

ENGINEERING ACTIVITIES SUSTAIN TECHNOLOGY TRANSFER IN ALABAMA

by

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1. BACKGROUND

The operation of the Alabama Technology Transfer Center is a joint effort of Engineering Outreach and Continuing Education of the College of Engineering and the Civil Engineering Department at Auburn University. The Alabama Technology Transfer Center was one of the first in the country, being formed in 1983 as a part of the original Rural Technical Assistance Program of the Federal Highway Administration.

Currently the same two university organizations carry out the operations of the Center in cooperation with the Alabama Department of Transportation and the US Department of Transportation. The base funding for the Center is from the Local Technical Assistance Program (LTAP) of the Federal Highway Administration and the Rural Transit Administration Program (RTAP) of the Federal Transit Administration. Both Administrations are part of the US Department of Transportation. Additional funds are received from registration fees charged to seminar and conference participants.

The center operation is performed in addition to other technical activities, which are selected to help sustain the LTAP and RTAP programs. Planning statewide conferences, conducting research, instructing courses and advising student groups are some of these activities. Funding for these other activities are often done on a break-even basis or as a part of the funded projects to develop audiences or materials.

2. ENGINEERING OUTREACH AND CONTINUING EDUCATION FUNCTIONS

The staff of Engineering Outreach and Continuing Education (EOCE) facilitates the training seminars, conducts the conferences, provides the newsletter production and maintains the mailing list of the Center. Attendees at seminars form the basis of the mailing lists. The name of an attendee is maintained on the list for two years from the date of the last seminar or conference attended. Changes of address are gained in two ways. First, by mailing newsletters to all seminar attendees the EOCE received phone calls and e-mail regarding changes. Secondly, changes are also gained from the requests for publications and videotapes. The Civil Engineering Department handles these requests and any changes that come in with those requests are forwarded to EOCE.

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To sustain their operation, the EOCE provides similar services for professional development courses offered to engineers and land surveyors, conferences for technical organizations, and training on radon testing for the southeastern United States. The Alabama Board of Licensure determines if an individual meets the requirements for Professional Development Hours for Engineers and Land Surveyors. The seminars developed by EOCE are designed to meet these requirements and the University's own requirements for Continuing Education Units (CEUs).

Facilitating such seminars and conferences requires considerable coordination. The EOCE staff handles the meeting room requirements for audiovisual materials and often reserves a block of hotel rooms for the participants. Preparing seminar announcement brochures requires receiving the material, laying out and proof-reading, then preparation and distribution to persons on the mailing list with enough advance time for the potential audience to consider attending. The course materials similarly need to be received, laid out, proofread and produced far enough in advance to have a sufficient quantity produced for the attendees registered. It is frequently the case that 10 to 20 percent walk-in attendance needs to be considered.

Examples of conferences are both statewide and regional in nature. Each February, the Alabama Transportation Conference is held. Originally held on the Auburn campus, the location has been moved to the Montgomery Civic Center to accommodate the attendance of approximately 1000 persons. A typical regional conference was the Southeastern Local Roads Conference of May 2000, which attracted approximately 300 persons from eight states at the Marriott Grand Hotel in Point Clear, AL. In addition, the EOCE facilitates training seminars, bus roadeos and conferences of the RTAP program.

At the conclusion of each seminar and conference an evaluation is performed. Participants are asked for their opinions on the topic, the handouts, the instruction, the service provided by EOCE and the facility. Additional space is provided for suggestions on new topics and methods of improving the delivery. Summary reports are prepared by EOCE for each event and distributed as a part of quarterly reports.

The EOCE staff also performs the financial management of the Center. Grant applications are written and funds are tracked by the EOCE. Purchase orders and travel expense vouchers are processed through the University channels. A summary of accounts is also maintained by EOCE for the differing activities of the LTAP and RTAP programs.

3. CIVIL ENGINEERING FUNCTIONS

The staff in the Civil Engineering Department provides the technical review of course materials, videotapes and publications, instructs seminars on topics in their area of expertise and writes articles of interest on technology transferred from and to Alabama. A tenured professor receives partial funding for this purpose as Director of the Center. A non-tenure track faculty member receives partial funding for this purpose as Assistant Director. A civil engineering Student Assistant receives full funding for a part-time position. Clerical assistance also receives partial funding for their assistance.

Finding and delivering technical materials often requires finding the information source after hearing a need from a potential information recipient and developing the appropriate media for delivery (REF 1). A steering committee meeting is held each year in which the Director moderates a presentation of the activities of the center. A list of potential seminar topics as requested by the participants is reviewed and a priority is developed based on these suggestions and additional topics suggested by the steering committee. This involvement of the requests from participants as the core of the list of candidate topics is an example of customer-centered leverage (REF 2). A contrasting model for managing technology development is centered on the intellectual capacity pool (REF 3). The first model should be considered as demand-centered and the latter should be considered as supply-centered.

