

**NATIONAL HIGHWAY INSTITUTE
PROGRAMS OF TRAINING AND TECHNOLOGY TRANSFER**

by

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ABSTRACT

The Federal Highway Administration (FHWA)'s National Highway Institute (NHI) develops and delivers training for the FHWA, State and local transportation agencies and private industry in the United States (U.S) and other countries. The NHI's objective is to sustain and expand the professional and technical capacity of the United States transportation community and to collaborate with other countries on training and technology programs.

This papers discusses the various which NHI an integral part of the Office of Professional Development (OPD) of FHWA, has in place for promoting professional development throughout the transportation community. NHI's programs include three divisions - State Programs, Universities and Grants Programs, and Affiliates Programs.

The main focus of State Programs is developing and delivering a training program aimed at State and local transportation agencies. Under the Universities and Grants Programs, the NHI awards grants to students and university faculty for study and research in transportation areas. A primary activity of the Affiliates Programs is the Local Technical Assistance Program (LTAP). The LTAP includes 51 centers in the U.S. that deliver training and technical information to rural and urban transportation agencies. Building on the success of the LTAP, the FHWA collaborated with the Pan American Highway Congress to form the Pan American Institute of Highways (PIH).

The NHI in cooperation with the OIP has worked with Finland, Estonia, Lithuania, Latvia and Russia to establish technology transfer (T2) centers in those countries, and in arranging for LTAP centers in the U.S. to assist the T2 centers through twinning liaisons. This involves ongoing dialogue and information exchange.

In Africa, T2 centers have been established in Tanzania, South Africa, Malawi and Zimbabwe. These centers are actively engaged in, or are planning programs of technical assistance for local agencies in their respective countries. The FHWA continues to follow the progress of these centers and to provide technical assistance where possible.

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1. INTRODUCTION

One of the objectives of this paper is to acquaint the participants with the mission and guiding philosophy of the Office of Professional Development (OPD) in which the National Highway Institute (NHI) resides. We shall briefly describe our ongoing efforts and the steps we are taking to strengthen the effectiveness of NHI programs of training and technology exchange in the United States and internationally. Included in this discussion will be efforts planned and underway to help meet the challenge of attracting and maintaining a qualified and motivated highway transportation workforce in the United States.

2. SCOPE

This presentation will focus on the training and technology programs of the NHI including:

- The role of the Office of Professional Development and NHI in developing partnerships with national and international organizations.
- Efforts with our national and international partners to identify innovative and effective practices in workforce development including recruitment, training, and retention of staff.
- NHI technical training programs, our distance learning initiative, instructor certification and the challenge of conducting meaningful program evaluation.

3. THE OFFICE OF PROFESSIONAL DEVELOPMENT

The FHWA is the agency within the U.S. Department of Transportation with responsibility for highway transportation in the United States. The Office of Professional Development is the office in FHWA where the NHI and the Local Technical Assistance Program (LTAP) are located. The OPD serves as the “in house consultant” for training and learning. It also provides leadership on national transportation workforce issues for FHWA headquarters and field offices. Figure 1 shows the OPD-NHI organization.

To effectively carry out these responsibilities, the OPD must continuously evaluate its programs, plan for the future and seek answers to these questions:

- Are we delivering the most effective training in a timely manner?
- Do our course evaluations provide useful information to improve our program?
- Do our grant programs reach the intended audience and do the recipients make meaningful contributions to transportation?
- How can we better leverage our resources through cooperative ventures with others?
- What policies and programs must be developed to assure accurate analyses of workforce needs, training and development including effective means of recruiting, motivating and retaining staff?
- Are we utilizing our limited resources effectively?



Figure 1: Federal Highway Administration Office of Professional Development National Highway Institute Organization

3.1 Workforce Issues

A priority of the Office of Professional Development is to work with the transportation community to develop and implement policies and programs that will assure that there is a competent, effective workforce in place to meet current and future transportation needs. A safe and efficient transportation system is critical to continued economic growth and the standard of living in the United States.

Strong economic growth in recent years, fueled by gains in the information technology industry, is increasing the demand for mobility and freight movement. This prosperity is contributing to more personal and business travel by automobile. In fact, vehicle miles traveled is growing twice as fast as the population. Freight transportation is also increasing rapidly as just-in-time inventory systems and e-commerce become more common business practices. In 1998, transportation related goods and services accounted for 11.2 percent or \$950 billion of the \$8.51 trillion U.S. gross domestic product.

There is growing concern that the current workforce that designs, operates and manages our surface transportation system is at risk as the “baby boom” generation approaches retirement. The United States Senate Subcommittee on Oversight of Government Management Report “The Crisis in Human Capital” estimates that 32 percent of the federal workforce will be at retirement age by 2004, and that another 21 percent will be eligible to retire, for a staggering total of 53 percent or 900,000 employees. Not all employees eligible to retire will do so, however, conservative estimates place the number of retirees by the year 2010 at 660,000.

