

A PROPOSAL FOR THE ESTABLISHMENT OF A VIRGINIA
TRANSPORTATION TECHNOLOGY TRANSFER CENTER

by

Project Director: M. C. Anday
Senior Research Scientist

Virginia Highway & Transportation Research Council
(A Cooperative Organization Sponsored Jointly by the Virginia
Department of Highways & Transportation and
the University of Virginia)

In Cooperation with the U. S. Department of Transportation
Federal Highway Administration

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VDOT Research Library

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INTRODUCTION

This proposal presents the rationale and details for the establishment of a transportation technology transfer center (T² center) at the Virginia Highway and Transportation Research Council (the Council) in Charlottesville, Virginia. It has been prepared in accordance with the guidelines transmitted by James M. Tumlin, the Division Administrator, Federal Highway Administration, with his letter of November 20, 1985, to Deputy Commissioner Oscar K. Mabry of the Virginia Department of Highways and Transportation.

The Council is cosponsored by the Virginia Department of Highways and Transportation (VDH&T) and the University of Virginia (UVA), and serves as the research division of the Department.

Since its formation in 1948 under an agreement between the VDH&T and UVA, two primary objectives of the Council have been the transfer of technology and the education and training of men and women in the fundamentals of transportation engineering and related subjects. These objectives have been emphasized in the agreements between the VDH&T and UVA. The full text of the original agreement with the modifications of 1966 and 1975 is given in Appendix A, and an excerpt is given here to reflect this emphasis.

The purpose of the Council is twofold: (1) to serve as a center for securing and disseminating information leading to a more scientific and improved approach to transportation, engineering and research, and (2) to educate and train men in the fundamentals of transportation engineering and other areas relevant to transportation. Thus the Council, operating in an academic community, takes advantage of the many resources and facilities of the University and at the same time brings to the University practical problems facing the highway and transportation field.

Activities envisioned to accomplish Council objectives include the following:

- (1) The carrying out of a research program and consulting with the operating Divisions of the Department and other state agencies to the end that innovations will be induced into state practices at the earliest possible date.
- (2) The education, training, and development of men and women in the fundamentals of transportation engineering and related subjects. The maintaining of relations with and cooperating with the Transportation Research Board, research divisions of other highway and transportation departments, universities, technical associations, and other agencies performing research for the purpose of keeping abreast of the latest developments in improved techniques.
- (4) The holding of joint meetings and conferences of persons interested in the development and improvement of all activities related to effective transportation systems.
- (5) The reporting and publishing of findings that are of general interest and value, and which add to fundamental knowledge or facilitate the application of sound practices.

The Council has carried out its objectives adequately, however; because of the heavy load of research in recent years, technology transfer (T²) activities have been conducted at a lower than desired level and the Council has always believed that this effort should be increased. This point will be expanded upon later.

The Council's and the VDH&T's T² activities are outlined in a report (Appendix B) prepared by H. E. Brown of the Council staff. It is interesting to note Mr. Brown's statement that "Although a sizeable effort is being continuously conducted by the Department and the Research Council to pass on important information to the state's smaller cities and towns, this effort is fragmented, lacks continuity, and, in many cases, is poorly 'packaged' for optimum results." He, therefore, goes on to recommend that the Council take on the additional task of

functioning as Virginia's T² center for the conveyance of transportation related information to engineers in the localities.

Another significant factor contributing to the submission of this proposal is that in recent years the VDH&T has greatly reduced its number of employees. All divisions of the VDH&T, including the Council, have been approximately equally affected by this reduction. As the number of employees has been reduced, the demand from the operating divisions to the Council for technical assistance has increased significantly. While the Council has responded to as many of these requests for technical assistance as possible, the applied research program, the major responsibility of the Council, has suffered since the number of employees could not be increased. The Council, therefore, seeks a means of restoring its applied research program to its previous level of effectiveness. A significant aid in this restorative effort would be the enhancement of the T² program. The Council's management envisions that if sufficient expertise can be developed within the VDH&T, then less technical assistance by the Council will be necessary.

Effective January 1, 1986, the Council has assigned responsibility for enhancing its T² activities at the general level to a senior research scientist, M. C. Anday, who will direct the center. It is envisioned that the formation of a T² center at the Council will aid the above solution.

OBJECTIVES

The general mission of the Transportation T² Center proposed to be developed at the Council is to improve the dissemination of highway and transportation related technology and research to local, nonurban transportation agencies. This mission will be accomplished by pursuing the following objectives:

1. To provide to rural agencies, on a continuing basis, information not now widely disseminated but which may be useful to them in solving transportation related problems.
2. To provide a central source that all rural agencies within the state can contact for information, sources of information, or guidance on transportation related problems.
3. To serve as a training center for rural agencies through the development and presentation of short courses, workshops, and seminars which address the transportation oriented concerns and needs of such agencies.

SCOPE

In Virginia, the construction and maintenance of the entire highway system (with the exception of roads in Henrico and Arlington counties, and parts of the streets of cities and towns) are managed by the VDH&T. Of the fifty states, only four (North Carolina, West Virginia, Delaware, and Virginia) operate such a statewide system. The remainder have a system in which subdivisions such as counties, townships, etc., have responsibilities for their own roads.

To manage its statewide system, the VDH&T is divided into nine construction and maintenance districts, each of which has several residencies comprising three or four counties. Each residency is managed by a resident engineer, with the help of an assistant.

To manage their street systems, the cities and towns employ a person who might or might not be an engineer.

The customers of the proposed T² center at the Council will, therefore, be the resident and assistant resident engineers and the person or persons in charge of roads in the cities and towns.

The tabulated road mileages in "Highway Statistics," which is published by the Federal Highway Administration (FHWA), indicate that the respective road mileages under the residencies of the VDH&T and the jurisdictions in cities and towns are approximately 51,000 and 12,500 miles, or 80% and 20% of the total state mileage, exclusive of parkways under federal jurisdiction. It is, therefore, envisioned that the effort of the T² center in serving the state and municipalities will be divided in approximately the same percentages.

TASKS

To accomplish the objectives of the T² center, the Council will conduct the following activities:

Task A - Compile and maintain a mailing list

Task B - Publish a quarterly newsletter

Task C - Distribute technology transfer materials

Task D - Provide information services

Task E - Conduct and arrange seminars and training sessions

Task F - Evaluate the effectiveness of the program

Task A - Compile and Maintain a Mailing List.

The Council, as part of its T² activities, will develop a mailing list of its clients cited above. The list shall include, as a minimum, all local agencies in Virginia with transportation responsibilities. This list will be updated at least once every 12 months and as needed by contacting these agencies. Approximately 1 month after the effective date of the agreement, three copies of the mailing list will be submitted to the FHWA division office. The list will be expanded as the need arises.

Task B - Publish Quarterly Newsletter

A quarterly newsletter will be published and mailed to those on the mailing list, and three copies will be submitted to the FHWA. As required, the newsletter, as a minimum, will include the following:

1. A list of transportation related technical materials (reports, studies, training packages, etc.) that become available for distribution together with the names, addresses, and telephone numbers of the sources from which the materials can be obtained.
2. Course announcements, including the titles and brief descriptions of the courses, the dates offered, the sponsoring organizations, and the names, addresses, and telephone numbers of course coordinators, if available.
3. Announcements of meetings, conferences, seminars, etc., of possible interest to employees of local agencies.
4. Other information related to technology transfer, especially in the areas of roads, bridges, and public transportation in nonurban areas.

In addition to the above, a service begun by the Council in 1983, namely, the preparation by the staff of summaries of the technical highlights gleaned from the annual meeting of the Transportation Research Board held in Washington, D.C., each January, will be expanded (see page B-9, Appendix B). For these summaries, each researcher of the Council submits a list of highlights that he believes represent the

important ideas from committee meetings, paper sessions, or personal contacts. A master list is compiled and distributed to the VDH&T's executive committee, division heads, and district engineers. Significant trends and ideas from the foremost research forum on transportation are thus speedily made available to the Department's managers.

It is believed that these highlights could benefit the agencies on the mailing list to be prepared under Task A.

Task C - Provide Technology Transfer Materials

1. In response to requests, the center will provide items listed in the quarterly newsletter for which the center is identified as a supplier.
2. The center will distribute selected technical materials and training packages.

In addition to the above, a related T² effort, already under way at the Council, might be expanded as an enhancement of technology awareness. At present, this effort involves the compilation of literature on environmental matters received by the Council Library (see page 10, Appendix B). The list is compiled by the librarian and is distributed to personnel of the Environmental Quality Division. It is envisioned that this effort could be expanded to include the distribution of a compilation on literature of interest to rural transportation agencies.

Task D - Provide Information Services

The center will provide technical information services as requested, using Council personnel (see section on Personnel for a description) and staff of the FHWA. The information could be in the form of advice or referral to published materials and may be handled by telephone, letter, or personal contact.

The services will not include engineering services (technical assistance) but will be confined to technology transfer.

Task E - Conduct and Arrange Seminars and Training Sessions

The center will conduct and arrange for the presentation of a minimum of ten 1-to-2-day seminars and training sessions on topics of concern to rural transportation agencies.

This activity obviously will include a "needs" determination and, therefore, the topics can not be specifically stated at present.

A series of workshops already being conducted at the Council will be expanded under this task. This series of annual workshops on Public Works Technology for Small Cities and Towns was initiated by the Council and the UVA in 1979 (see page B-9 of Appendix B). The premise behind the holding of these workshops is that the Department has much relevant technology of use to the small cities and towns, but these small municipalities have no organized forum from which to receive this information, whereas for larger municipalities it is obtained from the engineering staff and through memberships in formal technical organizations. The exchange of information at these workshops relates essentially to the technology needed by directors of public works and city engineers.

The two-day workshops are held at the Council and most of the attendees are from small cities and towns in central Virginia. It is envisioned that the program can be expanded by regionalizing it, say, by having groups meet in the western and eastern regions of the state.

Task F - Evaluate Effectiveness of Program

The evaluation of the effectiveness of the program will be accomplished as prescribed in the following FHWA guidelines.

1. Develop and implement an evaluation plan based on the objectives of this program.
2. Prepare and submit a final evaluation report. The report shall contain as a minimum:
 - a. A copy of the mailing list.
 - b. The number of new contacts on mailing list since effective date of contract.
 - c. A copy of each newsletter distributed.
 - d. The number and title of items distributed.
 - e. The number and the type of organization (e.g., counties, cities, planning organizations) to whom items were distributed.
 - f. The number and kinds of technical information services provided and the providers of these services.

- g. The number and titles of seminars and training sessions conducted.
- h. The number of persons attending seminars and training sessions.
- i. An evaluation of each seminar and training session.
- j. A description of the problems encountered in carrying out the tasks and proposed solutions.
- k. A summary of the users' evaluations.
- l. Narrative discussion of the effectiveness of the center in serving localities, including a focus on the quality of service given and feedback on its usefulness from the users.
- m. Recommendations for changes or modifications in approach to technology transfer for local transportation agencies.
- n. An estimated dollar savings experienced by user after implementing technology acquired from center's services. Documentation should be included. The FHWA will supply a sample form which could be used for documentation.

Schedule for Reports and Deliverable Items

A schedule of reports, etc., is given here as it relates to most of the tasks to be performed. As prescribed in the FHWA guidelines, they are:

- 1. One month after the effective date of the agreement, the state shall submit three copies of the compiled mailing list to the FHWA division office.
- 2. Two months after the effective date of the agreement, the state shall submit three copies of the evaluation plan to the FHWA division office.
- 3. Three months after the effective date of the agreement and quarterly thereafter, the state shall furnish the FHWA division office three copies of a quarterly progress report. Each report shall cover staff activities relevant to the agreement, including as a minimum:
 - a. Number of new names added to mailing list with a breakdown by the following categories: federal, state, local, university, other.

- b. Number of items mailed with a breakdown by the above categories.
- c. Number and designation of requests for information services with a breakdown by the above categories and the agency to whom the request was referred with a breakdown by the same categories.
- d. Number and designation of seminars and training sessions conducted or arranged, including number of participants and their agencies with a breakdown by the above categories.
- e. Comparison of actual expenditures with programmed expenditures.
- f. Actual expenditures covering:
 - (1) Staff time, including key staff members' names, titles, number of hours worked and rate. (Include number of hours spent providing (a) advisory services and (b) conducting seminars and training.)
 - (2) Materials
 - (3) Travel
 - (4) Other (telephone, postage, supplies, etc.)
- 4. Three months after effective date of the agreement and quarterly thereafter, the state shall submit three copies of the quarterly newsletter to the FHWA division office.
- 5. Fourteen months after the effective date of the agreement, the state shall submit three copies of the updated mailing list to the FHWA division office.
- 6. Fourteen months after the effective date of the contract, the state shall submit three copies of the evaluation report to the FHWA division office.

RESOURCES AND FACILITIES

Management

The center will be managed by M. C. Anday, senior research scientist. His staff will be a secretary, a librarian, and a graduate assistant, all assisting on part-time basis (see budget).

Guidance

It is envisioned that a task group with members from the Council, the Department, FHWA, and major Virginia universities will be formed to guide the activities of the T² center.

Facilities

The center will be located at the Council in Charlottesville, Virginia.

The Council has its own library, report reproduction facilities, and meeting rooms. State vehicles are also available for state business.

The library receives many publications from national technical organizations and federal agencies and from its exchanges with other universities and research organizations. The library has access to HRIS and TRIS information retrieval systems.

All facilities mentioned here will be available to the center.

