entire career within the organization. He retired in 1973.

Turner began his public service in 1929 as a junior highway engineer in the BPR, and in 1940, he came to Washington, D.C., to work in the Office of Engineering. Later, while on assignment in Alaska, he distinguished himself by pioneering the use of aerial photography in highway location. Because of his acclaim in Alaska, Turner was asked to head a mission to develop a highway system in the Philippines and from 1946 to 1950 he coordinated efforts to restore roads destroyed in World War II, including rehabilitation programs conducted by nine U.S. government agencies. As a result the Philippine Government presented Turner with the Legion of Honor.

Returning to the United States in 1950, Turner became Assistant to the Highway Commissioner, Thomas H. MacDonald, and coordinated work on the Inter-American Highway as well as activities in Ethiopia, Turkey, the Philippines, Liberia, and other countries. His appointment in 1954 as Executive Secretary for the Committee on the National Highway Program had a major influence in the development of financing methods for the construction of the nation's Interstate highway system.

The outfitted woodworking and electronics shops at the expanded FHWA research facility are pictured here. (FHWA photo)

After legislation establishing the Interstate system was enacted, Turner served as Deputy Commissioner and Chief Engineer for the BPR. He was also appointed to the Task

Ray A. Barnhart, Federal Highway Administrator, prepares for a trial "run" in a test vehicle at the Turner-Fairbank Highway Research Center, McLean, Virginia. (TRB photo by Herbert A. Pennock)

Francis C. Turner (left), after whom FHWA research center was named, admires dedication plaque with Lester P. Lamm, FHWA's Deputy Administrator. (TRB photo by Herbert A. Pennock)

Force that made recommendations to establish the first Department of Transportation in October 1966. On February 24, 1969, he became Federal Highway Administrator.

Turner is said to have brought significant change to highway transportation. A strong proponent of the research implementation process, he outlined a plan in 1969 for research implementation that set forth many of the principles that guided FHWA technology transfer through the 1970s and 1980s. He balanced his knowledge of the technical aspects of the highway industry with a broad perspective of highway systems as much more than concrete and pavement. The philosophy that "the highway system has to move people, not just vehicles" was Turner's "guiding light."

Turner was a member of the Highway Research Board Executive Committee from 1967 to 1972, and was very active in the activities of the Board.

LOOKING FORWARD

Barnhart, expressing the feeling of the some 180 FHWA staffers at the research center, maintains that the new facility has great potential for evaluating a wide variety of highway engineering problems. "FHWA looks forward to full use of these unique laboratories and the development of new technology to provide a cost-efficient highway system with enhanced safety and operational capabilities."

ACKNOWLEDGMENT

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MEETINGS

Call for Papers: Mineral Aggregates

The TRB Committee on Mineral Aggregates invites papers for a symposium on aggregate test properties and field performance to be held at the 64th Annual TRB Meeting in January 1985. Papers comparing test results and characteristics of all types of aggregate material with the material's actual field performance will be considered for inclusion in the symposium. Interested authors should submit abstracts to Stephen W. Forster, Federal Highway Administration, HNR-30, 6300 Georgetown Pike, McLean, VA 22101, telephone 703-285-2431. The abstracts should be provided no later than November 18, 1983.

Call for Papers: Expansive Soils

The TRB Committee on Environmental Factors Except Frost is sponsoring a symposium on expansive soils to be held during the 64th TRB Annual Meeting in January 1985. The symposium will provide a forum for the presentation and discussion of papers on identification and treatment of expansive soils. Emphasis will be placed on practical approaches to quantification and minimization of the problems associated with soil swelling. Topics planned for the symposium will include the following: geological and environmental effects; identification, prediction, and performance; and preconstruction and postconstruction treatment alternatives.

Prospective authors should submit three copies of an extended abstract (about 500 words) before November 15, 1983, to Symposium Chairman, Dr. S.S. Bandyopadhyay (Bandy), NFS/National Soil Services, Inc., 5814 Heffernan Street, Houston, TX 77087, telephone 713-644-9161. Full text for final review should be submitted by August 10, 1984.