Seminar and TRB Conference Attendance
Year 3

By

Michael D. Anderson, Ph.D.
Civil and Environmental Engineering Department
University of Alabama in Huntsville
Huntsville, Alabama

Daniel S. Turner, Ph.D.
Civil and Environmental Engineering Department
University of Alabama
Tuscaloosa, Alabama

Virginia P. Sisiopiku, Ph.D.
Civil and Environmental Engineering Department
University of Alabama at Birmingham
Birmingham, Alabama

Prepared by

UTCA
University Transportation Center for Alabama
The University of Alabama, The University of Alabama in Birmingham, and
The University of Alabama at Huntsville

UTCA Report 05303
May 11, 2006
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Title and Subtitle</td>
<td>5. Report Date</td>
<td></td>
</tr>
<tr>
<td>Seminar and TRB Conference Attendance: Year 3</td>
<td>May 11, 2006</td>
<td></td>
</tr>
<tr>
<td>Michael Anderson, Daniel Turner and Virginia Sisiopiku</td>
<td>UTCA Report 05301</td>
<td></td>
</tr>
<tr>
<td>9. Performing Organization Name and Address</td>
<td>10. Work Unit No.</td>
<td></td>
</tr>
<tr>
<td>Civil and Environmental Engineering Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Alabama in Huntsville</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huntsville, AL 35899</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Sponsoring Agency Name and Address</td>
<td>13. Type of Report and Period Covered</td>
<td></td>
</tr>
<tr>
<td>University Transportation Center for Alabama</td>
<td>Final Report/ 01/01/2005 – 2/28/2006</td>
<td></td>
</tr>
<tr>
<td>Box 870205, 271 H M Comer Mineral Industries Building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuscaloosa, AL 35487-0205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DTSR0023424</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Supplementary Notes</td>
<td>16. Abstract</td>
<td></td>
</tr>
<tr>
<td>17. Key Words</td>
<td>Students from the three campuses of the University of Alabama of System are engaged in a variety of transportation related research activities. This project provided a forum for transportation students to present their research results to faculty and students from their home campuses as well as transportation professionals from across the state. The students were selected to make presentations by faculty representatives from the three campuses, and were rewarded with travel funding to cover the cost of attending the Transportation Research Board Annual Meeting in Washington D.C.</td>
<td></td>
</tr>
<tr>
<td>18. Distribution Statement</td>
<td>19. Security Class (of this report)</td>
<td></td>
</tr>
<tr>
<td>Student Seminar, TRB Annual Meeting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>
Contents

Contents.................................................................................................................. iii
Figures .................................................................................................................. iii
Executive Summary .............................................................................................. iv

1.0 Introduction ..................................................................................................... 1
2.0 Selection of students ...................................................................................... 2
3.0 Student Seminar and Awards Luncheon......................................................... 3
4.0 TRB attendance .............................................................................................. 4
5.0 Conclusions ................................................................................................... 6

Appendices .......................................................................................................... 7
  A – Images from the UTCA Student Seminar .................................................. 7
  B – Accepted Abstracts ..................................................................................... 10
  C – Program for Student Award Luncheon ..................................................... 12

List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>2</td>
</tr>
<tr>
<td>A-1</td>
<td>7</td>
</tr>
<tr>
<td>A-2</td>
<td>8</td>
</tr>
<tr>
<td>A-3</td>
<td>8</td>
</tr>
<tr>
<td>A-4</td>
<td>9</td>
</tr>
</tbody>
</table>

iii
Executive Summary

There were two issues examined in this project. First, students from the three University of Alabama System campuses were provided an opportunity to present the results of their research in a professional forum. Second, students were provided an opportunity to attend an international transportation meeting to learn first-hand research work being conducted at other universities. This project addressed these issues by identifying deserving students and providing a forum to highlight their own research work, as a preface to exploring other research work being performed nationwide through attendance at the Transportation Research Board Annual Meeting.
Section 1
Introduction

The issues examined in this project were twofold. First, the project examined the variety of transportation research projects currently being performed by undergraduate and graduate students from the three institutions in the University of Alabama System. Moreover, the project provided a mechanism for students to present the results of their research to other faculty members from either their home campus or other UA System campuses. This was accomplished through a transportation student seminar hosted by the Institute of Transportation Engineers (ITE) Student Chapter at the University of Alabama at Birmingham (UAB). Interested students from the three campuses were required to submit an original abstract and resume to faculty members from the three schools. The faculty members then formed a review board and selected those students who were invited to make a presentation at the technical session.

