TRANSFERRING RESEARCH FINDINGS TO THE LOCAL HIGHWAY AGENCIES

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In 1983 ten Technology Transfer Centers were established in various states by the Federal Highway Administration under what is now known as the Local Technical Assistance Program (LTAP). Ten years later there are 55 technology transfer (T^2) centers, serving all 50 states plus Puerto Rico, and an additional four centers serving the Native-American populations. In addition, with the assistance of the FHWA, new T^2 centers are being formed in Europe and Latin America.

This paper describes a few of the successes experienced by the T^2 Centers, and offer some insight into why they are effective. It will cover some of the new directions that are being taken by the T^2 centers due to the 1991 ISTEA legislation. It is also intended to stimulate some discussion regarding a major problem that is faced by all technology transfer providers.

WHO PROVIDES T^2?

Among the 55 LTAP centers, 43 are housed at and administered by colleges and universities, 11 by state departments of transportation, and one jointly by a university and a DOT. Their activities have generally focussed on providing the following services to local (eg., county, city, town, village, borough, etc.) highway agencies:

- Develop and maintain a mailing list
- Publish a quarterly newsletter
- Conduct training seminars and workshops
- Provide technical assistance
- Provide an information service

Technical assistance usually is provided by answering questions through letters, telephone calls, and in some states, through an electronic bulletin board. Information is supplied by distributing research publications and technical articles, through a lending library, and in some states, through a videotape lending library. Certainly the most visible activity, and perhaps the most effective as well as being the most expensive, is the offering of training seminars and workshops.

Traditionally the audience has mostly been rural local highway agencies, although that is changing due to the 1991 ISTEA. The 1991 legislation provided that the program name be changed from a *Rural* to a *Local* Technical Assistance Program (LTAP), with an increased emphasis placed on extending the T^2 services to urban public works agencies in communities having a population up to one million people. In addition, the 1991 legislation encouraged new activities in the areas of tourism and economic development, and it provided for the creation of four new T^2 programs directed at Native American population areas.

Funding for the T^2 centers initially began at the level of $125,000 per year, with 100 percent coming from the Federal Highway Administration. Beginning in 1988, the formula was changed to 50 percent FHWA and 50 percent local. In many cases the states provided the local match out of Highway Planning and Research funds, which also came from the FHWA.

In 1988 the funding level was raised to $200,000 per center, and in 1993, under ISTEA, the base level was raised again to $220,000. Supplemental funds for the urban program were added in 1992 and 1993, having an 80-20 federal-local matching requirement, with the amount varying from state to state depending on the number of MPOs and similar large municipal areas.

In 1994 the additional funds for urban programming have disappeared, but the responsibility to minister to the urban areas remains. This is likely to create some significant pressures on the T^2 centers fairly soon.

WHAT HAS THE LTAP PROGRAM ACCOMPLISHED?

In 1991 the 47 T^2 Centers then in operation conducted 1,597 training courses, with a total attendance of 55,613. In addition, the centers offered 631 "roadshow" programs, informally taught by a circuit rider, with a total attendance of 10,449. The vast majority of the programs were offered in a one-day format, and taught close to home around the state rather than at a central location. Safety was a principal topic in 493 of the courses.

In one state the program participants reported that for every dollar spent on training (for program registration meals, travel, and worker salary) their municipalities saved $94.

In some cases the training has a hands-on emphasis, as in a program that trains grader operators. One highway supervisor reported:

> *From the town's point of view, the results of the session far exceeded our hopes. By its end, several miles of our roads, that beforehand were flat, constricted and virtually without drainage, were converted to widened, crowned ways with good drainage on both sides.*

Not all local highway agencies can afford the time or the minimal expense to send their employees to the

training programs. In this case the newsletters and the technical assistance outreach programs can still provide some help. In 1991 115,191 technical publications were distributed by the T^2 Centers. Collectively the centers maintain libraries with a total of 8,128 videotapes, and 10,237 individual loans were made. Many local highway agencies utilize the tapes to conduct their own in-house training programs. Quarterly newsletters were mailed to 140,539 contacts.