A review of the Federal Highway Administration workforce by the FHWA Workforce Planning and Development Task Force projects that in the next 10 years, 45 percent of FHWA employees will retire or will be eligible to retire. While detailed retirement projections have not been made for the state, local and private sector transportation workforce, it is generally recognized that the problem extends to those segments as well. These retirees will take with them years of experience, institutional knowledge and competencies that will be difficult to replace.

We recognize that planning and developing a new workforce must begin in earnest, but with a clear recognition that there will be a new generation of employees who will bring a different set of priorities into the workplace. These employees grew up in the electronic age, are more comfortable with change, have greater expectations for job satisfaction, and are more willing to challenge and to be challenged. They can have a dramatic and positive effect on transportation agency and private sector programs. How successful they become will depend to a great extent on the ability of employers to introduce the emerging workforce to new and innovative approaches in workforce planning and development.

The effort will be made more difficult as the competition for qualified professionals from other industry sectors drive salary and benefit compensation programs. We face a changing dynamic and increasing demand for a more efficient and safe transportation system and the challenge to develop and deploy new technologies. In recognition of these challenges, the OPD is cooperating with other organizations in conducting a series of studies designed to better address transportation workforce recruiting, development and retention issues.

The OPD, in cooperation with the Office of International Programs (OIP), is working with the American Association of State Highway and Transportation Officials (AASHTO) to conduct an International Transportation Workforce Study. The objective is to identify innovative and proven workforce policies and programs used by other countries in recruiting, developing and retaining transportation workers for possible use in the U.S. Countries visited included Germany, France, United Kingdom and Sweden. A ten-member team representing FHWA, AASHTO and the academic and private sectors completed the field study in April 2001. The study report is expected in the spring of 2002.

The Transportation Research Board (TRB), in cooperation with the OPD, is planning an 18-month workforce study to assess the likely human resource needs of surface transportation in the coming two decades. The study will project these needs and will make recommendations for recruiting, training and retaining needed personnel.

A “Domestic Scan” to gather information about State DOT “innovative practices” for workforce planning, development and implementation will be conducted cooperatively by the Association of State Highway and Transportation Officials (AASHTO), the National Transportation Training Directors (NTTD) and the FHWA Office of Professional Development. The New Mexico State Highway and Transportation Department will provide the lead for the study.

As part of the National Cooperative Highway Research Program “Managing Change in State Departments of Transportation” the Texas Transportation Institute (TTI) identified a number of innovative state agency workforce practices. The TTI final report was completed last month. The findings from this study will be used to develop components of the Domestic Scan. In a related effort, the American Road and Transportation Builders Association is surveying transportation contractors nationwide to identify their training and education needs.

We are looking forward to completing these studies and are confident that the results will help us develop policies and programs to better address our future workforce needs. We also recognize the need to develop our current workforce. The National Highway Institute has a dynamic and effective program that provides the technical information and training that our federal, State and private sector transportation officials need now.

4. NATIONAL HIGHWAY INSTITUTE

NHI was established by law in 1970 to operate within the Federal Highway Administration. NHI is charged with conducting education and training programs related to highways. It cooperates with State DOTs, private industry and other national and international entities to develop and administer training. The customers of NHI are employees of FHWA, State, and local transportation agencies and include members of metropolitan planning, police and public safety organizations. From a modest beginning some 30 years ago, NHI has evolved into a leading training organization with staff and partnership capabilities that reach all States and a significant number of local and metropolitan agencies in the United States.

4.1 State Programs

A primary activity of the NHI is the short course training program conducted by the State Programs Team. Each year NHI delivers over 550 courses, 2-5 days long to approximately 16,000 participants. These are primarily technical courses covering a wide variety of topics including road and bridge design, construction and maintenance, highway safety, traffic operations and intelligent transportation systems.

The courses are delivered in various locations in the U.S. usually in the central offices of the State DOTs. Instructors are drawn from FHWA, State DOTs and private industry. Course materials are complete with visual aids. Some course materials are available on CD and a few courses are available on the Web.

As shown in Table 1, the majority of course participants are employees of State and local transportation agencies. However, some participants are from private industry, universities and other countries. Last year, approximately 130 course participants were from other countries. Our website, www.nhi.fhwa.dot.gov includes the names of courses, descriptions and schedules for presentations which may be given at any State DOT.

FHWA	Other Federal	State	Local	Private	International	Others	Total
911	146	10,089	1,823	1,625	129	198	14,921
6.11%	0.98%	67.62%	12.22%	10.89%	0.86%	1.33%	100.00%

Table 1: National Highway Institute Course Attendance by Employer, Fiscal Year 00.