The second issue addressed in this proposal was sending some of the best students in Alabama to the Transportation Research Board Annual Meeting in Washington D.C. This meeting is one of the premiere transportation conferences in the world, attracting over 10,000 participants from around the globe. Attendance at this meeting enabled our students to experience, firsthand, the leading research topics being studied and the solutions to those topics. Attendance at this meeting represented an incredible opportunity for students from the UA System to learn about the future of transportation and how their education and research will help realize the future.

This project combined these two issues by awarding travel funds to students to attend the Transportation Research Board Meeting as a reward for being selected to present in the student seminar. This report is divided into five chapters. The introduction presents the basis of the project. Chapter two discusses the selection and review process used to pick the students invited to present. Chapter three provides a review of the student seminar. Chapter four presents the impact from the students attending the TRB Annual Meeting. The final chapter of this report provides an overview of results and expectations for future projects.
Section 2
Selection of Students

The initial task of this project focused on advertising and selecting the students to make presentations at the seminar, to highlight student research work. Advertising was accomplished by an announcement requesting students to submit abstracts of their potential research work for consideration of presentation at the student seminar. As an example, the announcement for UA is shown in Figure 2-1. Copies of the announcement were distributed to each of the campus representatives for the project and they were responsible for placing these in locations the students would see them and generate interest.

![Figure 2-1: Announcement for UA students](image)

Each announcement requested that the appropriate on-campus representative collect abstracts and resumes. The abstract and resume of each student was reviewed by two faculty members who were not from the student’s home campus. This process was desirable to remove some bias from the reviews, as individual faculty members were not allowed to judge the abstracts of the students with whom they worked on projects. In addition, the abstracts were made available to external members of the UTCA advisory board for review. The reviews from the representatives were then forwarded to Dr. Anderson, summaries were developed, and letters of acceptance to present a paper or a poster at the conference were sent to the students.

Overall, students representing two of the three campuses submitted abstracts and resumes for the program (none from UA, four from UAB, and four from UAH). Based on the travel funds and seminar time available, two students (one each from UAB and UAH) were selected to present formal papers at the seminar and receive funding to attend the TRB Annual Meeting, four students (two each from UAB and UAH) were selected to present posters at the seminar and receive funding to attend the TRB Annual Meeting, and the remaining students were invited to present posters at the seminar without receiving travel funds.
Section 3
Student Seminar and Awards Luncheon

The second task conducted in this project was to host a student seminar. The seminar was developed and hosted by the UAB ITE Student Chapter on November 9, 2005 in the Business and Engineering Complex on the UAB campus, a location easily accessible to students and faculty from the three campuses as well as representatives from around the state. Images from the seminar are included in Appendix A and the abstracts from the two selected student presenters are included in Appendix B. The announcement for the student seminar, including presenters and presentation titles is included in Appendix C.

Also included in the seminar was a presentation from former Alabama Section ITE president Mrs. Becky White of Sain Associates, Inc. The session was attended by approximately 26 people representing either faculty or students from the three campuses, and employees from local transportation agencies. After the technical session, a poster session was held to allow students who were not selected for the formal paper presentation a chance to display their research.
Section 4
TRB attendance

The final task conducted in this project was to provide travel funding for students to attend the Transportation Research Board Annual Meeting in January 2006 to those students who were selected. Before attending the TRB Meeting, each student was responsible for preparing an itinerary of sessions and committee meetings in which they intend to participate. The students had to discuss their selections with their on-campus representative prior to the trip. Session topics that were identified by the students included the following:

- Asset Management,
- Pavement Management Systems,
- Statewide Transportation Planning,
- Transportation Safety,
- Traffic Simulation,
- Intelligent Transportation Systems
- Pavement Testing, and
- Aviation

In addition, each student attending the TRB Meeting was required to prepare a written summary of the sessions attended. The summaries had to describe the relationship between conference sessions and his or her current research or interest in transportation. Quotes from the student summaries included:

- “The experience to the TRB 85th Annual Meeting was enthralling, as it has provided a good opportunity to learn about different research areas in Transportation Engineering. A direct interaction with committee members was easy and beneficial to get good understanding of the subject in particular interest areas. It has also provided an opportunity to meet with different people from academia and industry in transportation field. Therefore, participation in the TRB is eventful both academically for future research and making new contacts.”

- “The experience was very informative and helpful. As the meeting attracted more than 9,500 transportation professionals from around the world to Washington, D.C., it provided an unparalleled opportunity for information sharing and interaction. It also provided a good opportunity to learn about the latest developments in transportation research, policy, and practice. Moreover, the TRB 85th Annual Meeting Compendium of Papers CD-ROM given to all registrants was very useful.”

- “I went to the 2006 TRB Conference to gather information relating to freight modeling because I was considering this as my Ph.D. dissertation topic. The sessions I attended
were *Freight Systems Capacity Issues* Parts 2, 3, and 4, *Current Research in Freight Modeling*, and *Use of Commercial Vehicle Modeling and Surveys*. The sessions were interesting for the most part and I was able to gather some ideas in the freight modeling realm.”