Staff

For fiscal year 1986, the Council has been allocated a staff of 78 full-time equivalents (FTE's). A partial list of Council employees is given in Appendix C. In FY 1987, it is expected that the number of FTE's will be increased to 80. The breakdown of the staff by function and program areas is shown in Table 1.

TABLE 1

Staffing Plan in FTE's by Function and Program Areas Council-wide

Function & Program Areas	Permanent			Part-Time				Out-of-Group Act.			Total	
	Prof.	Tech.	Cler.	Joint Appt.	Res. Cons.	Stud. Author	Stud. N-Author	Use	Lend	Net	FTE	%
Gen. Adm.	2.0	0	1.0	0	0	0	0	0	-0.30	-0.30	2.70	3.5
Gen. Support	1.0	4.0	3.0	0.20	0	0	0	+0.40	0	+0.40	8.60	11.0
Research Act.												
PM, PM & E ⁽¹⁾	8.0	6.0	2.0	0.35	1.80	1.00	0.70	+1.80	+0.05	+1.75	21.60	27.7
C, B, & E ⁽²⁾	7.0	3.0	1.0	0.60	0.55	0.50	2.55	+0.80	0	+0.80	16.00	20.5
S ⁽³⁾	4.0	1.0	1.0	0.55	0	3.80	0.35	+1.00	-0.05	+0.95	11.65	14.9
TOTS ⁽⁴⁾	8.0	4.0	2.0	0.80	0.60	2.65	1.00	0	-3.60	-3.60	15.45	19.8
Unassigned	1.0	0	0	0	0	1.00	0	0	0	0	2.00	2.6
Subtotals	31.0	18.0	10.0	2.50 ⁽⁵⁾	2.95 ⁽⁶⁾	8.95	4.60	4.00	4.00	0	78.00	0
Totals	Permanent 59			Part-time				19			78	100

(1,2) Materials research
 (3) Safety research
 (4) Traffic operations and transportation systems research
 (5,6) Mostly from the University of Virginia

From Appendix C it can be seen that the Council has a mature staff. There are only 2 professional staff members with less than 10 years' service with the Council. This maturity reflects the level of expertise at the Council. Many members of the Council are nationally recognized, are chairmen and/or members of national technical organizations such as the Transportation Research Board, ASTM, American Society of Civil Engineers, Virginia Institute of Transportation Engineers, Institute of Transportation Engineers, and American Economics Society, and through these associations they have valuable contacts and sources of information in other states and the federal government.

Appendix C also shows that faculty and students from the UVA and other universities and consultants are also employed as needed. This force can be expanded if a need arises.

All of the above personnel will spend a portion of their time, say up to 5%, on tasks B, D, and E. The area of expertise of each professional staff member is also shown in Appendix C. Resumes of their experiences are given in Appendix D.

To perform tasks for which expertise is not available, the Council has the ability to contract with state universities. At present, for example, the Council has contracts with the Virginia Polytechnic Institute and State University (VPI & SU) for research on several environmental projects. The expertise in other universities can beneficially be used by the center.

It is also envisioned that parts of some tasks that can not be accomplished by the Council staff will be accomplished through involving other universities. Specific examples that can be cited are:

1. Regionalization of seminars for small cities and towns where a university in the western part of Virginia, such VPI & SU, can arrange and host such a seminar (Task E).
2. Some of the seminars and workshops could be developed and presented by other universities such as VPI & SU, Virginia Military Institute, and Hampton University.

BUDGET

The budget given in Table 2 is proposed for a period of two years, beginning November 1, 1986.

As explained in the FHWA guidelines, 50% of the budget is proposed to be financed from Rural Technical Assistance Program funds. The VDH&T will finance the remaining 50% from HPR funds.

Table 2
Detailed Budget

1.	<u>Direct Materials and Equipment</u>		\$ 8,000
2.	<u>Direct Labor</u>		
	Project Director (50% time)		
	Librarian (25% time)		
	Secretary (35% time)		
	Graduate Student (50% time)	\$80,000	
	Seminars, Workshops, Instructions	<u>20,000</u>	\$100,000
3.	<u>Fringe Benefits</u>		35,000
4.	<u>Travel</u>		10,000
5.	<u>Printing</u>		9,000
6.	<u>Other Direct Costs</u>		<u>8,000</u>
			<u>\$170,000</u>
7.	<u>Indirect Costs</u>		<u>80,000</u>
	TOTAL		\$250,000

APPENDIX A

REVISION OF ORIGINAL AGREEMENT OF NOVEMBER 1, 1948 ESTABLISHING THE VIRGINIA HIGHWAY & TRANSPORTATION RESEARCH COUNCIL AND MODIFIED JANUARY 1, 1966 JANUARY 1, 1975

MEMORANDUM OF AGREEMENT

Preamble

Recognizing the need for continuation of the mutual benefits derived from the location of the laboratories and offices of the Virginia Highway & Transportation Research Council on the Grounds of the University of Virginia under the AGREEMENT of November 1, 1948 as modified January 1, 1966 between the Virginia Department of Highways & Transportation and the University of Virginia; and further recognizing the need for revision of this AGREEMENT to meet present conditions and to create a more flexible and workable instrument, the two signatory parties hereby enter into a revised AGREEMENT, set forth below, in order to fulfill more efficiently the stated objectives.

The purpose of the Council is twofold: (1) to serve as a center for securing and disseminating information leading to a more scientific and improved approach to transportation, engineering and research, and (2) to educate and train men in the fundamentals of transportation engineering and other areas relevant to transportation. Thus the Council, operating in an academic community, takes advantage of the many resources and facilities of the University and at the same time brings to the University practical problems facing the highway and transportation field.

Activities envisioned to accomplish Council objectives include the following:

- (1) The carrying out of a research program and consulting with the operating Divisions of the Department and other state agencies to the end that innovations will be induced into state practices at the earliest possible date.
- (2) The education, training and development of men and women in the fundamentals of transportation engineering and related subjects.
- (3) The maintaining of relations with and cooperating with the Transportation Research Board, research divisions of other highway and transportation departments, universities,

technical associations, and other agencies performing research for the purpose of keeping abreast of the latest developments in improved techniques.

- (4) The holding of joint meetings and conferences of persons interested in the development and improvement of all activities related to effective transportation systems.
- (5) The reporting and publishing of findings that are of general interest and value, and which add to fundamental knowledge or facilitate the application of sound practices.

Basis For Agreement

NOW THEREFORE, the Virginia Department of Highways & Transportation, hereinafter called the Department, and the University of Virginia, hereinafter called the University, in this revised AGREEMENT made the 1st day of January in the year 1975, do hereby agree to continue the joint operation of the laboratories and activities established by the Agreement of November 1, 1948, as modified January 1, 1966, under the following arrangements:

1. Name: The name of the organization and the laboratories shall now be the Virginia Highway & Transportation Research Council.
2. Location: The principal office and laboratories shall be in the Shelburne Building located on Edgemont Road on the Grounds of the University in Charlottesville, Virginia.
3. General Responsibilities of Each Party: The Department will contribute funds, manpower, and equipment, to assist the Council in carrying out its practical and long-range research projects and also to assist the Council in fulfilling other objectives.

As a result of the payment by the Virginia Department of Highways & Transportation to the University for all costs incurred in the design and construction of the Shelburne Building, the building will be assigned to the Council for a minimum period of 50 years rent free in accordance with the lease signed May 4, 1973.

The University will maintain the Shelburne Building at cost. The University also agrees to extend faculty privileges to the professional staff of the Council and in other ways to make the Council and its personnel a part of the University activities.

Government and Operation

4. Administration: A Board of Administration shall be composed of the Chief Engineer and the State Highway Research Engineer of the Department of Highways & Transportation; the Dean of the School of Engineering and Applied Science of the University; and one member each appointed by the Commissioner of the Department of Highways & Transportation and by the President of the University. When necessary, any board member may appoint a temporary deputy to serve in his absence. The Chief Engineer of the Department of Highways & Transportation shall be the Chairman of the Board, and the State Highway Research Engineer shall be the Executive Officer, responsible for administering the activities of the Virginia Highway & Transportation Research Council.

5. Responsibilities of the Board: The Board shall establish policy in all matters pertaining to personnel, finances, facilities and the research program. The Board may appoint Research Advisory Committees, at its discretion, to assist in the formation of plans and policies.

6. Staff: The staff of the Virginia Highway & Transportation Research Council may be composed of employees of the Department of Highways & Transportation, employees of the University, or of personnel with joint appointments. When engaged in Council-sponsored research, authorized by the Administration Board, all members of the Council staff shall report to the State Highway Research Engineer regardless of the organization by which they are employed. Faculty and graduate and undergraduate students of the University and of other institutions of higher learning may be employed part-time by the Council whenever it is possible to use their services. The Administration Board may authorize the State Highway Research Engineer to fix the terms of employment, assignment to projects, governing regulations and responsibility of supervision of such faculty or student employees. The State Highway Research Engineer and such other members of the staff as are employed and paid directly by the Department of Highways & Transportation shall be subject at all times to the rules and regulations of the Department of Highways & Transportation and, likewise, any members of the staff who are employed by the University shall be subject to the rules and regulations of the University.

7. Resources of the Council: The operations of the Council shall be funded by (a) funds allocated in the Virginia Department of Highways & Transportation budget to highway research; (b) Highway Planning Research funds for projects as approved by the Federal Highway Administration; (c) Contract research funds from such sources as the National Cooperative Highway Research Program or the Federal Highway Administration. No funds shall be solicited or used from agencies whose activities might result in a conflict of interest for state employees.

The Administration Board will have administrative authority over all such research funds for research projects in Virginia. The determination of specific needs for Council resources from either the Department of Highways & Transportation, the University, or other sources, will be made by the Administration Board.

Arrangement for Modification and Termination

8. Provision for Modification and Termination: This AGREEMENT may be modified at any time by mutual agreement of the parties hereto. All modifications shall be in writing. It is further agreed that unless terminated by mutual consent by the parties hereto, it may be terminated by either party after written notice of intent to the other party one year in advance.

The cooperating agencies fully recognize the benefits derived by both parties from the successful operation of the Virginia Highway & Transportation Research Council. The reputation so gained is the result of full cooperation on the part of the University and the Department of Highways & Transportation, and it is the intent and desire of both agencies to further the work of the Virginia Highway & Transportation Research Council, realizing the need for the Research Council to be an integral part of the sponsoring agencies.

In concluding this AGREEMENT the cooperating agencies agree that the effectiveness of the organization and the mutual benefits to be derived from such an undertaking can be obtained only by full support and cooperation on the part of both agencies.

IN WITNESS WHEREOF, the parties hereto have executed this AGREEMENT, the day and year first above written.

VIRGINIA DEPARTMENT OF HIGHWAYS & TRANSPORTATION

Commissioner

UNIVERSITY OF VIRGINIA

President

APPENDIX B

TECHNOLOGY TRANSFER EFFORTS BY THE DEPARTMENT AND THE RESEARCH COUNCIL

by

Harry E. Brown
Senior Research Scientist
January 25, 1985

(For use in this proposal, attachments 1, 2, and 3 of Mr. Brown's report have been omitted.)

TECHNOLOGY TRANSFER EFFORTS

For FY 1982, the Congress appropriated \$5 million to the FHWA to develop the Rural Technical Assistance Program (RTAP) to "meet the growing demands placed on a program for helping rural roads, resulting from increased urban sprawl and the increased size and weights of trucks carrying goods from farm to market." The next year, Congress appropriated an additional \$5 million to the FHWA to further develop the RTAP, and directed that the funding be used "to develop a program and implementation schedule setting forth the special needs of rural transportation and identifying how this program can help meet these needs." While this program has been followed since its inception, because the rural transportation system in the Commonwealth is the responsibility of the Department rather than the local government, the RTAP program is of limited applicability to Virginia's needs.

Of the thirty some projects presently funded under the RTAP, the 23 operating Technology Transfer (T²) centers are considered the most visible and most important nationwide. These T² centers are located at universities with two exceptions; however, their funding is channeled through the state DOTs. The locations of the 23 centers and a listing of projects presently supported under the RTAP are attached (see Attachments 1 and 2). It can be seen that many of these subjects have been included in Virginia's research program and operational activities.

A recent copy of the newsletter published by the Penn State T² center (a major function of all T² centers is to produce a bimonthly newsletter) is appended (see Attachment 3) to indicate the types of information being transferred and the level of expertise at which the information is directed.

Even though this brief report will show that the Department and the Research Council are doing a creditable job of transferring transportation technology, information, etc., to the smaller municipalities of the Commonwealth* ("smaller" is considered to be a population of 50,000 or less in this report), it is believed that there is a definite need to establish a bona fide technology transfer program to better serve their needs. In addition, enhanced technology transfer within the Department would also be desirable. It is also thought that, because the Department's residencies, districts and divisions are continuously involved in technology and information transfer as part of their ongoing responsibilities, as will be discussed later, and because this activity is an integral part of the Research Council's mission

*The counties of Arlington and Henrico were not considered in this report.

and the fact that the Council is the designated technology transfer coordinator of FHWA material to the Department, also discussed later, the Research Council should develop and begin to implement immediately a T² program similar to those administered by the 23 T² centers, regardless of the availability of specially designated funds. Initially, the program would be relatively small in scope and could be funded from HPR monies, state research funds, or some combination. Other types of funding could be sought as warranted.

A summary of the districts', divisions', and Research Council's present technology and information transfer efforts is given later, and it is shown that some of the small municipalities' technology needs are already being met in a variety of ways. It is believed, however, that there are many "unmet" needs and that in many cases where the basic needs are being met, better "packaging" is in order to optimize the results of these endeavors.