The content of seminar materials is often adapted to the requirements of the audience formed by the recipients. The four needs of adult learners have been summarized in the literature as follows:

1. Experience of the participants, which will be used to evaluate the trainers.
2. Desire to learn or the requirement to attend.
3. Peer pressure, which results in a reluctance to ask questions.
4. Desire to share their experience (REF 1)

An example of meeting these needs in Alabama is demonstrated by the work zone traffic control seminars. These seminars have been taught to a variety of target audiences including public works officials, state department of transportation inspectors, design engineers and contractors personnel. Course material is modified as appropriate for the audience. The course material includes 35 mm slides, videotapes, PowerPoint presentations and workshops. In each case, the instructors use several icebreaker techniques to bring out the experience of the audience. Question and answer periods are often used to facilitate the desire to learn. In some of these periods the instructors ask questions of the class; in other periods, the instructors encourage questions from the participants. In addition workshop exercises are conducted where participants are given questions to answer from the lecture and notes. A review period follows where participants are asked to share their answers.

To sustain their operation, the members of the staff also conduct undergraduate courses, graduate studies, research projects and other projects in their areas of expertise. Undergraduate courses include Transportation Engineering, Airport Design, Geometric Design, Statistics and Computer Methods. Graduate courses include Traffic Operations, Highway Capacity and Directed Readings. Research projects have included an evaluation of work zone traffic control devices, analysis of wet weather accidents and development of a state specification for illumination requirements for nighttime work zones.

In addition to regularly scheduled classes, some students enroll for Special Projects classes. Topics in this category have included:

- Redesign of a church parking lot, which offered three alternatives to the existing design
- Study of traffic circulation patterns around a rural regional elementary school
- Study of the effectiveness of temporary speed bumps in residential areas for traffic calming

- Operation of a special event shuttle van system for the grand opening of the National Center for Asphalt Technology, which attracted over 600 persons from around the globe
- Preparation of a proposal, progress reports, a final report and a PowerPoint presentation on an environmental competition
- Comparison of alternative mixtures and the process for comparing mix designs for a concrete canoe competition

Attending conferences such as the annual meeting of the Transportation Research Board and associated workshops keep the staff informed on current research topics and their results. Recent workshops on audible pedestrian signals and roundabouts have produced speakers for several conferences.

The two faculty members funded through the Alabama Technology Transfer Center also serve as advisors to the student chapters of the American Society of Civil Engineers (ASCE) and the Institute of Transportation Engineers (ITE). The advisor to ASCE has overseen the regular meetings, officers meetings, an Alabama Student Chapter Conference in 1999 and a Southeast Regional Student Conference in 2001. The advisor to ITE has overseen the many speaker meetings and the annual shuttle van project, which transports 1000 visitors from a satellite parking area to the Engineering Day activities in the center of campus. The shuttle van project is staffed entirely by civil engineering students. The ASCE Student Chapter assists in maintaining the Alabama Section ASCE website (REF 4). The ITE Student Chapter assists in maintaining the Alabama Section ITE website (REF 5). These websites list the training activities of the LTAP Center and contain links to the LTAP Center website (REF 6).

Attending professional meetings and conferences such as those sponsored by Alabama Sections of ASCE and ITE keep the staff informed on current applications and their results. The staff has also given presentations at these conferences on subjects such as red light enforcement, traffic signal removal and Internet literacy.

The videotape library involves all of the Civil Engineering staff in the Center. The tapes are obtained by the Director or Assistant Director after being located either in newsletters, technical journals or at conferences. The Civil Engineering staff members evaluate the videotapes for inclusion in the library. Copyright provisions are considered at this juncture. With permission granted, three or more copies are made for the library. The videotape is then listed in the newsletter and in the catalog. The student assistants perform the day-to-day operations of distributing and receiving the returned videotapes. The requests are received by phone or e-mail by the clerical staff, and labels are prepared for shipping. The student assistant locates the desired tape or tapes and packages them carefully for shipping. The student also maintains the log of when each tape is shipped, to whom it is shipped and when it is returned. The videotapes are generally loaned out for a period of five days. Short lists of the videotapes on specific subjects have also been developed on request for work zone traffic control, bridge maintenance and dust control.