The NHI course catalog is available at no cost either in hard copy or in CD format. Copies of the CD are available during this conference. If you do not get a copy here, please give me or another FHWA staff person your business card and we will send one to you.

In an effort to sharpen the presentation skills of instructors for NHI courses we have developed an instructor certification program which involves two phases. First, the instructor attends a 4½ day instructor development course that focuses on basic techniques to enhance the effectiveness of a presentation. This may include, for example, use of well designed training aids that ensure effective presentation. The second part is observation of an instructor in a training setting by a “master trainer” from NHI to make an assessment of whether the instructor is employing good instructional techniques. A certificate is issued to the instructor upon satisfactory completion of both parts.

4.2 NHI and The Distance Learning (DL) Initiative

Since 1970, the National Highway Institute (NHI) has developed and delivered training to the transportation workforce, helping to bring new highway technologies to the agencies responsible for building and maintaining the nation’s surface transportation infrastructure. We have developed a quality training curriculum. However, we recognize that we must continually adapt the curriculum, course design, and delivery methods to keep pace with changes in highway program technology. There are also major technological advances in training methodologies and we have been identifying strategies to integrate other media to provide efficient and effective training for our customers. One strategy that appears particularly promising is the use of distance learning (DL) technologies – especially web-based technologies.

The term distance learning is defined as an environment in which the participant(s) and instructor(s) are not at the same place at the same time, and appropriate communications technology is used to deliver the instruction. Further, distance learning is the process of extending the learning, or delivering instructional resource-sharing opportunities to a variety of locations via different modes, i.e., the use of video, audio, computers, multimedia, satellite communications, or some combinations of these, or used in conjunction with traditional delivery methods.

We currently have three courses available via web-based training. Our goal is to provide 15 distance learning courses this year by converting existing courses or developing new courses in the distance learning format. These courses would be available at any time to anyone with access to the World Wide Web.

4.3 Universities and Grants Programs

The NHI is also authorized, by statute, to grant fellowships to study and conduct research on transportation topics. The Universities and Grants Programs (U&GP) awards are made to students and university faculty for study and research in transportation areas. Approximately 100 grants are awarded each year under the Dwight David Eisenhower Transportation Fellowship Program (DDETFP) to students enrolled in various colleges and universities throughout the U.S. We work with over 750 universities including participating Historically Black Colleges/Universities (HBCUs) and Hispanic Serving Institutions (HSIs) and Tribal Colleges (TCs).

Since the program was established, the DDETFP has awarded more than \$20 million to prospective transportation professionals. Approximately 2,000 awards have been made to students and faculty to date. Most awards have been made to masters and doctoral students. Others were made to undergraduate students as well as a limited number for faculty.

The first DDETFP awards were in 1992 in both nationally-competed and campus-based award categories. The DDETFP encompasses all modes of transportation. The six fellowship award categories are as follows:

- Graduate (GRAD) Fellowships enable students to pursue Master's or Doctorate Degrees in transportation-related disciplines at the university of their choice.
- Grants for Research Fellowships (GRF) acquaint undergraduate and graduate students with transportation research, development and technology transfer activities at U.S. Department of Transportation facilities.
- Faculty Fellowships (FF) provide faculty in the transportation field with opportunities to enhance and update their transportation knowledge, including attendance at conferences, courses, seminars, and workshops.
- Historically Black Colleges and Universities (HBCU) Fellowships provide HBCU students with opportunities to enter careers in transportation.
- Hispanic Serving Institutions (HSI) Fellowships provide HSI students with opportunities to enter careers in transportation.
- Tribal Colleges (TC) Fellowships are designed to identify transportation-related activities and provide student and faculty fellowship opportunities at Tribal Colleges.

During a 1998 review, DDETFP recipients from the six award categories were surveyed. The data showed that over 60 percent of the Graduate Fellowships respondents received Ph.D's. Further, over 94 percent of HSI respondents and over 59 percent of HBCU respondents were pursuing careers in transportation. One hundred percent of responding HSI recipients and 68 percent of HBCU respondents received degrees in engineering or related fields. The Dwight David Eisenhower Transportation Fellowship Program provides a unique opportunity for interdisciplinary and intermodal transportation research through a variety of academic programs.

In a related effort, NHI cooperates with the Federal Transit Administration and the DOT Research and Special Programs Administration in funding and administering a University Transportation Centers (UTC) Program.

The UTC Program has three objectives; to conduct transportation research, to provide transportation education to students, and to carry out technology transfer activities. The program provides important benefits to the transportation community and assists graduate students in conducting research and encourages them to pursue transportation careers. The UTC Program includes 33 centers and is funded at about \$22 million annually.