It should be noted that the Council's FY85 Research Program anticipated that 14.8% of its effort would be devoted to Technology transfer, with another 21.7% allotted to Technical Assistance, which generally involves specific short-range efforts.

The following summary of the Department's technology and information transfer efforts is broken down under Districts, Divisions, and Research Council. Also mentioned is the non-VDHT effort of transferring technology to local governments administered by an association called the Virginia Innovation Group.

In compiling the summary, no endeavor has been made to identify those efforts directed towards local governments that might qualify under a RTAP arrangement as compared with those that would be required if Virginia was organized like the majority of states and operating a true RTAP center.

Districts

A survey of the districts revealed a certain sameness in their ways of interacting with the small cities and towns, as would be expected. Whether it's technology transfer or just part of their jobs, the districts deal with these municipalities at both the district and residency levels. The efforts by the district staff are usually made in response to a formal request, whereas at the residency level efforts are more informal. The former are characterized by telephone and written requests usually resulting in accounts receivable work, while the latter

are characterized by the resident engineer's response to a friendly verbal request which results in small "favors." There are no regularly planned meetings with the municipalities, but the districts do consult with them on an "as needed" basis.

Traffic engineering is by far the most prevalent type of technology being sought by the small cities and towns. Thus, the district traffic engineer probably interacts with the localities more than any other person on the district staff. If it can be assumed that traffic matters comprise 90% of the district's technology transfer efforts, then materials, drainage, bridge, and others make up the remaining 10%. Limited manpower within the districts and residencies limits the amount of accounts receivable work, much less the gratis type, that can be extended to the municipalities.

Divisions

A survey of the divisions of the Central Office revealed a rather wide range of interactions with the small cities and towns of the state. The diversity of the technology, information, services, etc., being provided to the municipalities is best shown by a partial list of examples cited from the divisions surveyed.

1. Administrative Services

- Permits municipalities to realize considerable savings by offering them the opportunity of purchasing vehicles through the Division's contract for purchase.
- Shares its specifications and bid proposals, for use as examples, with the local governments.

2. Bridge

- Extends invitations to representatives of local governments to attend bridge inspection training courses conducted by the National Highway Institute.

3. Construction

- Reviews specifications and special designs of municipalities and offers constructive comments, when the Department has an interest in the project.
- Answers numerous questions by local governments about the Department's position on disadvantaged business enterprises and other federal regulations, particularly when a

municipality is about to use federal money on a construction project.

- Furnishes a display booth at business fairs to remind the business community of the service provided by good roads and to discuss proper road construction practices.

4. Environmental Quality

- Performs noise studies on an accounts receivable basis.
- Informs localities as to the results of the Division's own noise studies when they are pertinent to the localities' interests.
- Discusses good environmental quality practices and seeks input from municipalities on Department projects to see if the proposed project is compatible with the municipalities' future plans.

5. Equipment

- Responds to requests for specifications of equipment used by the Department.

6. Information Services

- Responds to many inquiries, but most of its information is transmitted to the local governments via the community's newspaper.

7. Location & Design

- Sends, as a "good business" procedure, finished plans to the appropriate planning district.

8. Materials

- Provides inspector training and certification in portland cement concrete, bituminous concrete, central mix aggregate, and nuclear safety to more than 100 local government employees per year.

9. Programming & Scheduling

- Provides an opportunity for local officials to learn of future projects by welcoming them at the allocation hearings held in the nine districts.

10. Public Transportation

- Provides performance evaluations for transit operators.
- Provides planning assistance to public transportation agencies.
- Provides forecasts of transit costs to municipalities.
- Assists in the start-up of transit operators.
- Assists in the training of transit mechanics.
- Assists in the statewide marketing of public transportation.
- Serves as a clearinghouse for information on public transportation. (The Division has the desire to transfer this task elsewhere and the Research Council is the prime prospect to undertake this task.)
- Conducts two seminars a year with transit operators to develop experimental projects of interest to them.
- Provides financial and technical assistance to the ridesharing efforts of the state.

11. Rail

- Interfaces with local officials through the state rail advisory committee. Besides the representatives from the five major railroads operating in Virginia, the committee includes the executive directors of the 22 planning districts.
- Holds public meetings to alert citizens of potential abandonments and similar matters.

12. Secondary Roads

- Interacts most frequently with the boards of supervisors of cities and towns with population of less than 3,500, since the communities' roads are a part of the Department's secondary system.
- Participates frequently with the Virginia Association of Counties by providing a representative to be a part of their program.

13. Transportation Planning

- Deals almost directly with the 11 metropolitan planning organizations and thus municipalities with populations greater than 50,000, but the Division does respond to requests for studies from small cities and towns.

14. Urban

- Holds public hearings for urban projects and interacts with the municipalities with populations greater than 3,500 by consulting with them on projects within their boundaries.

Research Council

The transfer of technology, in the broadest sense, has been an integral part of the Research Council's mission since the Council's inception in 1948. The Department's research effort is administered by the Research Council and the Department's research policy is stated in Policy Memorandum DPM-10-3, which was last revised in 1978. Further evidence of the Council's fundamental support of the transfer of technology is found in Section 2 (Research Policy) which can be found in the Council's recently distributed Policy Manual. Section 1.00 of DPM 10-3, found on pp. 2-5 of the Manual, states in part:

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.

In addition to research, the activities described include training and development, cooperation with other research agencies, sponsorship of meetings and conferences, and the dissemination of findings of general interest (emphasis added).

In the early years of the Council's existence, its more obvious efforts in technology transfer were the holding of the annual Highway Materials Conference, the visual aids short courses, the statistical control conference, and a number of short courses pertaining to basic statistical concepts. At present, the Council makes an explicit effort to disseminate technology by programming this effort into its formal research program. The Research Council, in FY 83, adopted a formal research program concept and allocated to Technology Transfer 11.7% and to Technical Assistance 24.0% for a total of 35.7% of the total research effort that year. Applied and conceptual research comprised the

remaining 64.3% of the research program. For FY 85, Technology Transfer and Technical Assistance efforts are programmed to be 14.8% and 21.7%, respectively, for a total effort of 36.5%.

Since July 1982, the Research Council has served as the technology transfer agent for the FHWA to the Department. In this capacity, the Council receives copies of various technical reports from the FHWA and has the responsibility of distributing these to the appropriate Department division(s). Each transmittal is accompanied by a Virginia Division Technology Review and Transmittal Form (Attachment 4). It is the responsibility of the appropriate Group Leader at the Council to make contact with the affected division(s), to discuss and coordinate the response, complete the last portion of the form, and transmit it to the FHWA within 30 days.

Beginning in 1983, the Research Council added another technology transfer effort to its overall program; namely, the preparation by the staff of summaries of the technical highlights gleaned from the annual meeting of the Transportation Research Board held in Washington, D.C., each January. Each researcher submits a list of highlights that he believes represent the important ideas from committee meetings, paper sessions, or personal contacts. A master list is compiled and distributed to the Department's executive committee, division heads, and district engineers. Significant trends and ideas from the foremost research forum on transportation are thus speedily made available to the Department's managers.

In the spring of 1979, the Council and the University of Virginia conducted the first annual workshop on Public Works Technology for Small Cities and Towns. The premise behind the holding of this workshop is that the Department has much relevant technology to use of the small cities and towns, but these small municipalities have no organized forum from which to receive this information, whereas larger municipalities have engineering staffs and formal technical organizations from which to receive such technology. The exchange of information at these workshops relates essentially to the technology needed by directors of public works and city engineers.

The stated purposes of the workshops are --

To provide a forum for sharing technology on public works and related matters of concern to small cities, towns, and urban communities of Virginia.

To provide a resume of new developments in transportation and related technologies by recognized experts.

To encourage a continuing dialogue among the engineering and management personnel of the cities, towns, and urban communities in Virginia to the end that the most up-to-date technology is being used.

The two-day workshops are held at the Research Council in March or April. The programs are planned in the late fall for the spring meeting by a rotating committee of attendees with a Research Council staff member serving on this committee as a permanent "Executive Director." The small registration fee for these workshops offsets the printing and postage costs incurred by the Research Council.

Another technology transfer endeavor by the Research Council was the considerable assistance recently given the Environmental Quality Division (EQD) to improve the training, education, and technology transfer among personnel of the division, field personnel working with the EQD, and others that affect the operations of the Division. Needs, level of personnel, available programs, etc., were studied to determine what information was available and what was needed, and what information, training, etc., were needed for the different levels of personnel. The types of needs were divided into three groupings: instructional, informational, and technology transfer. Personnel interacting with the Division were divided into four levels and the types of needs were identified for each level. Current technology generated through the literature is handled by the Research Council. Every month or two, a list of the pertinent literature received by the Council library is prepared and distributed to the Central Office and District personnel in managerial capacities. Literature searches through HRIS and TRIS are also being offered to the Division and other divisions by the Council on a cost-free basis, at present.

Recently, the Public Transportation Division requested that the Council look into the most feasible way of transferring technology to transit operators. Although serving as a clearinghouse is an objective of the Division, the Division's staff believed that improvements in transferring technology to the transit agencies (transit systems and ride-sharing programs) were needed. As a result of this perceived need for improved transfer of technology by the Division and by the operators themselves, since they expressed such at a recent meeting here in Charlottesville, the Council and the Division are now looking at four alternative ways of establishing a good system of getting the technology to the user. A survey form will be mailed out in January 1985 to these transit agencies and it will request the information needed to aid in selecting the best of the four proposed alternatives.

To indicate typical technology and information efforts by the Council, a list of these transfer efforts recently or continuously administered was compiled late last year and is appended (Attachment 5).

Although not a part of the Virginia Highway & Transportation Research Council's or the Department's efforts to transfer technology to the small municipalities, there is a recently formed organization that appears to offer significant promise in providing local governments (all sizes) with an up-to-date listing of technical items, innovations, and products. This organization, The Virginia Innovation Group (VIG), is made up of "Virginia cities, towns, counties, and private companies joined together to expand the use of science and technology products in local governments." The aims of the VIG are "the identification and transfer of technology to local governments from private industry, small businesses, federal laboratories, and other local governments. The organization is funded by local government and private sector membership fees, contracts with private sector and local governments, royalties from small business products, and cooperatively funded projects. The VIG is presently managed by Richard F. Weeks, Jr., and its mailing address is P.O. Box 40, Chesterfield, VA 23832.

In summary, this brief report indicates that the Central Office, districts, residencies and the Research Council are daily performing numerous and varied technology transfer functions. The report also shows that the information to be conveyed by many of the 33 projects comprising the formal RTAP program (Attachment 2) has been or is being transferred by the Department to its employees who have responsibility for rural roads and to the small cities and towns of Virginia on a continuing basis.

Even though the Department is providing many of the services that a proper RTAP center would provide to Virginia's small municipalities, this effort is fragmented, lacks continuity, and, in many cases, is poorly "packaged" for optimum results.

The whole technology transfer endeavor of the Department needs to be "tightened-up" and strengthened to better serve the recipients. And, the Research Council is ready to undertake this task and to function as Virginia's technology transfer center.

Attachment 5

A LIST OF PRESENTLY KNOWN EFFORTS
AT TRANSFERRING TECHNOLOGY
TO THE MUNICIPALITIES OF VIRGINIA
BY VETRC

1. Annual Workshops on Public Works Technology for Small Cities and Towns - 30 to 40 attendees.
2. Local Traffic Records System -- A microcomputer based system presently used by approximately 15 municipalities.
3. Local Traffic Records System Microcomputer Software -- A project directed to the installation and maintenance of software for the municipalities using the Council developed system.
4. Local Police Selective Traffic Enforcement Projects -- Council researchers worked with local officials in evaluating this federally funded program.
5. Local Police Alcohol Selective Enforcement Projects -- Council researchers worked with local officials in evaluating this federally funded program.
6. Driver Education Program Performance Evaluation System -- Council researchers developed system by which state and local officials can evaluate the state system.
7. Mini-Crash Facts: Youth Fact Sheet -- Council researchers developed specific accident data reports to help local administrators in tailoring their accident countermeasures program.

8. Evaluation of Microcomputer Applications in Transportation Engineering -- A Council study solicited and addressed the needs of 63 local traffic engineers, public transit operators, city planners, and metropolitan planning organizations.
9. Access Management for Streets and Highways -- Cosponsored with VASITE, the Council conducted this workshop which all municipalities were invited to attend. Most of the 42 attendees were from cities and towns.
10. First Annual Mid-Atlantic Region Conference on Ridesharing -- Four Council members served as facilitators with the responsibility of developing a methodology for fielding problems and questions on the topic. Eighteen in-state and twenty out-of-state agencies participated.
11. Trip Generators at Special Sites -- Council research project in which input was sought from 29 traffic engineers and planners. The findings, sent to all municipalities in Virginia, prompted numerous requests for detailed information.
12. Microcomputers in Traffic Engineering -- In cooperation with the FHWA, the Council presented a workshop on this topic at two locations within the state. The majority of the 50 attendees were from local governments.
13. Experimental Projects from the Perspective of Transit Operations -- Three Council researchers assisted the Public Transportation Division in the conduct of a workshop to identify needed experimental projects and research as viewed by these agencies.