4. RESOURCES DEVELOPED AND EXCHANGED

The combination of efforts for technology transfer and other activities sustain the staff of the center. Training seminars, newsletters, videotapes and publications are the transfer agents for the information to be gained from a source and delivered to a recipient (REF 1). An example covering all four of these media is road surface management. LTAP staff attended seminars in Ohio and Washington, DC, on the subject to review course materials. A pilot course was conducted using instructors from Auburn University and an engineering firm with pavement evaluation experience in Alabama. That experience was documented in the newsletter (REF 7). Videotapes on the subject were added to the Videotape Library Catalog, which currently lists 350 titles (REF 8). When a set of videotapes became available on a high-speed data acquisition van, two titles were added to the catalog. When Auburn University acquired such a van for research purposes, an article was written describing the vehicle and the projects planned (REF 9).

Training courses are developed and taught. The work zone seminars are based on the latest national Manual on Uniform Traffic Control Devices (REF 10), but supplemented by Alabama examples and materials. A seminar entitled “Older Driver Highway Design” was similarly based on a national reference (REF 11), taught by Federal Highway Administration engineers and supplemented by a set of Alabama examples covering the principles emphasized in the course. These Alabama examples were gathered by the Alabama Technology Transfer Center staff and presented in a PowerPoint presentation.

Newsletters are written, produced and distributed. Articles from Alabama have highlighted road surface management techniques, work zone traffic control techniques, incident management response techniques, worker safety issues and bridge maintenance and design issues. These articles were written by the Civil Engineering staff, and then forwarded to the EOCE staff for production and distribution. Articles from outside Alabama are located in journals, trade magazines and other LATP Center newsletters, which are reviewed by Civil Engineering staff. A copy is then sent to EOCE for production and distribution of the newsletter.

Videotapes are found, reviewed, listed in the newsletter and a catalog and distributed when requested. The Civil Engineering staff performs the location, reviewing and writing of the descriptions. In the review process, videotapes from vendors are considered only if the material has more educational value than advertising. The descriptions are then written by the Civil Engineering staff and forwarded to EOCE for inclusion in the newsletter. In addition the videotape catalog is produced and maintained by the Civil Engineering staff.

The videotapes demonstrate a wide range of exchange of technology. Videotapes have been obtained from:

- Agencies other than the US DOT including the Army Corps of Engineers, Bureau of Indian Affairs, Federal Interagency Committee on Dam Safety, USDA Forest Service and Waterways Experiment Station

- Departments of transportation in Arkansas, California, Georgia, Iowa, Louisiana, Maryland, Michigan, Minnesota, New Mexico, New York, North Carolina, Pennsylvania, South Carolina, Texas, Virginia and Washington
- Local agencies in Gwinnett County, Georgia, and Pierce County, Washington
- LTAP centers in Alaska, Arkansas, Iowa, Michigan, Minnesota, New Mexico, New York, Nevada, Pennsylvania, Vermont and Washington
- Organizations such the ASCE, ITE, AAA Foundation for Traffic Safety, American Concrete Pavement Association, American Traffic Safety Services Association, Asphalt Emulsion Manufacturers Association, Asphalt Recycling and Reclaiming Association, Insurance Institute for Highway Safety, National Asphalt Pavement Association, National Association of County Engineers, National Lime Association, National Utility Contractors Association, Portland Cement Association and The Asphalt Institute
- State agencies such as the Alabama Forestry Commission and the Carolinas Associated General Contractors
- Universities such as Auburn, Clemson, North Carolina State, Penn State, South Dakota School of Mines and Wisconsin-Madison

The range of agencies, organizations and locations are demonstrations of LTAP work using the process of “Thinking Outside the Box”. Many of the videotapes are from US DOT FHWA and deal directly with surface transportation. However, one tape in particular describes the dust control methods developed for airfields on military bases. The products, equipment, limitations and economics of each alternative have similar applications on rural roadways.

Publications are identified, reviewed, reproduced, listed in the newsletter and distributed when requested. The identification is done by reviewing journals and newsletters and by attending conferences. The Civil Engineering staff performs the review and obtains copyright permission, as needed. Reproduced copies are kept on file and distributed by the student assistant. The listing in the newsletter is written by the Civil Engineering staff and produced and distributed by the EOCE staff.

These activities keep the entire staff of the center prepared and well versed for the activities of technology transfer. All activities involve both the EOCE and Civil Engineering staffs.

5. CONCLUSIONS

Technology Transfer is the result of a process involving research, evaluation and delivery. Researching the sources requires productive relationships and partnerships. Evaluation of the media chosen for the delivery of the technology needs to match the capability of sources and the requirements of the audience of recipients. Delivery to the recipients requires making the target audience aware of the resources and listening to their needs through an evaluation of the presentations.

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