Student Seminar and TRB Conference Attendance

By
Dr. Michael Anderson  
Department of Civil and Environmental Engineering  
The University of Alabama in Huntsville

Dr. Jay Lindly  
Department of Civil and Environmental Engineering  
The University of Alabama

and

Dr. Virginia Sisiopiku  
Department of Civil and Environmental Engineering  
The University of Alabama at Birmingham

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 Number 03308  
February 2004
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 these transportation students to present their research results to faculty and students from their home campuses as well as transportation professionals in a professional setting. The students were selected to make the presentations by faculty representatives from the three campuses, based upon competitive abstracts. They were rewarded with travel funding to attend the Transportation Research Board 2004 Annual Meeting in Washington D.C.
Contents

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

1.0 Introduction ............................................................................................... 1
2.0 Selection of students ................................................................................ 2
3.0 Student Seminar ....................................................................................... 4
4.0 TRB attendance ....................................................................................... 5
5.0 Conclusions ............................................................................................. 7

Appendix A - Abstracts Submitted by Students Selected to Make Presentations .... 8
Appendix B - Photographs from UTCA Student Seminar ................................... 11

List of Figures

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2-1</td>
<td>Announcement for UAH students.</td>
<td>2</td>
</tr>
<tr>
<td>Figure 2-2</td>
<td>Example acceptance letter.</td>
<td>3</td>
</tr>
<tr>
<td>Figure B-1</td>
<td>Example student presenter</td>
<td>18</td>
</tr>
<tr>
<td>Figure B-2</td>
<td>Second example student presenter</td>
<td>19</td>
</tr>
<tr>
<td>Figure B-3</td>
<td>Example student presentation session</td>
<td>19</td>
</tr>
<tr>
<td>Figure B-4</td>
<td>Collective photo of student presenters</td>
<td>20</td>
</tr>
<tr>
<td>Figure B-5</td>
<td>Faculty and students</td>
<td>20</td>
</tr>
</tbody>
</table>
Executive Summary

There were two main activities conducted in this project. First, students from the three University of Alabama System campuses needed an opportunity to present the results of their research in a professional forum. Second, they would benefit from attending an international professional meeting to learn first-hand research work being conducted at other universities. This project addressed these issues by identifying deserving students to attend a forum to highlight their research work, and by providing a means for these student to attend the Annual Meeting of the Transportation Research Board to explore other research work performed worldwide.
Section 1
Introduction

The activities conducted in this project were twofold. First, there were many high-quality transportation research projects being performed by undergraduate and graduate students working through the University Transportation Center for Alabama (UTCA). These students were located at The University of Alabama (UA), The University of Alabama at Birmingham (UAB) and the University of Alabama in Huntsville (UAH). Unfortunately, no mechanism existed for the students to present the results of their research to the other faculty members from either their home campus or the other campuses. This project addressed that situation by developing a transportation student seminar track as part of the First Annual UTCA Research Symposium. Students from the three campuses were required to submit an original abstract and resume to a transportation faculty member at their home schools. These faculty members formed a review board, and selected students to present papers at the technical session.

The second issue addressed in this proposal was sending UTCA’s best students to the Transportation Research Board (TRB) 2004 Annual Meeting in Washington D.C. This meeting is one of the premiere transportation conferences in the world. Attendance at this meeting enabled the students to experience, firsthand, the research topics being studied and the solutions to those topics. Attendance at this meeting represented an incredible opportunity for students from the University of Alabama System to learn about the future of transportation and how their research will contribute to future transportation systems.

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 track.

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 select students to present their papers. 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 provides overall results and establishes expectations for student seminars in the future.
Section 2
Selection of students

The initial task for this project focused on advertising and selecting the students to give presentations at a seminar designed to highlight student research work. The advertising was accomplished through an announcement requesting students to submit an abstract of their potential research work for consideration of presentation at the student seminar. A sample announcement (used at UAH) is shown in Figure 2-1. Copies of the announcement were distributed to each of the campus representatives for the project. On each campus, a faculty member posted the announcements, generated interest among students, and fielded questions from students.

UAH Students Interested in Transportation

The University Transportation Center for Alabama (UTCA) is sponsoring a student research competition with a chance to earn a trip to the annual Transportation Research Board Meeting in Washington D.C., January 2004.

Anyone interested in the UTCA student research competition needs to submit an abstract of current or proposed research and a resume to Dr. Michael Anderson by July 31, 2003. The abstract must be less than 500 words and detail a transportation related project. From the submitted abstracts, three students will be selected to present their work at a student research seminar this fall. Those students will attend the annual Transportation Research Board Meeting in Washington D.C., January 2004. Full-time students enrolled through the spring semester of 2004 are eligible.