14. Design of Rumble Strips -- The Council, responding to numerous field requests, developed and distributed to Department and local government personnel, guidelines for the design of rumble strips.
15. State of the Art of Residential Traffic Control -- At the request of the Planning and Engineering Division of Arlington County, the Council prepared a report on the above named subject.
16. Virginia Transit Maintenance Seminar -- Council researchers assisted the Public Transportation Division in presenting this seminar to 30 to 40 transit operators.
17. Seminars on Cost Analysis and Other Factors in Decisions Regarding Contract Maintenance vs. Using State Forces -- Council researchers created this seminar for presentation to all appropriate maintenance decision makers.
18. Seminars on Life Cycle Costing -- Council researchers will be presenting a series of these seminars this spring. Subjects to be included, but not limited to, will be bridge and pavement maintenance, purchasing, fleet management and traffic operations.
19. Techniques for Pavement Rehabilitation -- This was a NHI 4-day training course presented to approximately 40 Virginia Department of Highways and Transportation employees.

Appendix C

STAFF PERSONNEL

		<u>Date Started</u>	<u>Area of Expertise</u>
PERMANENT STAFF			
Allen, G. R.	Highway Research Senior Scientist	8-16-73	Economics & Finance
Anday, M. C.	Highway Research Senior Scientist Group Leader	3-16-59	Soils, Environmental, Statistics
Andrews, Angela J.	Library Assistant A	9-16-76	
Arnold, E. D., Jr.	Highway Research Scientist	7-01-77	Transp. Planning
Blackwell, S. R.	Highway Traffic Technician C	12-01-73	
Brown, C. H.	Clerk Typist	4-01-72	
Brown, H. E.	Highway Research Senior Scientist Group Leader	7-01-69	Concrete
Burton, M. W.	Highway Materials Technician C	10-01-75	
Carlton, Ivy	Clerk Steno D	12-01-69	
Clemens, G. G.	Highway Research Scientist C	2-01-71	Chemistry
Cottrell, B. H., Jr.	Highway Research Scientist B	1-22-79	Traffic
Deasy, E. J., Jr.	Staff Photographer	3-05-79	
Ferguson, W. S.	Highway Research Senior Scientist Group Leader	6-14-65	Safety
Fewell, A. M.	Clerk Steno C	10-16-67	
French, J. W.	Highway Materials Technician Supervisor	12-01-64	
Garrison, J. M.	Offset Duplicating Machine Operator	10-01-70	
Giannini, C. E., Jr.	Highway Materials Technician Supervisor	5-16-56	
Green, Delores J.	Production Control Technician	6-20-77	
Gunn, R. W.	Highway Materials Technician Supervisor	6-16-58	
Harris, M. O.	Highway Materials Technician Supervisor	2-01-61	
Hilton, M. H.	Highway Research Senior Scientist	7-01-51	Structures, Energy
Hughes, C. S. III	Highway Research Senior Scientist	6-16-62	Bituminous
Kelsh, W. E.	Highway Research Scientist B	2-01-79	Computers
Kennedy, J. M.	Clerk Steno C	11-01-67	
Knight, E. L.	Research Administrative Officer	1-01-56	
Long, R. R.	Highway Research Scientist A	6-01-84	
Lynn, C. W.	Highway Research Scientist B	4-16-73	Safety
Mahone, D. C.	Highway Research Senior Scientist	6-16-57	Maintenance, Pavement surface character- istics
Marshall, B. F.	Highway Materials Technician Supervisor	8-01-66	
Maupin, G. W., Jr.	Highway Research Scientist C	6-01-68	Bituminous
McDaniel, M. A.	Clerk Steno C	10-01-68	

Staff Personnel (continued)

PERMANENT STAFF

McGeehan, D. D.	Highway Research Scientist C	9-01-69	Underwater Inspection
McGhee, K. H.	Highway Research Senior Scientist	6-16-57	Pavement, Pavement Management Structures
McKeel, W. T., Jr.	Highway Research Scientist C	7-01-63	
Mills, A. J., Jr.	Highway Materials Technician C	9-01-64	
Mills, J. L.	Laboratory Mechanic C	7-01-68	
Newlon, H. H., Jr.	Research Director	6-16-56	History, Concrete
Noble, D. F.	Highway Research Scientist C	1-16-64	Geology, Noise
Ozyildirim, H. C.	Highway Research Scientist C	7-01-74	Concrete
Payne, C. W.	Highway Materials Technician Supervisor	12-01-63	
Perfater, M. A.	Highway Research Scientist C	3-01-72	Communications Social Studies
Robertson, R. N.	Highway Research Senior Scientist Group Leader	8-01-62	Transportation Planning, Traffic
Shelor, J. D.	Highway Traffic Technician Supervisor	3-16-65	
Shepard, F. D.	Highway Research Scientist C	10-01-64	Traffic
Sprinkel, M. M.	Highway Research Scientist C	10-01-68	Concrete
Stoke, C. B.	Highway Research Scientist C	9-01-70	Safety
Thompson, L. A.	Clerk Steno C	8-01-59	
Thornton, M. A.	Engineering Technician C	8-01-82	
Turner, B. A.	Clerk Steno C	10-14-75	
Vanderberry, J. M.	Clerk D	10-16-62	
Wagner, A. J.	Highway Materials Technician C	1-08-79	
Walker, H. N.	Highway Research Scientist C	4-01-66	Petrography
Wood, L. E., Jr.	Highway Materials Technician Supervisor	7-16-65	
Woodson, L. L., Jr.	Highway Traffic Technician C	6-01-72	
Wyant, D. C.	Highway Research Scientist C	7-01-70	Soils, Environmental, Maintenance

Staff Personnel (continued)

TEMPORARY STAFF

JOINT APPOINTEES
(Research Council - University of Virginia)

3aber, T. T.	Civil Engineering	6-03-85	Structures
Barton, F. W.	Civil Engineering	2-19-73	Structures
Demetsky, M. J.	Civil Engineering	9-15-70	Traffic
Farber, N. J.	Civil Engineering	6-01-81	Safety
Hoel, L. A.	Civil Engineering	10-04-76	Transp. Planning
Kinnier, H. L.	Civil Engineering	5-13-75	
Iu, Shaw	Civil Engineering	9-01-80	Storm Water Management

CONSULTANTS

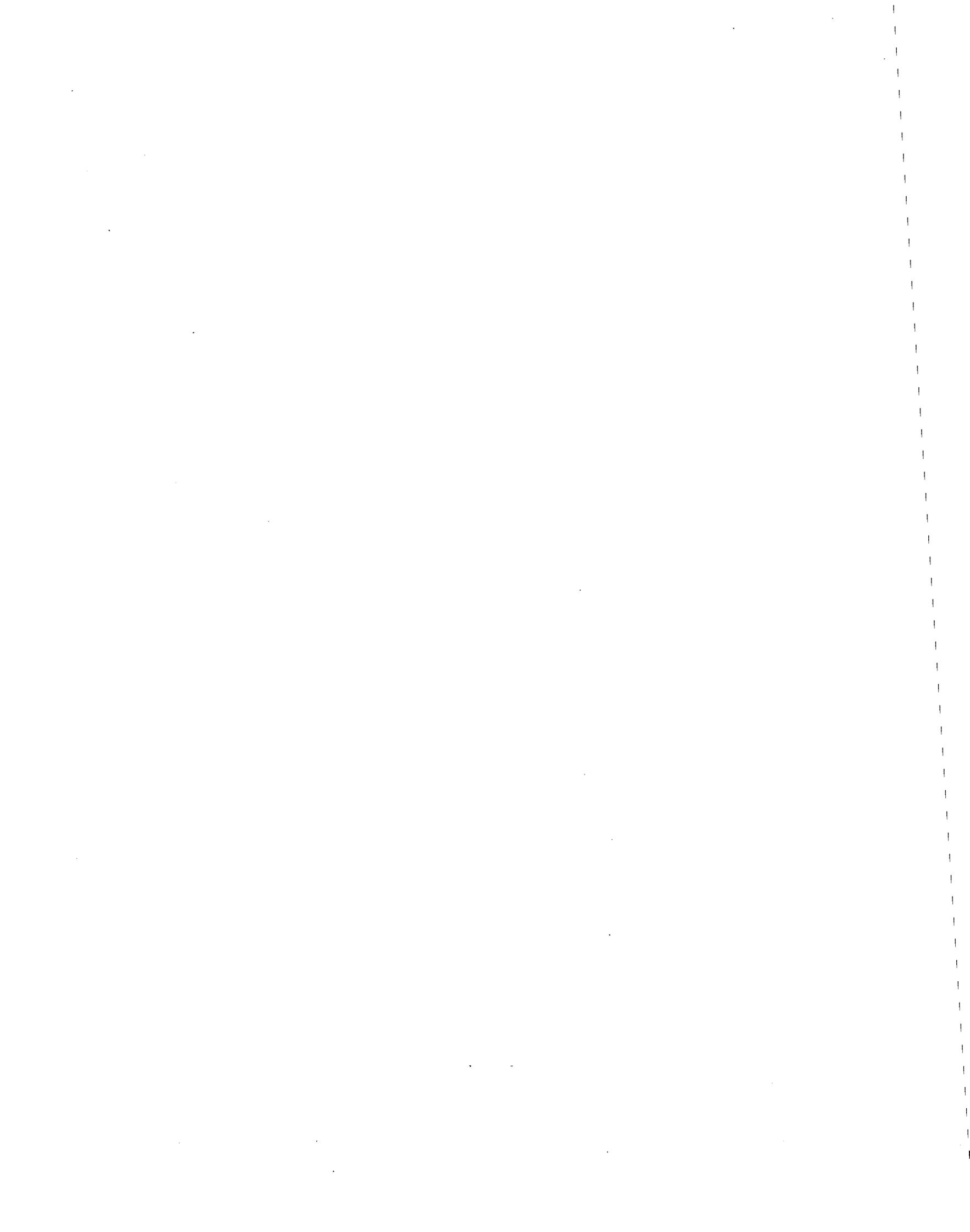
Halstead, W. J.		4-25-77	Materials, in general
Melville, P.		1-01-85	Maintenance
McCormick, F. C.		9-19-84	Structures
Pawlett, N. M.		10-22-73	History
Sherwood, W. C.		9-10-72	Geochemistry, Environment
Zuk, William		2-01-57	Architecture, General Engi- neering, Structures

OTHERS

Graduate Assistants
Summer Trainees
Student Helpers

APPENDIX D

RESUMES FOR COUNCIL STAFF MEMBERS



GARY R. ALLEN
Box 3817 University Station
Charlottesville, Virginia 22903

(804) 293-1938

PERSONAL:

Date of Birth: October 30, 1947

CURRENT POSITION:

Senior Research Scientist

EDUCATION:

B.A. Economics, Berea College 1970
Certificate in Transportation Pricing, Finance, and
Investment Planning, Carnegie Mellon - August 1977
Ph.D., Economics, University of Virginia, May 1978

EXPERIENCE:

August 1973 to present

Senior Research Scientist, Virginia Highway and
Transportation Research Council - responsible
for developing program in applied economics,
administration, finance research and policy
in the field of transportation

May 1972 - August 1972

Graduate Economic Assistant, Virginia Highway and
Transportation Research Council

BIOGRAPHICAL SKETCH

of

Mehmet C. Anday
Senior Research Scientist

Date of Birth : September 7, 1928

Marital Status : Married

Education : B.S. Civil Engineering,
Robert College, 1952

M.S. Civil Engineering,
Purdue University, 1953

Professional Experience: Assistant Materials Engineer with the
Virginia Department of Highways and
Transportation, Fredericksburg, District,
1953-1954.

Construction Engineer, Turkish Ministry
of Public Works, H.Pasa Harbour Constr.
1955-1957.

Construction Engineer, Turkish Sugar
Company, Ankara Sugar Factory Constr.
1958-1959.

Research Engineer
Virginia Highway & Transportation
Research Council, 1959-1962.

Research Engineer C
Virginia Highway & Transportation
Research Council, 1962-1972

Senior Research Scientist,
Virginia Highway & Transportation
Research Council, 1972 - present
Presently serving as Assistant Head.

Military History : Turkish Army Engineering Corps.
1954-1955.

Professional Society

Memberships

: American Society for Testing and Materials:
Committee D-18 Soils and Rocks for
Engineering Purposes, and its Subcommittee
D18.08, Special Construction Control Tests,
Section D18.08.03, Cement Stabilization;
Section D18.08.07, Nuclear Methods;
Chairman, Subcommittee D18.15 Stabilization
with Admixtures; Chairman, Section D18.15.04
Stabilization with Lime; and Subcommittee
D18.99, Evaluation of Data

Transportation Research Board: Committee A2-
J03, Lime and Fly-Ash Stabilization; Committee
A2K02, Embankments and Earth Slopes.

EUGENE D. ARNOLD, JR.
Box 3817 University Station
Charlottesville, Virginia 22903

(804) 293-1931

PERSONAL:

Date of Birth: February 24, 1946

CURRENT POSITION:

Highway Research Scientist C

EDUCATION:

MSCE - Georgia Institute of Technology, 1971
- emphasis in Transportation Planning
- cumulative GPA: 3.8
- Special Research Project: "Development of a Procedure to Evaluate Spot Speed Measurements Using Easily Identifiable Parameters"
BCE (with distinction) - University of Virginia, 1968
- cumulative GPA: 3.2
- Undergraduate Thesis: "An Investigation of the Stripping and Whip-Off Characteristics of Typical Virginia Surface Treatment Materials"

EXPERIENCE:

August 1977 to present

Highway Research Scientist, Virginia Highway and Transportation Research Council - conduct theoretical and applied research in transportation planning, traffic engineering, and public transit. Specifically, (1) initiate, conduct, and achieve implementation of research in above disciplines, (2) keep abreast of current activities in above disciplines and submit findings to the Department of Highways and Transportation (VDH&T) as appropriate, (3) provide consulting and technical services to the operating divisions of the VDH&T, (4) maintain effective communication and liaison with appropriate personnel within the VDH&T, and (5) prepare and present papers and talks to local, state, and national audiences.