Each center must evaluate its program on an annual basis and submit a report to its state DOT and to the FHWA. In so doing, many of the successes of the program are identified. For instance, the following was reported by one client:

> *We dramatically improved construction techniques by following highway rehabilitation and construction information related to the use of geotextiles, drainage facilities, and soil testing. Consequently, we eliminated problem areas that have existed for decades.*

WHY ARE THESE PROGRAMS EFFECTIVE?

There are a multitude of reasons why the T^2 Center programs are effective. They seem to fall into a relatively small number of categories, however.

1. *The FHWA LTAP program allows each T^2 program to tailor its activities to meet local needs.* Unlike many federally funded programs, this one has managed to avoid the "one size fits all" way of thinking. In some states local government is comprised of a small number of units, often predominantly or extensively run by professional engineers. In other states local government is run by non-engineers, either appointed or elected. Often these latter governments are very small, with a low base of property values, few miles of road to maintain, and few employees. The types of technology transfer programs that work effectively with such different kinds of local government are quite different.

2. *The T^2 programs are run by people who honestly care about their client agencies and want to make a difference.* In many instances the T^2 centers are lead by or employ active or retired local highway department officials, who have broad experience in construction and who have considerable knowledge to share. A great deal of effort is going into understanding the needs of the audience and arranging suitable programs to meet those needs.

3. *The training programs that are taught are relevant to the needs of the audience.* A decade ago a popular buzzword was "appropriate technology." Perhaps for technology transfer in the 1990's the corresponding buzzword should become "appropriate training." It is not sufficient to preach the gospel of technology, it is necessary that the preaching be relevant to the listeners. Much of the success of the T^2 movement has been in its ability to recognize the right information to provide at the right time.

It is not useful to try to train a highway employee to use methods that a limited budget will not permit the agency to utilize. Thus in some cases it is better to train a highway employees to do a better, longer-lasting job of blading a road than it is to teach them to pave the road. Traffic counts and economic analysis might indicate that the road should be paved, but the practical realities of the situation dictate that the road remain with an aggregate surface.

4. *The T^2 Center programs are meeting a previously unfulfilled need.* In 1982, before the advent of the FHWA-sponsored RTAP program, there were very few active T^2 programs ministering to the needs of local government. Back in 1895, when the Office of Road Inquiry was first formed (the precursor to today's FHWA), until the start of World War II, there was a great, national involvement in providing training for highway departments at both the state and local levels. Road Shows went from city to city and state to state, espousing new and better methods of road building. Extension agents from the universities taught workshops on "scientific" road construction methods. And industry provided a large amount of training and direct technical assistance through associations such as the Asphalt Institute, the Portland Cement Association, the American Road Builders Association, and others.

Gradually over the three decades following World War II many of these activities died and were forgotten. When the T^2 movement came along in the 1980's, there was a great need for such programs, particularly on the part of local government.

MAINTAINING FUTURE EFFECTIVENESS

Over the past eleven years since the first ten T^2 Centers were established, there has been a notable maturation of the movement. The first decade was also a period when each state had to decide whether and when to get on board. The first decade was a period when the transition from having 100 percent federal funding to finding a source for a local 50 percent match had to be dealt with. This decade was a period when the T^2 Centers had to meet their audience and identify their role.

While some might argue that we are not yet out of the woods, much of the preliminary maneuvering is behind us, and now is an excellent time to look ahead. We need to identify clearly what is needed in order to do the job that is in front of us. Each individual T^2 Center might have a slightly different perspective, but there are a few broad principles that should apply to all of the centers.

- Get to know the audience even better. After a few years of serving a given set of constituents there is a danger that the servers may feel they know the

constituents well. But in public works everything is changing all of the time. There may be no other field of endeavor that has a higher rate of turnover of personnel. Each year's budget is very dependent on the national and local economic climate, and that changes yearly. Thus both the audience and the needs of the audience are continuously changing.

• Be sure that you know how to approach your audience. With the addition of new responsibilities under ISTEA to provide training for urban municipalities and related matters, there is a danger in assuming that the urban problems are the same as those of rural local government. There may be a world of difference, beginning with a less enthusiastic willingness to partake of the traditional T^2 program offerings. Before doing things that are not effective, and then trying to recover from it afterward, it would be better to engage in a careful diagnostic of the new audience.