4.4 Affiliates Programs

The mission of the Affiliates Programs is to promote education, training, and technology sharing among local, national, and international transportation partners. These programs will enhance existing partnerships and develop new partnerships to create a more coordinated learning environment for the transportation community. The Affiliates Programs encompass three programs: Local Technical Assistance Program (LTAP), Partnerships Program, and International Program.

The LTAP consists of 51 centers one in each of the 50 states and in Puerto Rico. Closely aligned with LTAP is the Tribal Technical Assistance Program (TTAP). There are six TTAP centers which serve the American Indian Tribes. The TTAP provides technical assistance and training to local agencies and tribes in support of their transportation programs. The LTAP and TTAP centers are funded at 50% with funds administered by FHWA and 50% from other sources which may include State DOTs, local agencies and universities. Most training courses are 4-8 hours. Approximately 150,000 local agency employees receive training each year.

The Pan American Institute of Highways (PIH) is also closely related to the LTAP. The PIH is an independent organization founded in 1986 by resolution of the Pan American Highways Congress which is sponsored by the Organization of the American States. The PIH mission is to transfer innovative and traditional technology for improving highway transportation systems throughout the Americas. The PIH is headquartered in the FHWA Office of International Programs. It currently includes 90 technology transfer centers in 21 Central and South American countries and the Caribbean. Over 3,000 individual members participate in delivering programs and carrying out the organization's mission. The PIH develops and delivers programs that support its mission and membership through training and technical assistance.

We often partner with other transportation organizations to develop programs on important issues of rural road safety, construction and maintenance, uniform signs and markings, highway safety and asset management. Our partnership efforts have allowed us to establish a consensus on objectives and to pool resources. Some of our recent efforts have included work with the National Association of County Engineers, and transportation components of the U.S. Department of Agriculture, the U.S. Environmental Protection Agency and the American Public Works Association.

Through the Office of International Programs, FHWA has been instrumental in establishing technology transfer (T2) centers in several European countries including Russia and Sub-Saharan Africa. These T2 centers are making excellent progress in helping to meet local needs. The Office of Professional Development is currently working with T2 centers in

Tanzania, Zimbabwe and Malawi on a train-the-trainer program. The intent is to provide a cadre of African instructors with the knowledge and course materials to deliver priority training to the local agencies in their countries. The first two train-the-trainer courses were held in Tanzania just prior to this conference.

The Office of Professional Development and National Highway Institute routinely cooperate with the Office of International Programs on matters that include technology exchange with organizations outside the U.S. This ranges from delivering training and providing training materials to hosting visitors in the U.S. for technical programs designed to meet specific needs of our international customers. Normally, the States that host our courses will accommodate one or two visitors at no charge.

The FHWA is cooperating with the PIH, the World Road Association, Organization for Economic Cooperation and Development, LTAP and other organizations in hosting the International Symposium on Transportation Technology Transfer, July 29 – August 2, 2001 in St. Petersburg, Florida. A principal theme of the conference is the technology of technology transfer. We are looking forward to a good attendance and would like to see that the African countries are well represented. This will be a good opportunity for representatives from the T2 Centers in Africa and other countries to exchange information and share their experiences.

5.0 CONCLUSION

In summary, the NHI and OPD will continue to deliver training and to partner with other organizations to economize on resources. We will be promoting the concept of train-the-trainer and using the train-the-trainer approach where feasible to extend our programs and make the most of our limited budget. We believe that the train-the-trainer strategy is especially applicable in African countries that are starting to provide priority training. We will continue to work with our Office of International Programs and the African T2 Centers to help implement this training.

The National Highway Institute welcomes and encourages comments on its programs from our customers. Important sources of feedback are the evaluations we receive from the agencies and individuals we work with and these comments have resulted in important revisions to our program. As a result of the recommendations we have received, we have expanded the instructional and learning media in our training, and strengthened our instructors through certification. We will continue to evaluate our programs and to look for more effective techniques for evaluation with a view to ensuring the effectiveness of our training programs.

We are encouraging a greater interface between LTAP training and the traditional NHI courses, and the exchange of instructors as the needs warrant. The LTAP centers are continuing as an important resource for local agencies and their efforts often reach beyond their state boundaries.

While we are optimistic that the numbers of courses and grants we provide will continue to increase, our main focus will be on ways to help ensure that each opportunity for training or assistance gives positive results. We will continue to strive to provide high quality and cost effective programs.

It has been a privilege for me to provide you with information about the FHWA Office of Professional Development and the National Highway Institute. I thank you for your attention and invite you to visit our office in Arlington, VA near Washington D.C. We will be pleased to have you.

REFERENCES

Senator George V. Voinovich, Chairman, Subcommittee on Oversight of Government Management, Restructuring and the District of Columbia, "Report to the President: The Crisis in Human Capital", December 2000.

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