Specific Projects and Activities: See Published Research Reports; Talks, Papers, and Presentations; and Miscellaneous Activities

July 1976 to July 1977

Senior Transportation Coordinator, Head, Ports and Waterways Section, Virginia Department of Highways and Transportation, Transportation Coordination Division - provided necessary input data for the multi-modal statewide transportation planning process. Coordinated planning and development of ports and waterways with other governmental agencies and with

EXPERIENCE:
(continued)

other Divisions within the Department. Maintained inventories of existing and proposed port, waterway, and pipeline facilities. Provided staff support to the Governor's Council on Transportation.

Specific Projects -

1. Supervised the development of an informal report entitled "Federal Receipts and Expenditures in Port Areas of Virginia"
2. Supervised the development of an informal report entitled "Port Finances in Virginia"
3. Responsible for development of an informal report entitled "The State's Role in Water Transportation"

Sept. 1, 1974 to
June 1976

Senior Transportation Coordinator, Head, Special Studies Section, Virginia Department of Highways and Transportation, Transportation Coordination Division - primarily responsible for (1) developing and conducting special studies or programs relating to both urban and rural transportation which were requested or were initiated by the Virginia General Assembly, the Department, and the U.S. Department of Transportation, (2) coordinating with others as required who were charged with the responsibility of developing and conducting the aforementioned studies or programs, and (3) providing special studies input as required to the multi-modal statewide transportation plan and other transportation plans. Other areas of responsibility included (1) coordinating with the Transportation Planning Division in developing and/or conducting transportation studies or programs of mutual interest, and (2) providing technical expertise and Departmental policy guidelines regarding special studies and programs through membership on various technical committees.

Specific Projects -

1. Responsible for day-to-day administration of UMTA's Section 16(b)(2) Program for the provision of transportation services to the elderly and handicapped, including the planning requirements.
2. Responsible for day-to-day administration of the U.S. DOT's Rural Highway Public Transportation Demonstration Program (Section 147).
3. Supervised the development of a report entitled "The Feasibility of Para-transit in Virginia", December 1975
4. Supervised the development of a report entitled "Transportation Source Air Pollution in Virginia", House Document 17, 1976
5. Participated in administrative procedures required in supervising a consultant's study which resulted in a report entitled "Commuter Railroad Feasibility in Virginia", House Document 14, 1974.

EXPERIENCE:
(continued)

6. Participated in several local para-transit studies
7. Participated in several local elderly and handicapped studies
8. Supervised the development of an informal report entitled "Richmond-Washington Rail Passenger Demand Study"
9. Participated in the development of an informal report entitled "Interchange Carpool Parking Lot Study", November 1974

January 1972 to
August 1974

Associate Transportation Planning Engineer, Mass Transit Section, Virginia Department of Highways and Transportation, Metropolitan Transportation Planning Division - generally responsible for developing, coordinating, and monitoring highway oriented transit projects within 10 urbanized areas of the state, including the close coordination and cooperation with the transportation districts, planning districts, local jurisdictions, and/or bus companies. Also, provided assistance to the various planning agencies in conducting transit technical studies

Specific Projects -

1. Participated in several fringe lot/express bus projects, including Parham Road Express Lot, Denbigh Lot, Princess Anne Plaza Lot, Dale City/Woodbridge Area, and Greenwood Drive
2. Participated in State-agency carpool survey
3. Participated in several exclusive bus lane projects or studies, including Arlington Boulevard, Virginia Beach Boulevard, Main Street/Cary Street, Wilson Boulevard, and Lee Highway
4. Responsible for parking study in Grundy, Virginia
5. Responsible for transit portion of the 1974 National Transportation Study

October 1971 to
December 1971

Engineer Trainee, Urban Planning Division, Georgia Highway Department - study engineer for the Augusta Regional Transportation Study, primarily involved with the 3-C planning process.

June 1971 to
September 1971

Engineer Trainee, Traffic and Safety Division, Georgia Highway Department - conducted a special project concerning spot speeds to be used as a special research paper at Georgia Tech

September 1970 to
May 1971

Graduate Assistant, Georgia Institute of Technology - assisted a professor in the CE Department in various capacities in teaching an undergraduate course in transportation engineering

November 1968 to
August 1970

U.S. Army - clerical duties

EXPERIENCE:
(continued)

Engineer Trainee, Bituminous Section, Virginia Highway and Transportation Research Council - assisted research engineer in laboratory research concerning asphalt pavement

Summers, 1966 and 1967

Special Summer Undergraduate Assistant, Virginia Highway and Transportation Research Council - responsible for developing a research project and conducting the necessary research (both in the literature and the laboratory) for an assigned problem. Results were written reports entitled "Investigation of Sand, Shell, and Slag in Bituminous Mixes", September, 1966; "Effects of Moisture on Typical Virginia Surface Treatment Materials", March 1968

Summer 1965

Highway Inspector Trainee, Virginia Department of Highways and Transportation - inspected various elements of highway construction

Furman W. Barton

Born:

Greenville, South Carolina, 1932

Education:

B.C.E. (civil engineering)	University of Virginia, 1954
M.S. (structural mechanics)	University of Illinois, 1959
Ph.D. (structural mechanics)	University of Illinois, 1962
Post Doctoral Study	NASA-Langley Research Center, 1966, 1968

Experience:

Research Associate and Assistant Professor, Department of Civil Engineering, University of Illinois, 1957-1964

Assistant and Associate Professor, Department of Civil Engineering, Duke University, 1964-1967

School of Engineering and Applied Science, University of Virginia, Charlottesville, VA

Division of Applied Mechanics:

Chairman, 1971-1975

Department of Civil Engineering:

Associate Professor, 1967-1978

Professor, 1978--

Visiting Professor, University of California, Berkeley, 1980.

Professional Societies:

Phi Eta Sigma

Tau Beta Pi

Chi Epsilon

Sigma Xi

Furman W. Barton

Professional Societies (continued):

Phi Kappa Phi

American Society of Civil Engineers

American Society of Mechanical Engineers

American Academy of Mechanics

HARRY E. BROWN
SENIOR RESEARCH SCIENTIST
VIRGINIA HIGHWAY & TRANSPORTATION
BOX 3817, UNIVERSITY STATION
CHARLOTTESVILLE, VIRGINIA 22903

Telephone: (804) 293-1960

EDUCATION

BSCE, Virginia Polytechnic Institute, 1958
MCE, University of Virginia, 1963

EXPERIENCE

Highway Engineer Trainee, June 16, 1958

Highway Engineer Trainee, August 18, 1958
(Assigned to Prestressed Concrete Plant,
Harrisonburg, Virginia)

Highway Engineer Trainee, May 1, 1959
(Assigned to Location & Design,
Richmond, Virginia)

Highway Engineer Trainee, October 1, 1959
(Assigned to Testing Division,
Richmond, Virginia)

Highway Engineer Trainee, January 4, 1960
(Assigned to Bridge Division,
Richmond, Virginia)

Highway Engineer Trainee, July 1, 1960
(Assigned to Highway Research Council)

Highway Research Engineer A, December 16, 1962

Highway Research Engineer B, July 1, 1964

Resigned from Highway Research Council,
February 28, 1966

Employed by Shockey Brothers, Prestressed
Concrete Company, Winchester, Virginia as
Director of Technical Activities, March 1,
1966.

Employed by the Union Carbide Corporation,
Tarrytown, New York as a Research and
Development Engineer, July 15, 1968

Reemployed by Research Council as a Highway
Research Engineer C, July 1, 1969

Became Section Head of Industrialized
Construction Section, April 3, 1972

Began duties as Assistant Head, August 2,
1976

From August 2, 1976 until present (August
1983), administratively responsible for
all research relative to Concrete, Structures
and Energy

GERARDO G. CLEMENA
P. O. Box 3817, University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1949

CURRENT POSITION

Research Scientist C

COLLEGIATE
TRAINING

Far Eastern University, Manila, B. S.,
1965, Chemistry
University of Virginia, Virginia, M. S.,
1967, Physical Chemistry
University of Virginia, Virginia, Ph.D.,
1971, Analytical Chemistry

EXPERIENCE

Philippine Atomic Research Center, 1964-1965,
Neutron activation analysis utilizing gamma
ray spectrometry.

University of Virginia, 1965-1966, Lab.
instructor in general chemistry.

University of Virginia, 1966-1967, Lab
instructor in radiochemistry.

Rohm & Haas Company, Penna., 1967-1968,
Development and adaptation of analytical
methods in polymer and monomer analyses.

University of Virginia, 1968-1969, Lab.
instructor in courses in electronics and
instrumental chemical analysis.

University of Virginia, 1968-1970, Spark
source mass spectrometry.

Virginia Highway and Transportation Research
Council, 1971 to present, Research Scientist
Conducted research in:

1. chemical analyses of highway materials,
2. highway related air pollution,
3. application of nondestructive testing
techniques in highway maintenance
problems, and
4. usage of solar energy.

CURRENT INTEREST

- (1) Nondestructive inspection of overlaid bridge deck with ground-penetrating radar.
- (2) Testing of concrete with microwave reflection measurements and other nondestructive techniques.
- (3) Cathodic protection of bridge decks.
- (4) Cutting and removal of concrete.
- (5) Chemical analyses of asphalt admixtures.

MEMBERSHIPS

Transportation Research Board, Committee A2H01, Instrumentation Principle and Application.

Transportation Research Board, Committee A3F03, Transportation and Air Quality.

BENJAMIN H. COTTRELL, JR.
Box 3817 University Station
Charlottesville, Virginia 22903

(804) 293-1932

PERSONAL:

Date of Birth: November 30, 1955

CURRENT POSITION:

Highway Research Scientist

EDUCATION:

M.S. in Civil Engineering, University of Virginia,
January 1979

B.S. in Civil Engineering, Rensselaer Polytechnic
Institute, Troy, New York, May 1977

EXPERIENCE:

May 1979 to present

Highway Research Scientist, Virginia Highway and
Transportation Research Council

January 1979 to
May 1979

Highway Engineer Trainee, Virginia Highway and
Transportation Research Council

Michael J. Demetsky

Born:

Pittsburgh, PA, 1941

Education:

B. S. C. E.	Carnegie Institute of Technology, 1963
M. S. C. E.	Carnegie-Mellon University, 1968
Ph. D.	Carnegie-Mellon University, 1971

Experience:

Design Engineer, Swindell-Dressler Company, Pittsburgh, PA,
1963-1964, 1966

Company Officer, US Army, Corps of Engineers (military), 1964-
1966

Project Engineer, Transportation Research Institute, Carnegie-
Mellon University, part-time while a graduate student, 1966-
1970

Department of Civil Engineering, Research Laboratories for the
Engineering Sciences, School of Engineering and Applied
Science, University of Virginia, Charlottesville, VA

Assistant Professor, 1970-1975

Associate Professor, 1975-1982

Professor, 1982--

Resume

Wayne S. Ferguson

EDUCATION

University of Richmond
University of Virginia

Master of Commerce, 1967
Bachelor of Science,
Commerce, 1965

EMPLOYMENT SUMMARY

Virginia Highway and Transportation 1965 - Present
Research Council

PROFESSIONAL EXPERIENCE

Virginia Highway and Transportation 1978 - Present
Research Council

Senior Research Scientist and Group Leader of the Research Council, an organization jointly sponsored by the Virginia Department of Highways and Transportation and the University of Virginia.

Responsible for the administration and management of one of the four Council research groups. Program funded by the Virginia Division of Motor Vehicles from state and federal funds, both grant and contract projects. Staff of four professional researchers, one faculty research engineer, seven to twelve graduate students, and secretaries.

Directed and supervised a study of the performance of timber barricades as the primary barrier/channelization device for work area separation on the widening of I-495 in Northern Virginia.

Directed and supervised research team which evaluated the acceptance and usage of sign permissive right-turn-on-red in Virginia; the potential benefits of general permissive right-turn-on-red, and the traffic, safety, and energy consequences of the alternatives.

Chaired and directed a task force of the Highway Design and Safety Committee of the Virginia Department of Highways and Transportation which involved the development and pilot testing of a short course on highway work zone safety leading to a VDHT certification program for project safety officers.

Directed and supervised research team which evaluated the movement, by highway, of fourteen foot wide manufactured housing units to ascertain the likely traffic, safety, and economic consequences of generally permitting such wide load movements.

Directed and supervised a study to review and evaluate federal and state regulatory, inspection, and enforcement activities regarding motor carrier safety in Virginia.

VHTRC

1969 - 1978

Principal Safety Research Analyst of Highway and Transportation Research Council. Responsible for the administration and management of one of eleven Council sections. Research program funded by the Virginia Department of Transportation Safety from state and federal funds, both grant and contract projects. Staff of six professional researchers, two to five graduate students, and secretary.

VHTRC

1965 - 1969

Research Analyst, Economics, Finance and Administration Section of Highway & Transportation Research Council. Research assignments included primary responsibilities for studies on revenue sources for financing Virginia highways, manpower planning and control, base year expenditures and cost estimates for implementing 1966 Highway Safety Act, and other highway safety studies. Duties included supervising other research staff and graduate students.

COMMITTEE ACTIVITY

Transportation Research Board, National Academy of Science, National Research Council, Division of Engineering.

Chairman (1974-1979) T.R.B. Committee ALA05, Planning and Administration of Transportation Safety.

Member, (1980 -) T.R.B. Group 1 Council, Transportation Systems Planning and Administration.

Chairman and workshop report editor of TRB national workshop on The Role of the State Highway Safety Agency in Managing a State's Highway Safety Program.

