

Introduction

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This Record constitutes a journal of the Symposium on Technology Transfer for low-volume roads agencies held during the January 1985 Annual Meeting of the Transportation Research Board. The two objectives of the symposium were to (a) review ongoing technology transfer programs with regard to their format and content, and (b) assess the needs and most effective means for accomplishing technology transfer to local roads agencies.

With the advent of the Rural Technical Assistance Program sponsored by the Federal Highway Administration (FHWA), there has been a tremendous growth of activity for providing technical training to low-volume roads personnel. By early 1986 the FHWA had established 32 technology transfer (T^2) centers around the country. Because several centers serve more than one state, more than this number of states are benefitting from the programs conducted by the centers. In a majority of the states the T^2 centers are located at a university or college. In a few states the departments of transportation are providing the leadership.

Many T^2 centers are an entirely new activity for the agency. The centers have been underway for 1 to 3 years, and they are experiencing all of the problems of a developing program. Some of the centers are located in universities where the tradition of providing technology transfer to local governments has existed for many years. These centers can share their organizational experience and help the newer centers become effective more quickly. It is the intent of some of the papers in this Record to facilitate this communication.

The range of programs described in this Record indicates the different needs of each state for technology transfer; however, there is also a great deal of common ground.

In the first paper the following studies are synthesized for easy comparison: Initiating a New Technology Transfer Program by Henry R. Lambert, Director of the Transportation Information Exchange at St. Michael's College, Winooski, Vermont; Seventy Years of Technology Transfer: A Review of the Purdue Program by Charles F. Scholer, Associate Director of the Highway Extension and Research Project for Indiana Counties and Cities at Purdue University; A State DOT Approach to Technology Transfer by Oscar L. Sebastian, Applied Technology Engineer for the Delaware Department of Transportation; and The FHWA Region Nine Technology Transfer Program Roadshow by Robert F. Krull, Technology Transfer Specialist for the Federal Highway Administration, San Francisco.

The authors were asked to respond to four questions for the paper:

1. How do you decide what topics to cover in your training programs?
2. How do you communicate with the audience? What constitutes effective communication?
3. Who is your audience, and is it the same for all types of training?
4. How do you measure the technology transfer?

In addition, each of the four authors was asked to cite specific training materials that they had found to be particularly useful.

The remaining papers are presented as they were submitted, and the reception of technology transfer by the target audience is discussed. Recent findings regarding effective means for technology transfer are also discussed.

The symposium ended with a discussion between the producers of technology transfer materials and the users or consumers of them. The panelists included: Robert J. Betsold, Director, Office of Implementation, Federal Highway Administration; Milton Johnson, Executive Secretary-Treasurer, National Association of County Engineers; Norman Paulhus, Director, Technology Sharing Program, U.S. Department of Transportation; Richard Lanigan, County Highway Superintendent, Delaware County, New York; and David A. Anderson, Professor, Department of Civil Engineering, Pennsylvania State University. There was no permanent record of the panel's discussions, but after the program the panelists were asked to respond in writing to the question: "What do you consider to be the distinguishing features of an outstanding technology transfer program?" The responses are outlined in the following section.

TECHNOLOGY TRANSFER PROGRAMS

The characteristics of a successful T^2 program are detailed as follows:

- Recognition. Local officials or target audience must be aware of the existence of the center and the type of services it can provide.
- Representation. Locals should have an opportunity to indicate their needs and to suggest topics for coverage by the center, for example, through short courses, newsletters, technical advisories. Periodic reassessment of the needs is also necessary.
- Acceptance. This is linked to the socialization process and establishment of credibility that comes over an extended time period. It requires the removal of barriers to communication, often necessitating the on-site "spitting on bridges and kicking of potholes," as expressed by one of the participants in the TRB session. There has to be a development of trust, which begins with peer acceptance.
- Communication. This is a difficult problem when the target audience has diverse experience, skill, and educational levels. Prerequisites can be set for admission to college courses, but oral and written communication must be as clear and simple as possible when dealing with local officials elected or appointed without consideration of their technical qualifications.
- Effective delivery system. An effective means for delivering information is necessary. Publications have value if they are clearly and simply written, well illustrated, and user oriented. Audio-visual presentations are helpful in encouraging incremental change, for instance, in improving the performance of a familiar task like grading an unsurfaced road or cleaning ditches. Training courses are better, because of face-to-face interaction, an opportunity to share experience with peers, and, usually, written materials for future reference. Finally, hands-on, show-and-tell activities or demonstrations comprise the most expensive, but most effective, approach. One variation is the T^2 van approach used successfully in FHWA Region 9, and

also being established at the Pennsylvania and Washington T² centers. Here, the knowledge, personality, and communication skills of the van operator are critical.

• Feedback and evaluation. A channel for feedback of information on the perceived effectiveness of the program, and a conscious evaluation of activities, materials, and participants are important because (a) materials become outdated, (b) requirements change, (c) technology advances, (d) people lose enthusiasm, (e) some instructors are less effective than others, and (f) local needs and interests change with the seasons. A good program manager wants to continually adjust the system to improve the service, but this requires feedback, which could be difficult to obtain.

CONCLUSIONS

After many years of allowing local officials to determine independently how best to build local roads,

there has been a sudden rush to provide them with technical assistance and training. Although in many instances the local roads officials desire access to up-to-date technology, the trainers need to be aware of the capabilities and interests of their audience. Perhaps the papers in this Record can provide some perspective on this.

Feedback and evaluation have been cited as characteristics of a good T² program. However, time is required for measurable change, which occurs so slowly that it is difficult to identify what or who are the agents. Thus a great deal of patience will be required by the T² centers, and a large measure of faith will be needed by their sponsors if these newly instituted programs are to have any effects, measurable or otherwise. Most observers would say that cooperative extension has effectively trained farmers in the principles of scientific agriculture, even though the program celebrates its 75th year in 1986. By that standard, the highway technology transfer programs have a long way to go.