Overall, the students took advantage of the opportunity to learn from top researchers and to identify how those research ideas can be incorporated into the student’s work. This was exactly the purpose of conducting this project.
Section 5
Conclusions

This project was conducted to help develop a community of students from the three campuses. It highlighted the work these students were performing, and provided a means to explore other research being performed nationwide.

The relevance of this project was far reaching. It allowed students from the three campuses to compete against each other and to present their research results in a professional forum, attended by transportation professionals from across the state. In addition, this project allowed students to learn first-hand what research topics were being examined internationally through attendance at the TRB Annual Meeting. The students’ experiences and education gained through this project are will be reflected in the quality of graduate work being performed at the three campuses.
Appendix A
Images from UTCA Seminar

Figure A-1: Student presenter Xuping Li
Figure A-2: Student presenter Jeff Wilson

Figure A-3: Poster session
Figure A-4: Faculty and students from paper competition
Appendix B
Accepted Abstracts

Simulation Tools for Propulsion System Analysis of Fuel Cell Hybrid Transit Vehicles

By

Xuping Li
Department of Civil and Environmental Engineering
The University of Alabama at Birmingham
Birmingham, Alabama

Conventional transit bus designs waste substantial energy through braking, resulting in poor propulsion system efficiency. There have been increasing concern about the dependence on imported petroleum and urban air quality. Researchers have considered applying alternative propulsion systems to transit vehicles for several years. Fuel cell systems have the potential to achieve the goals of high efficiency and low emissions, either as stand alone propulsion systems or in a hybrid configuration. Previous studies provided a sound foundation for commercial viability of transit vehicle fuel cells and their supporting infrastructure. However, significant improvements are still needed for commercialization of hybrid fuel cell transit vehicles to be viable.

Since practical experience on the hybrid configuration in transit vehicles is limited and hardware prototypes are expensive, mathematical modeling and simulation techniques are particularly attractive for exploring preliminary designs and studying trade-offs. The objective of this study is to review simulation tools that hold the potential to study hybrid propulsion system configurations of transit vehicles for future reference. This paper first provides an overview of the main existing hybrid propulsion system simulation tools. Thereafter, it focuses on three commercially available simulation software packages: ADVISOR, PSAT, and GCtool. A detailed discussion is provided on modeling approaches, model capabilities, and limitations, and their potential to evaluate the feasibility of applying automotive fuel cell propulsion systems to transit vehicles. Furthermore, several applications of the software packages are summarized to highlight their functionalities.
A Pavement Management System for County Roads

By

Jeffery P. Wilson
Department of Civil and Environmental Engineering
The University of Alabama in Huntsville
Huntsville, Alabama

In recent years asset management has become important because the public wants to see the Federal, State, and Local governments run more like a private business. A pavement management system (PMS) is one aspect of asset management that deals entirely with roadways. A PMS is essentially a decision support tool that stores various types of information about roads and supports future forecasts of condition. This thesis covers a PMS that was designed for county roads in the state of Alabama. A PMS computer program was designed with county engineers in mind, to help them provide expedient management of their roads. To incorporate future forecasts of condition, road data was collected and was analyzed with linear regression to build a pavement deterioration equation.
Appendix C
Program for Student Award Luncheon

THE UAB INSTITUTE OF TRANSPORTATION ENGINEERS STUDENT CHAPTER
cordially invites you to the

1st ANNUAL STUDENT AWARD LUNCHEON
Celebrating the achievements of our transportation students

Wednesday, November 9, 2005
11:00 a.m.–1:00 p.m.

The University of Alabama at Birmingham
Business and Engineering Complex (BEC) Room 157

Welcome Dr. Virginia Sisiopiku, Associate Professor
The University of Alabama at Birmingham

Student Competition Awards Presentation Dr. Mike Anderson, Associate Professor
The University of Alabama in Huntsville

Simulation Tools for Propulsion System Xuping Li, Graduate Research Assistant
Analysis of Fuel Cell Hybrid Transit Vehicles The University of Alabama at Birmingham

A Pavement Management System for Jeff Wilson, Graduate Research Assistant
County Roads

Buffet Lunch

Context Sensitive Solution: Are You Ready Mrs. Becky White, Assistant Vice President,
for Group Participation? Sain Associates, Inc.

Closing Remarks Abdul Muqueet Abro,
UAB ITE Student Chapter President

Poster Session

This event is co-sponsored by the UAB Student Chapter of the Institute of Transportation Engineers,
the University Transportation Center for Alabama, and the University of Alabama at Birmingham