Chairman of Conference Planning Subcommittee., Committee ALA05, National Conference on Management Utilization of Traffic, Accident, and Highway Data for Planning and Evaluating Highway Safety Programs.

INSTRUCTIONAL ACTIVITY

Served as instructor for National Highway Traffic Safety Administration sponsored national workshops on the evaluation of highway traffic safety programs. Also served on committee providing oversight to the development of curriculum material for the workshops.

Instructor, University of Virginia Division of Continuing Education short courses on principles of traffic engineering for technicians.

MEMBERSHIPS

Transportation Research Board, National Academy of Sciences,
National Research Council, Division of Engineering.

Highway Design and Safety Committee, Virginia Department of
Highways and Transportation.

Alpha Kappa Psi

Virginia Safety Association

Nicholas J. Garber

Born:

Freetown, Sierra Leone, West Africa, April 13, 1936

Marital Status:

Married

Education:

B.Sc.	(civil engineering)	Battersea College, University of London, 1961
M.S.		Carnegie-Mellon University, Pittsburgh, PA, 1968
Ph.D.		Carnegie-Mellon University, Pittsburgh, PA, 1970

Experience:

Teaching

Part-time lecturer, Fourah Bay College, University of Sierra Leone, teaching 3 hours a week, final year engineering students, 1964-1965

Part-time lecturer, Fourah Bay College, University of Sierra Leone, teaching 3 hours a week, final year engineering students, 1966-1967

Teaching fellow, Carnegie-Mellon University, Pittsburgh, Pennsylvania, teaching 3 hours a week, of soil mechanics at undergraduate level, 1968-1969

Assistant professor of Engineering and Applied Science, State University of New York at Buffalo, teaching 3 hours a week, of Soil Mechanics at the undergraduate level and 3 hours a week, of Transportation at the post-graduate level, 1970-1972

Associate Professor and subsequently Dean of the Faculty of Engineering, Fourah Bay College, University of Sierra Leone, teaching 12 hours a week at undergraduate level, 1972-1980

Nicholas J. Garber

Experience (continued):

Visiting Associate Professor, Civil Engineering Department, University of Virginia, teaching of graduate and undergraduate courses, 1980-1981

Associate Professor, Civil Engineering Department, University of Virginia, teaching of graduate and undergraduate courses, 1981--

Professional

Engineer, Jenkins Potter and Bingham, Consulting Engineers, London, 1961-1962

Engineer, Randell Palmer and Tritton Consulting Engineers, London, 1962-1963

Engineer, Scott and Wilson Kirk Patrick, Consulting Engineers, London, 1963-1964

Executive Engineer, subsequently Senior Executive Engineer, Ministry of Works, Sierra Leone, 1964-1967

Project Engineer, Systems Planning Co-operation, Consulting Engineers, Pittsburgh, Pennsylvania, 1969-1970

Consultant, Techsult and Company Ltd, Consulting Engineers, Freetown, Sierra Leone, 1972--

Membership of Committees:

Member of the Sectorial Committee on Transport and Communications, a sub Professional Committee of the Sierra Leone Planning Board.

Member of Council, and President of Sierra Leone Institution of Engineers.

Member of Senate University of Sierra Leone.

Member of Court University of Sierra Leone.

Member, Traffic Records and Accident Analysis Committee (A3B11), Transportation Research Board.

Executive Member, Minorities in Engineering Committee, American Society for Engineering Education.

Nicholas J. Garber

Professional Societies:

American Society of Civil Engineers - Member

Institution of Civil Engineers (U. K.) - Member

Institution of Engineers (Sierra Leone) - Member

Institute of Transportation Engineers - Member

American Society for Engineering Education - Member

Professional Registration:

United Kingdom - MICE, Chartered Engineer

Member, Sierra Leone Institution of Engineering

Commonwealth of Virginia

Honors:

National Scholarship, 1957

Pittsburgh Plate Glass Fellowship, 1967

WOODROW J. HALSTEAD
P. O. Box 3817, University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1953

PERSONAL

Married
Date of Birth: 4/07/1913
Place of Birth: Norfolk County, Virginia

EDUCATION

B.S. in Chemical Engineering, University of
Virginia, 1934

Special Training in Electronics, USNR, 1944-45

EXPERIENCE

August 1975 to Present: Independent consultant
on highway materials problems. Beginning in
April 1977, served primarily as a parttime
consultant with Virginia Highway and Trans-
portation Research Council. Principal
investigator of several projects. These
include:

- (a) Use and Conservation of Energy in Highway
Construction;
- (b) Potential for Utilizing Industrial Waste
and By-Products in Construction of
Transportation Facilities in Virginia;
- (c) Use and Quality Control of Fly Ash as an
Ingredient in Hydraulic Cement Concrete
for Highways; and
- (d) Performance Related Specifications for
Hydraulic Cement Concrete.

All of these involved state of the art pre-
sentations with special attention to the
applicability to Virginia conditions. Provides
assistance concerning other researchers on
concrete and asphalt properties as requested.

During same period served as consultant to
several panels preparing synthesis of information
on problems of national concern for the Trans-
portation Research Board (NCHRP Synthesis Project
Activities involved review of published literature
consultation with active researchers and highway
engineers dealing with problem and preparation of
the draft of the report on the subject. Subject
matter of reports prepared includes:

- (a) Open Graded Asphalt Friction Course for
Highways;

- (b) Quality Assurance for Highway Construction;
- (c) Energy involved in Highway Construction Materials and Procedures; and
- (d) Criteria for Asphalt Friction Courses.

June 1935 to August 1975: Employed by Federal Highway Administration. During career conducted, planned and administered research on highway materials including test methods and procedures for asphalts, asphalt mixtures, tars, cements, concretes, paints, soils, and other speciality materials. (This period included 2 years (1944-46) on active duty with U.S. Navy as Reserve Officer).

Level of responsibilities progressively increased from Research Chemist and Chemical Engineer to management positions. Held position of Chief, Materials Division, Office of Research of Federal Highway Administration for 8 years prior to retirement (1968-75).

PROFESSIONAL
AFFILIATION

Active throughout career with professional groups including American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), Highway Research Board (now Transportation Research Board - TRB), and Association of Asphalt Paving Technologists (AAPT).

Chairman of ASTM Committee C.01 on Cements (1963-68) and active on Committee D.04 on Road and Paving Materials, serving as chairman of a number of subcommittees at various times. Also, active on Committee C.09 on Concrete. A member of ASTM's Committee on Standards for six years.

Member of several TRB committees and chairman of Committee on Properties of Concrete-Chemical Aspects (6 years) and a member of Group Two Council (planning group for annual meetings (3 years)).

Secretary of AASHTO Committee on Materials (10 years). Duties including preparing text for publication of AASHTO Standards on Highway Materials and Test Methods.

Member, Board of Directors for AAPT for 7 years (1966, 68-73), president of AAPT (1971).

Marvin H. Hilton

Born:

Lynchburg, Virginia; October 19, 1932

Education:

B. C. E. University of Virginia, 1959

M. C. E. University of Virginia, 1966

Experience:

Virginia Department of Highways:

Engineering Drafting and Highway Construction Inspection,
1951-1953, 1955-1958

Location and Design, Materials, Traffic and Planning, Bridge
Design, and Bridge Construction, 1959-1963

US Army Signal Corps (military service), 1953-1955

Research Engineer, Virginia Highway and Transportation Research
Council, 1963--

Part-time Instructor (night school), City of Charlottesville, VA,
1970-1973

University of Virginia, Charlottesville, VA:

Lecturer, Landscape Architecture, School of Architecture,
1973, 1974

Lecturer, Civil Engineering Department, School of Engineering
and Applied Science, 1977--

Registration:

Registered Professional Engineer, State of Virginia

Professional Societies:

American Society of Civil Engineers
Blue Ridge Branch (Past President, Director)
Virginia Section Committee on Awards

Sigma Xi

Marvin H. Hilton

Professional Societies (continued):

Transportation and Research Board:

Committee A2-F04, Construction of Bridges and Structures (Past
Chairman)

Standing Committee on Research Needs

Committee A3-A04, Visibility

Energy Research Task Group, Virginia Highway and Transportation
Research Council (Chairman)

LESTER A. HOEL

Birthdate

February 26, 1935

Education

B.C.E. (cum laude)	City College of New York, 1957
M.C.E.	Polytechnic Institute of New York, 1960
D.Eng.	University of California (Berkeley), 1963

Experience

Lecturer in Civil Engineering, City College of New York, New York,
1958-1960

Assistant Professor of Engineering, San Diego State College,
San Diego, California, 1962-1964

Fulbright Research Scholar and Visiting Professor of Transportation,
1964-1965, Norges Tekniske Hogskole, Trondheim and Institute
of Transport Economy, Oslo, Norway, 1964-1965

Principal Engineer, Wilbur Smith and Associates, 1965-1966

Carnegie-Mellon University, Pittsburgh, Pennsylvania
Associate Professor of Civil Engineering, 1966-1970
Associate Director of Transportation Research Institute, 1966-1974
Professor of Civil Engineering, 1970-1974

Hamilton Professor and Chairman, Department of Civil Engineering,
School of Engineering and Applied Science, University of
Virginia, Charlottesville, Virginia, 1974 - present

Professional Societies

American Society of Civil Engineers
Institute of Transportation Engineers
Transportation Research Board
American Society for Engineering Education
Transportation Research Forum
American Association for Advancement of Science
Sigma Xi
Chi Epsilon
Tau Beta Pi

Professional Registration

California, Pennsylvania, Virginia

Honors

City College of New York Alumni Award, 1957
Fulbright Research Scholar, 1964-1965
Who's Who in America
Walter L. Huber Civil Engineering Research Prize, ASCE, 1976
Pyke Johnson Transportation Research Board Award - for most outstanding paper in the field of planning and administration, 1978

Consulting

Staff Consultant, GAI, Inc., Monroeville, Pennsylvania
Vice President, Systems Planning Corporation
Commonwealth of Puerto Rico
Michigan Department of Transportation
Consulting Associate, Roger Creighton, Associates
CONSAD Research Corporation
Pittsburgh Urban Redevelopment Authority
Pennsylvania Department of Highways and Transportation
Trailways Corporation
Transportation Research Board
State of New Jersey, Department of Education
Onqui-Harai, Associates, Pittsburgh
Carrol V. Hill and Associates, Columbus, Ohio
Urban Design Associates
Techsult, Ltd.

Courses Taught

Highway Engineering
Transportation Engineering
Engineering Economics
Introduction to Engineering Planning
Transportation Systems Planning and Analysis
Traffic Theory and Application
Urban Transportation: Issues and Problems
Interregional Transportation Systems
Transportation Systems Design

Book Reviews

Holt, Rinehart and Winston
Prentice-Hall
Macmillan Publishing Co.
Allyn and Bacon
Addison-Wesley
McGraw-Hill
William C. Brown
AAAS - Science Book and Films
Civil Engineering - ASCE

University and Community Committees

University Traffic and Parking (Chairman)
 Search Committee for Associate Dean (Chairman)
 SEAS Promotions Committee
 SEAS Space Committee
 Engineering Research Building Committee
 International Students Committee
 Policy Board, Charlottesville Urban Observatory Program
 Policy Committee, Charlottesville Area Transportation Study
 SEAS CAD/CAM Committee

Editorial Advisory Boards

Journal of Specialized Transportation: Planning and Practice
 Transportation Research Journal
 Journal of Advanced Transportation
 Socio-Economic Planning Sciences
 Lea Transit Compendium

Professional Committees

Council of University Transportation Centers (Secretary-Treasurer)
 Transportation Research Board
 Executive Committee Member
 Division A Council (Chairman)
 Intermodal Transfer Facilities Committee
 Transportation Education and Training (Chairman)
 Workshop on Vertical Movement in Transit Stations (Chairman)
 Transportation for the Transportation Disadvantaged
 Ad Hoc Committee on Railroad Education
 Statewide Multimodal Transportation Planning
 Task Force on Post 1990 Issues for the Northeast Corridor (Chairman)
 State Role in Rail Transport
 National Cooperative Highway Research Program
 Project Panel B8-21 (Chairman)
 State Role in Rail Transport
 Task Force on Multidisciplinary Education in Transportation
 Systems Planning
 Institute of Transportation Engineers
 Station Access Committee
 Traffic Planning for New Towns
 Transportation Planning for Colleges and Universities
 American Society of Civil Engineers
 Transportation Research Council
 Transportation Education Committee (Chairman)
 Highway Safety Committee (Chairman)
 Accreditation Board for Engineering and Technology (ABET)
 Ad Hoc Visitor for Civil Engineering and Engineering and
 Public Affairs

BIOGRAPHICAL SKETCH

of

C. S. Hughes
Senior Research Scientist

Date of Birth : September 26, 1935

Marital Status : Married

Education : B.S.C.E. - Virginia Polytechnic Institute
and State University, 1958
M.S.C.E. - University of Virginia, 1962

Professional Experience: 1958-1962 - Highway Engineer Trainee
(Survey Party, Location & Design,
Materials Division, Research)
1962-1965 - Research Engineer B,
Bituminous Section
1965-1968 - Head, Pavement Section
1968-1973 - Head, Bituminous Section
1973 - present, Senior Research Scientist

Military History : None

Professional Society
Memberships : Association of Asphalt Paving Technologists
National Cooperative Highway Research
Program
Transportation Research Board
Registered Professional Engineer
Chi Epsilon
Tau Beta Pi
Sigma Xi

RESUME

William E. Kelsh

EDUCATION

University of Virginia	Master of Computer Science
University of Virginia	Master of Planning
University of Virginia	B.A., Mathematics

EMPLOYMENT SUMMARY

Virginia Highway and Transportation Research Council - Safety Group	1979 - Present
Virginia Highway and Transportation Research Council - Environmental and Economics Section	1979 - 1979
Insurance Claims Adjuster	1973 - 1975

PROFESSIONAL EXPERIENCE

Virginia Highway and Transportation Research Council
Research Scientist

Contract manager for implementation of RAPID accident analysis software system in Virginia.