• Maintain a positive relationship with the FHWA. The modern interpretation of the Golden Rule is "he who has the gold makes all the rules." The FHWA provides the initiative from which funding for all T^2 centers flows, and for this reason alone it would be wise to work closely with the FHWA people at the Division and Regional levels. But beyond that, in recent years the importance within FHWA of being involved in the success of the T^2 movement has grown immensely.

Now is an especially excellent time to build on the relationship with the FHWA, because there are no immediate crises. Find out how you can help them to be successful, and your T^2 Center will be successful along with them. You may find that the people at FHWA are willing to help nudge matters along within the state DOT on behalf of the T^2 Center.

• Build on the relationship with the state DOT. If things are going well right now, they probably will change. If they are going poorly, they need to change. In either case, there is a need to build a climate of understanding with the state DOT. Officially, the FHWA works through the state DOTs in communicating with the Technology Transfer Centers. Thus the state DOTs are now and will remain on the critical path to success for the T^2 Centers.

• Integrate into the University environment. While not *all* T^2 centers are housed at universities, nearly three-fourths of them are. It is particularly important for the university-affiliated centers to avoid becoming too isolated from the surrounding academic environment. While some centers are "on the fringe" of the university, in separate centers, institutes, cooperative extension and/or continuing education programs, many of the most successful centers are located in academic departments.

This proximity provides an entree to researchers and other teaching professionals that is typically not available to the more remote programs. The possible exception to this "rule" is in the case of an affiliation with a large transportation institute, where faculty and other transportation professionals are drawn together, perhaps from many academic departments and even several campuses. If there must be a trade-off between having greater autonomy and having more extensive affiliation, due to the importance of networking in the success of T^2 efforts, having greater access to colleagues should be given a higher priority.

• Look beyond the borders of your own state. One characteristic of most successful and effective T^2 programs is that they are run by thieves. Well, not thieves in the legal sense of the word, but T^2 people are definitely willing to adopt good ideas that they see being used elsewhere.

Now is a good time to start to think regionally and to build liaisons with the T^2 Centers in the states that border on yours. In September 1993 the *LTAP Training Exchange* published a list of 55 training programs that the LTAP Centers were willing to share with each other. Course development consumes a large proportion of the funds available for training, and using a good course developed by another T^2 center is a good way to save money all around.

In summary, the effective manager of a technology transfer program needs to be able to be simultaneously introspective and visionary, aware of what is happening with the audience, the funding agencies, and all of the other T^2 Centers. Such a person has to be willing to develop new programs, steal the best ideas from his or her colleagues, and share the best ideas and programs with other centers!

WE HAVE ONE LITTLE PROBLEM

While this is supposed to be a report on the effectiveness of the T^2 centers and how we transfer research findings into practice, there is one great concern, that needs to be addressed.

The problem faced by all of the technology transfer centers is *how to measure whether the technology has been transferred?* This may not seem like much of a problem to those who are not involved, but some of us face the problem on a daily basis. It cuts to the quick as far as evaluating the effectiveness of technology transfer is concerned.

This is not a problem that can be researched according to the customary scientific methods. We cannot, for instance, establish a "control group" by selectively keeping part of the audience ignorant and unaware of a new road construction method, while others are being trained. After a particular point in the training supposedly both groups could be watched to see if one group uses the new method or if their roads last longer, or something.

In the absence of such an impossible scenario, it is difficult to establish whether the training that is given has any effect. Commonly questionnaires are used. And sometimes field visits or telephone interviews are tried. But there is always the uncomfortable suspicion that those interviewed may be telling the interviewers

what they want to hear. "Oh yes! Your training program was very beneficial!" "Oh yes! Our municipality saved millions of dollars as a result of that training program!" "Oh yes! We use those materials daily. Why only last night I read them to my children while they were going to sleep!"

How can we know, really, whether the training has any effect on the behavior or the decisions of the agency that received it? How can we know that their procedures did not change because of reading an advertisement in a magazine, or due to a visit of a salesman, or because the highway crew in an adjacent town was using the new method?

This is a problem that would benefit from some good, clear thinking.