Principal investigator in design, development, and implementation of a model microcomputer-based local traffic records system.

Principal investigator in development of an implementation plan for reform of Virginia's statewide accident processing system.

Staff researcher for Governor's Task Force on Drunk Driving, Public Education and Community Action Committee.

Principal investigator in study, review, and evaluation of Virginia's Traffic Records Project.

Principal investigator in study and evaluation of NHTSA's Data Analysis and Reporting Techniques (DART) System.

Principal investigator in economic analysis of Virginia's system for processing accident data.

Editor and co-author of Virginia's FY 1981 Highway Safety Plan.

Co-principal investigator in the development of an automated file of essential highway safety planning data. Coordinated development of computer system to compile statewide driver education program statistics.

Virginia Highway and Transportation Research Council
Research Assistant

Co-principal investigator in exploring the feasibility of using computer graphics techniques for environmental assessments.

General Adjustment Bureau, Inc. - Claims Adjuster

Investigated, negotiated, and settled multiple line insurance claims including fire, theft, automobile, personal liability and workmen's compensation claims.

MEMBERSHIPS

Member of National Safety Council Traffic Records Committee.

Member of National Safety Council Traffic Records User Committee for Data Analysis.

Member of Transportation Research Board

Member of TRB special task force to review TRB activities related to accident records and highway safety data analysis.

Member of Task Force for TRB Committee A1A05 to plan and organize National Conference on Management Utilization of Traffic, Accident, and Highway Data for Planning and Evaluating Highway Safety Programs.

BIOGRAPHICAL SKETCH

of .

Robert R. Long, Jr.
Research Assistant

DATE OF BIRTH : December 22, 1957

HOMETOWN : Front Royal, Virginia

MARITAL STATUS: Married

EDUCATION : M.E. Civil Engineering, University of Virginia,
May 1982
B.A. Environmental Science, University of
Virginia, May 1980

WORK EXPERIENCE: Employed by the Research Council full- and
part-time since June 1979. Originally a student
helper in the Environmental Section. Currently,
a researcher in the Pavement Section. Research
centers around pavement management. Also,
experienced with computer analysis.

CHERYL W. LYNN

1455 Canfield Lane
Charlottesville, VA. 22901
(804) 979-8049 (Home)
(804) 293-1905 (Office)

RESEARCH SCIENTIST with a federally sponsored state research agency. Responsibilities include the conception, preparation, execution and presentation of research, and training of research personnel in the area of transportation safety. Areas of knowledge include survey research and opinion polling, applied statistical procedures, general experimental design, computer applications and technical writing.

EXPERIENCE

July 1977-
present Safety Group, Virginia Highway and Transportation Research Council, Charlottesville, Virginia: State research organization sponsored jointly by the Virginia Department of Highways and Transportation, the University of Virginia, and the Virginia Department of Transportation Safety.

Position: Research Scientist

Responsibilities: To plan and conduct independent research projects in relation to road user behavior; to act as liaison with the data processing division in development of information systems and analysis; to provide statistical consulting for colleagues, and training and supervision for student researchers; to produce reports of research fundings and provide technical editing.

Aug. 1974-
July 1977 Virginia Highway and Transportation Research Council

Position: Research Analyst

Responsibilities: To plan and conduct research projects, and to produce reports of the findings: to provide some statistical consulting and training.

April 1973-
Aug. 1974 Virginia Highway and Transportation Research Council

Position: Research Assistant

Responsibilities: To conduct research under supervision and some independent studies; to produce research reports; to plan and conduct statistical analyses; to edit reports and prepare synthesis of available literature.

Prior to
April 1973

Research assistant for professor in perceptual and industrial psychology, educational psychology, and physiological psychology at the University of Virginia (2 years).

EDUCATION

Bachelors: University of Virginia (1971)
Majors: Psychology, Undergraduate Research

Masters : University of Virginia (May 1975)
Major : Educational Psychology

Working knowledge of ALGOL, FORTRAN, and BASIC, and experience with interactive systems and standard statistical packages, such as SPSS, SAS, OMNITAB, etc.

PUBLICATIONS See attached list. All publications are available upon request.

PROFESSIONAL SOCIETY MEMBERSHIPS American Statistical Association
American Psychological Association
Human Factors Society
Transportation Research Board

AWARDS

Virginia Juried Research Award: Best Paper 1978 -
"Repeal and Modification of Mandatory Motorcycle
Helmet Legislation."

Virginia Juried Research Award: Best Paper 1979 -
"Truck Safety Regulation, Inspection and Enforce-
ment in Virginia." (co-author)

Dillard Award: Runner up 1980: "The Impact of Lower-
ing the Legal Drinking Age in Virginia."

Dillard Award: Best Paper 1982: "The Impact of the
Virginia Driver Improvement Program on Negligent
Driving - 12 Month Report."

NHTSA Award of Honor, 1983 "The Impact of the Virginia
Driver Improvement Program on Negligent Driving -
24-Month Report."

Biographical Sketch

DAVID C. MAHONE
Senior Research Scientist

DATE OF BIRTH: July 31, 1927

MARITAL STATUS: Married

EDUCATION: B. S. University of Virginia - 1954
Completed 24 hours course work toward Master's Degree
In Education
Completed 30 hours at School of Engineering & Applied
Science, University of Virginia

PROFESSIONAL EXPERIENCE: Teacher of science, mathematics, history,
U. S. government, physical education,
Coached - baseball, football and basketball
Virginia Highway & Transportation Research
Council
Materials Technician C - 1957-1960
Research Engineer A - 1960 - 1965
Research Analyst B - 1965 - 1967
Research Analyst C - 1967 - 1974
Senior Research Scientist - 1974 - present

MILITARY HISTORY: U. S. Navy - June 1945 - August 1948

PROFESSIONAL SOCIETY MEMBERSHIPS:

Sigma Xi
American Society for Testing & Materials
National Cooperative Highway Research Progr
Transportation Research Board

BIOGRAPHICAL SKETCH

of

G. W. Maupin, Jr.
Research Scientist

Date of Birth : April 25, 1941

Marital Status : Married

Education : B.S.C.E., University of Virginia, 1964
M.S.C.E., University of Virginia, 1968

Professional Experience : 1964 - 1968 - Engineer Trainee
1964 - 1965 - Worked in field in
Culpeper District
1965 - 1968 - Worked at Research
Council
1968 - 1973 - Research Engineer B
1973 - Present - Research Scientist C

Military History : None

Professional Society
Memberships : American Society for Testing and
Materials: First Vice Chairman
Committee D-4; Subcommittee D04.20,
Mechanical Tests of Bituminous Mixes;
Subcommittee D04.21, Specific Gravity
and Density of Bituminous Mixtures;
D04.37, Modifier Agents for Bitumen in
Pavements and Paving Mixtures.

Transportation Research Board: Committee
A2D03, Characteristics of Bituminous-
Aggregate Combinations to Meet Surface
Requirements.

American Society of Civil Engineers

Registered Professional Engineer

DANIEL D. McGEEHAN
Box 3817 University Station
Charlottesville, Virginia 22903

(804)293-1922

PERSONAL:

Date of Birth: November 13, 1939
Marital Status: Married with 4 children

CURRENT POSITION:

Highway Research Scientist C

EDUCATION:

B.A., Lincoln University, Pennsylvania, 1969
M.Ed., University of Virginia, 1973
20 additional credits in Public Administration,
Graduate School of Government and Foreign Affairs,
University of Virginia

EXPERIENCE:

September 1979-
Present

Virginia Highway and Transportation Research Council:
1969-1973, Research Analyst A
1973-1974, Research Analyst B (Acting Section Head)
1974-1976, Section Head
1976-1979, Principal Research Analyst C
1979-Present, Research Scientist

January 1969-
September 1969

Insurance Company of North America - Management Trainee

MILITARY HISTORY:

U.S. Marine Corps, Active Duty, 1960-1964;
Reserve, 1964-1966;
Present Status, 5A

PROFESSIONAL SOCIETY
MEMBERSHIPS:

Transportation Research Board: Secretary and Task
Force Chairman on Committee for Citizen Participation
in Transportation Planning (CP/TP)

Member of Committee on Environmental Impact Statement
Review Process (formation committee)

National Association of Underwater Instructors

National Oceanographic Society

August 1, 1983

Biographical Sketch
K. H. McGhee
Senior Research Scientist

Born: May 14, 1936

Marital Status: Married

Education: B.C.E., University of Virginia, 1964
M.C.E., University of Virginia, 1968

Professional Experience:

Construction Inspection and Materials Testing - 3 years
Research Studies in Highway Materials and Pavement Design - 23 years

Military History: U. S. Army Reserves 1954-62
Honorably Discharged

Professional Society Memberships and Activities:

Transportation Research Board

Past Chairman, Committee A2B05, Pavement Condition Evaluation;
Member, Committee A2B06, Pavement Management Data Collection and Analysis.
Former member Concrete Curing Committee; Pavement Drainage Committee;
Task Force on Optimizing the Use of Materials and Energy in Construction.

National Cooperative Research Program

Project C1-17, Recycling Pavement Materials, Problem Author and
Panel Member
Project C1-19, Nationwide Survey of Jointed Concrete Pavements,
Chairman Advisory Panel
Project 20-5, Topic 10-05, Collection and Use of Pavement Condition
Data, Member Topic Panel
Project C1-21, Repair of Joint-Related Distress in Portland Cement
Concrete Pavements, Panel Member.
Project 20-5, Topic 13-04, Portland Cement Concrete Overlays,
Panel Member

Federal Highway Administration

Chairman, Region 3 Pavement Management Advisory Committee;
Member Review Panel, FCP Project 1-W;
Technical Advisory Committee on Cost Allocation

American Concrete Paving Association

Past Chairman, Restoration and Rehabilitation Committee;
Former Member Materials and Mix Design Subcommittee;
Former Member Joints Subcommittee.

Registered Professional Engineer

Society of Sigma Xi

Tau Beta Pi

WALLACE T. McKEEL, JR., RESEARCH ENGINEER
VIRGINIA HIGHWAY AND TRANSPORTATION RESEARCH COUNCIL
BOX 3617 UNIVERSITY STATION
CHARLOTTESVILLE, VIRGINIA 22903

EDUCATION:

B.S. (Civil Engineering)	Virginia Military Institute - June 1957 Lexington, Virginia
Master of Civil Engineering	University of Virginia - August 1963 Charlottesville, Virginia

REGISTRATION:

Registered Professional Engineer, Commonwealth of Virginia

PROFESSIONAL COMMITTEES AND ACTIVITIES:

Chairman, TRB Committee A3C14, Adhesives and Bonding Agents
Member, TRB Committee A3C06, Structures Maintenance
Member, ACI Committee 546 on Repair of Concrete Bridges
Member, NCHRP Review Panel 12-18
Member, NCHRP Review Panel, Project 20-5, Topic 14-12,
Use of Epoxies with Concrete
Past President, Blue Ridge Branch, Virginia Section, ASCE

EXPERIENCE:

1957-1959	Engineer, ESSO Research and Engineering Company, Linden, New Jersey
1953	6 Months active duty, 2Lt USAR
1959-1963	Bridge Design Engineer, Virginia Department of Highways, Richmond, Virginia
1963-1968	Bridge Design Engineer, Virginia Highway Research Council Charlottesville, Virginia.
1968-Present	Research Engineer, Virginia Highway and Transportation Research Council, Charlottesville, and Head, Structures Research Section, 1968-75.

BIOGRAPHICAL SKETCH

of

David F. Noble
Research Scientist

PERSONAL : Born April 20, 1928, married

EDUCATION : B.S. in Geology, Franklin and Marshall
College, Lancaster, Pa., 1952.
M.S. in Geology, Florida State University,
Tallahassee, Florida, 1962.

PROFESSIONAL EXPERIENCE: Virginia Highway & Transportation
Research Council, Charlottesville,
Virginia, 19 1/2 years.
U.S. Naval Oceanographic Office,
Suitland, Maryland, 1 1/4 years.
Virginia Department of Highways,
Richmond, Virginia, 3 1/2 years.
Louis Moyd, Consulting Geologist,
exploration, Yonkers, N.Y., 2 1/2 years.

MILITARY EXPERIENCE : U.S. Army, July 1946 to December 1947.

PROFESSIONAL SOCIETY
MEMBERSHIPS : Clay Minerals Society, 20 years
Transportation Research Board, 15 years
A2H01 - Subcommittee on Noise
A3B07 - Subcommittee on Liaison

H. Celik Ozvildirim

Born:

December 26, 1944

Education:

BSCE Robert College, Turkey, 1967

MSCE Robert College, Turkey, 1969

Ph. D. (civil engineering) University of Virginia, 1974

Experience:

(route location and bridge analysis and design), Tek-Ser Design Bureau, Turkey, 1968-1969

Research Scientist (properties and performance characteristics of concrete; bridge rating and analysis), Virginia Highway and Transportation Research Council, 1974--

Lecturer, Civil Engineering Department, School of Engineering and Applied Science, University of Virginia, Charlottesville, VA, 1977--

Professional Societies:

American Concrete Institute

Committee 226 - Fly Ash, Slag, Other Mineral Admixtures, and Supplementary Cementitious Materials

Committee 308 - Curing Concrete

Committee 309 - Consolidation of Concrete

American Society for Testing and Materials

Committee C-9 - Concrete and Concrete Aggregates

Transportation Research Board

Committee A2E05 - Chemical Additions and Admixtures for Concrete

Biographical Resumé

of

Nathaniel Mason Pawlett
Faculty Research Historian

Birth : October 20, 1935

Marital Status : Married

Education : M.A. in History - University of Virginia

Professional Experience : Faculty Research Historian, Virginia Highway
& Transportation Research Council, 10 years
Lecturer in History, Piedmont Virginia
Community College, 4 years

Military History : U.S.A.F. 1956-1960

Professional Society
Memberships : Association for Preservation Technology
Society of Architectural Historians of
Great Britain
Society for Industrial Archaeology
Virginia Historical Society

MICHAEL A. PERFATER
P.O. Box 3817-University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1939

PERSONAL

Date of Birth: November 12, 1946

CURRENT POSITION

Research Scientist C

EDUCATION

B.A. Sociology - University of Virginia, January 1970

M.Ed Educational Sociology - University of Virginia,
January 1972

Six post graduate hours in Urban Sociology and
Statistics

Certificate in Citizen Participation, Norfolk State
College, 1973

Certificate in Communications, University of Virginia,
1974

PROFESSIONAL
DEVELOPMENT

February 1966 to February 1970, Student Assistant in
the Research Council's report section (part-time
and full time).

February 1968 to September 1968, Methods Analyst
with the Norfolk and Western Railway System. Prepared
a manual on an automated method for overhauling diesel
locomotives.

February 1970 to March 1972, Graduate Assistant in the
Research Council's Economics section. Assisted in
public hearings studies and conducted study on
Relocation in Virginia.

March 1972 to June 1974, Research Analyst A in the
Council's Economics section. Conducted studies on
social and environmental impacts and developed
expertise in questionnaire design.

June 1974 to August 1979, Research Analyst B with
Environmental Management and Economics Section
(now a part of Traffic Operation and Transportation
Systems group). Responsible for studies on social
and environmental impact, residential relocation,
pedestrian travel, audiovisual enhancement of
public information procedures, public opinion
polling and for the Council's work in community
involvement.

RICHARD NEAL ROBERTSON
P.O. Box 3817-University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1924

PERSONAL

Married 5'9" 180 lbs.
Date of Birth: 6/8/40
Place of Birth: Danville, Virginia

CURRENT POSITION

Senior Research Scientist C

EDUCATION

B.S.- 1962, Virginia Polytechnic Institute
Major: Civil Engineering

M.S., 1972, Virginia Polytechnic Institute and
State University
Major: Transportation

Professional Program in Urban Transportation,
Carnegie-Mellon University, 1976

EXPERIENCE

September 1972
to
Present

Virginia Highway and Transportation Research Council -
Research Scientist C - Responsible for the administration
of the Council's traffic operations and transportation
systems group which conducts theoretical and applied
research leading to a more scientific and improved
approach to transportation planning and systems.

October 1965
to
September 1971

Virginia Department of Highways - District Traffic
Engineer, Culpeper District - In charge of the district
traffic office which covers thirteen counties, including
the urban area of Northern Virginia. Duties consisted
of the planning, operations and maintenance of traffic
activities. The traffic organization consisted of
thirteen engineers and technicians and 70 installation
and maintenance personnel.

August 1962
to
September 1965

Virginia Department of Highways - Highway Engineer
Trainee - Through the Department's Engineer Training
Program, experience was received in construction,
location and design, and traffic and planning. While
in the Traffic and Planning Division, detailed
knowledge and experience were received through the
In-Service Training Program.

PROFESSIONAL
MEMBERSHIP

International Right-of-Way Association. 1983
President/Director of that body.

NATIONAL COMMITTEE
ASSIGNMENT

Member of the Transportation Research Board Committee
on Citizen Participation. Within that committee
chairman of the Task Force on Information Exchange.

STATE COMMITTEE
ASSIGNMENT

Past Chairman of Right-of-Way Environment, Education
and Program Committees of the International Right-
of-Way Association. Also served as Secretary,
Vice-President, President Elect and President of
that body.

August 1979 to present, Research Scientist C with Traffic Operations and Transportation Systems Group. Responsible for studies in public participation, public preferences for signing and signal treatments, in-house studies of management methodologies in various areas, feasibility of teleconferencing within Department operations, and motorist services.

FRANK D. SHEPARD
Box 3817 University Station
Charlottesville, Virginia 22903

(804)293-1930

PERSONAL:

Date of Birth: December 28, 1937

CURRENT POSITION:

Highway Research Scientist C

EDUCATION:

MCE, University of Virginia, 1964

BCE, University of Virginia, 1962

Certificate of Traffic Engineering, Yale Bureau of
Highway Traffic, 1968

EXPERIENCE:
1964 to Present

Highway Research Scientist, Virginia Highway and
Transportation Research Council, Charlottesville,
Virginia

BIOGRAPHICAL SKETCH

of

W. Cullen Sherwood
Faculty Research Analyst

BIRTH : February 8, 1932

MARITAL STATUS : Married, three children

EDUCATION : B.A. in Geology - University of Virginia
M.A. in Geology - University of Virginia
Ph.D. - Lehigh University

PROFESSIONAL EXPERIENCE: Virginia Highway & Transportation
Research Council, 8 years
Professor of Environmental Sciences -
4 years, University of Virginia
Professor of Geology - 11 years,
James Madison University

MILITARY HISTORY : U.S.A. Army, 1954-1956

PROFESSIONAL SOCIETY
MEMBERSHIPS : Geological Society of America
Virginia Academy of Science
American Institute of Professional
Geologists

MICHAEL M. SPRINKEL
P. O. Box 3817, University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1941

PERSONAL

Married 6'0" 190 lbs.
Date of Birth: 6/28/1948
Place of Birth: Charlottesville, Virginia

CURRENT POSITION

Research Scientist C

EDUCATION

B.S., Civil Engineering, 1972
University of Virginia

Master of Engineering, Civil Engineering, 1975
University of Virginia

REGISTRATION

Registered Professional Engineer, Virginia

EXPERIENCE

June 1972
to
Present

Virginia Highway & Transportation Research Council -
Research Scientist - Responsible for planning,
conducting, and implementing research in the areas
of industrialized construction, concrete, timber,
steel and polymer materials, and alternative fuels.

December 1967
to
June 1972

Virginia Department of Highways & Transportation -
Sub-professional responsibilities in highway
location and design and inspection of materials
and construction.

RESUME'

Charles B. Stoke

EDUCATION

B.A., University of Virginia, 1963
M. Ed., University of Virginia, 1965
30 semester hours beyond Masters toward doctorate

CAREER SUMMARY

1965-1966 - Fork Union Military Academy - Instructor of Science, Guidance Counselor, and coached three sports.

1966-1970 - City of Charlottesville Public Schools - Guidance Counselor, in charge of standardized testing program at one Jr. High School plus standard counselor duties.

1970 - Present - VHTRC Safety Section - Principal investigator in driver improvement and behavior, licensing and testing of drivers, moped and bicycle safety, pedestrian safety, seat belt use, and related topics.

PROFESSIONAL AFFILIATIONS

American Driver & Traffic Safety Education Association
Research Division Secretary '73-'74
Research Division Vice Chairman '74-'75
Transportation Research Board
Member A3B03, Operator Education and Regulation Committee
Member A3B02, Vehicle User Characteristics
American Psychological Association, Div. 22
Virginia Safety Association

HONORS AND
PROFESSIONAL
SOCIETIES

Member, American Society of Civil Engineers,
Secretary - Blue Ridge Branch ASCE

Professional Member, Post-tensioning Institute

Member, TRB Committee A2F04
"Construction of Bridges and Structures"

Member, TRB Committee A2E03
"Mechanical Properties of Concrete"

Member, Concrete Research Advisory Committee,
Virginia Highway & Transportation Research Council

HOLLIS N. WALKER
P. O.Box 3817, University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1952

PERSONAL

Birth: June 6, 1926, Medford, Mass.
Caucasian, Female
Marital: Widowed; five daughters, all adult

EDUCATION:

A.B. Geology, Boston University, 1947
M.S. Geology, University of Michigan, 1949

CURRENT POSITION

Research Scientist C

EXPERIENCE

April 1966
to
Present

Virginia Highway and Transportation Research Council - Research Scientist C. A materials scientist with emphasis on the microstructure of highway materials, especially concrete. The equipment techniques and skills of geology, mineralogy, and petrography are employed in the study of the microstructure and components of concrete with the aim of discovering ways of producing a strong, durable, less costly product. Defines, plans, supervises and executes original research projects. Provides technical assistance and services for other concrete and materials researchers. Conducts investigations of highway materials as requested by the Construction and Maintenance Divisions of the Virginia Department of Highways and Transportation. Participates in the teaching of the training program for concrete technicians by presenting the results of various petrographic examinations and showing that the placing history of the concrete is recorded in and decipherable from the hardened concrete product.

September 1964
to
March 1966

Geologist, Virginia Division of Mineral Resources. Performed petrographic analyses of rocks and minerals. Was mainly concerned with specimens of rocks retrieved from the drilling of water wells. These specimens were analyzed and correlated with the expressed surface geology to deduce the subterranean structures.

December 1953
to
August 1964

Temporary retirement - Housewife and mother.

May 1950
to
December 1953

Petrographer GS-9, U. S. Bureau of Mines, College Park, Maryland. Performed identification and analyses of rock and mineral substances by means of the petrographic microscope, visual spectroscopy and chemical tests; development of new and/or improved methods of research. Development of new procedures for analysis of rocks, minerals, and man-made materials; preparation of reports and articles for the technical press.

August 1949
to
May 1950

Optical Crystallographer, Harvard University Medical School, Boston, Mass. Optical analysis and basic property determination of various organic crystals. Preparation of organic crystals for X-ray diffraction. Operation of X-ray diffraction equipment. Preparation of charts, graphs, and standards for interpretation of the single crystal diffraction patterns.

October 1947
to
May 1949

Teaching assistant, geology, parttime, University of Michigan.

September 1946
to
June 1947

Teaching assistant, geology, parttime, Boston University.

PROFESSIONAL
SOCIETIES

Transportation Research Board, Committee on
"Performance of Concrete Chemical Aspects"

American Society for Testing and Materials,
Committee C-9 "Concrete"

"Petrography Concrete"

"Pore Structure of Concrete"

"Concrete Aggregates"

"Finely Divided Admixtures"

American Ceramic Society

International Cement Microscopy Association

American Mineralogical Society

BIOGRAPHICAL SKETCH

of

David C. Wyant
Research Scientist

Date of Birth : January 26, 1947

Marital Status : Married

Education : B.S., Civil Engineering
University of Virginia, 1970

M.E., Civil Engineering
University of Virginia, 1973

Professional Experience : Thirteen years with Virginia Highway
and Transportation Research Council
in soils, water pollution, geotextile,
and concrete patching research.

Military History : None

Professional Society
Memberships : TRB, ASTM, ASCE

Shaw L. Yu

Born:

Kiangsi, China; October 11, 1938

Education:

BS (civil engineering)	National Taiwan University, 1961
MS (hydraulics and hydrology)	Cornell University, 1965
PhD (hydrology)	Cornell University, 1968

Experience:

Research Assistant, Taipei Hydraulics Laboratory, 1962-1963

Cornell University, Ithaca, NY

Teaching Assistant, School of Civil Engineering, 1963-1966
Research Assistant, School of Civil Engineering, 1966-1968

Rutgers University, New Brunswick, NJ

Assistant Research Professor, Water Resources Research
Institute, 1968-1970
Assistant Professor, Department of Civil and Environmental
Engineering, 1968-1973
Associate Professor, Department of Civil and Environmental
Engineering, 1973-1978

Visiting Research Professor, Civil Engineering, National Taiwan
University, Taipei, Taiwan, 1975-1976

Consultant in Environmental Engineering, China Engineering
Consultant, Inc., Taipei, Taiwan, 1974--

Consultant in Environmental Engineering, Waterways Experiment
Station, US Army Corps of Engineers, Vicksburg, MI, 1978--

Visiting Associate Professor, Environmental Sciences, University of
Virginia, Charlottesville, VA, 1977-1978

Professor, Department of Civil Engineering, Tulane University, New
Orleans, LA, 1978-1979.

Shaw L. Yu

Professional Societies:

American Geophysical Union

American Society of Civil Engineers

American Water Resources Association

Chi Epsilon

Chinese Society of Civil Engineers

Sigma Xi

Tau Beta Pi

Honors:

The Elon Huntington Fellowship in Hydraulics, Cornell University,
1964-1965

WILLIAM ZUK
P. O. Box 3817, University Station
Charlottesville, Virginia 22903

Telephone: (804) 293-1929

EDUCATION: B.S.C.E. (with distinction), Cornell University
M.S.D.E., John Hopkins University
Ph.D., Cornell University

CURRENT POSITION Consultant

EXPERIENCE Taught at University of Denver, Cornell University and University of Virginia (present rank of Professor); worked with Fenestra, Martin and Saxe Engineering organizations. Consultant for numerous private businesses and governmental bodies. Presently consultant with Virginia Highway and Transportation Research Council.

PROFESSIONAL SOCIETIES American Society of Civil Engineers: Aesthetics Committee
Chi Epsilon
National Cooperative Highway Research Program:
Project 1-14 — "Influence of Downgrade Super-elevation on Wet Skidding Accidents."

(For further information, see Who's Who in America)