For more information, please contact Dr. Michael Anderson in the Department of Civil Engineering at 824-5028 or mkeas@cee.uah.edu

Figure 2-1 Announcement for UAH students

Each announcement requested that abstracts and resumes be submitted to the appropriate on-campus representative. The reviews of the abstracts and resumes were performed by the two on-campus representatives who were not on the student’s home campus. This removed some bias from the reviews, as individual faculty members who worked closely with students on projects, were not allowed to judge those students. A ranking system was developed for the resume, abstract, and writing ability of the students. The reviews from the representatives were then
forwarded to Dr. Anderson. He developed summaries, and sent letters of acceptance and rejection to the students. Figure 2-2 shows an example acceptance letter.

To: Student

From: Dr. Michael Anderson

Re: "Abstract Topic"

Date: October 7, 2003

---

I am pleased to notify you that after review of the above abstract, your paper has been accepted for presentation at the University Transportation Center for Alabama Research Results Symposium in Birmingham, Alabama on November 17, 2003. Your paper will be scheduled in an afternoon session and you will be given approximately 15 minutes to present your paper.

On behalf of the reviewers, we would like to thank you for your interest in the Symposium and look forward to seeing you in November in Birmingham. If you have any questions, please contact Dr. Michael Anderson at 256-824-9028 or mikra@ece.ua.edu.

---

Figure 2-2 Example acceptance letter

Overall, 14 students submitted abstracts for the program (five from UA, five from UAB and four from UAH). Based on the travel funds and seminar time available, nine students were selected to present their papers at the seminar and to receive funding to attend the TRB Annual Meeting. The abstracts submitted by the nine “selected” students may be found in Appendix A of this report.
Section 3
Student Seminar

The second task conducted in this project was to host a student seminar track as part of the UTCA Research Symposium, conducted at the Holiday Inn in Homewood, I-65 and Oxmoor Road, Birmingham, AL. This location was easily accessible to students and faculty from the three campuses, as well as representatives from around the state. The names of the student presenters, titles of presentations and associated home campus are shown in Table 3-1:

<table>
<thead>
<tr>
<th>Table 3:1 Student Presentation Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UA Students</strong></td>
</tr>
<tr>
<td>Dale Schwach Mechanical Engineering</td>
</tr>
<tr>
<td>&quot;A novel design and experimental study of a rolling contact fatigue testing system for precision components of advanced vehicles&quot;</td>
</tr>
<tr>
<td>Sharif Ullah Civil Engineering</td>
</tr>
<tr>
<td>&quot;Feasibility study of the introduction of bus transit system between Tuscaloosa and Birmingham&quot;</td>
</tr>
<tr>
<td>Jon William Civil Engineering</td>
</tr>
<tr>
<td>&quot;Web-based licensing for state airports&quot;</td>
</tr>
<tr>
<td><strong>UAB Students</strong></td>
</tr>
<tr>
<td>Nader Amer Civil Engineering</td>
</tr>
<tr>
<td>&quot;Roller compacted concrete pavement mix design procedure using the Gyratory compactor&quot;</td>
</tr>
<tr>
<td>Sameer Patharkar Civil Engineering</td>
</tr>
<tr>
<td>&quot;Regional traffic simplation for emergency preparedness&quot;</td>
</tr>
<tr>
<td>Charles Robinson Civil Engineering</td>
</tr>
<tr>
<td>&quot;Development of an Intermodal management system using GIS components with integration of environmental justice elements&quot;</td>
</tr>
<tr>
<td><strong>UAH Students</strong></td>
</tr>
<tr>
<td>Shalana Brown Civil Engineering</td>
</tr>
<tr>
<td>&quot;Increasing the awareness of transportation engineering for underrepresented minorities and females&quot;</td>
</tr>
<tr>
<td>Rachna Narem Industrial Systems Engineering</td>
</tr>
<tr>
<td>&quot;Verifying the quality of the accident analysis data using statistical quality methods and tools&quot;</td>
</tr>
<tr>
<td>Jeff Wilson Civil Engineering</td>
</tr>
<tr>
<td>&quot;Is Greensheild's Model valid for the Huntsville area&quot;</td>
</tr>
</tbody>
</table>

The student paper sessions were part of two tracts during the afternoon of the Symposium. Dr. Anderson from UAH moderated the sessions, which were attended by approximately 30 people representing either faculty or students from the three campuses, managers of the Alabama Department of Transportation, and representatives from local transportation agencies.

After the technical session, a reception was organized by the UAB Student Chapter of the Institution of Transportation Engineers. This gathering provided students from the three campuses a chance to meet each other, mingle, and blend into a single transportation student body representing all three campuses. Sample photographs showing the students during their presentations and at the reception may be found in Appendix B.
Section 4
TRB attendance

The final portion of this project was student attendance at the Transportation Research Board Conference in January 2004. This was a “reward” for those students selected to give presentations at the UTCA Research Symposium. Before attending the TRB Meeting, students were required to prepare an itinerary of sessions and committee meetings they intend to visit during the meeting. These were discussed with their on-campus representatives to ensure that student had selected the most applicable portions of the huge TRB meeting. Some of the session topics that were identified by the students included:

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

Each student attending the TRB Meeting was required to prepare a written summary of the sessions attended, and to explain the relationship between the selected sessions and his or her current research interests. Quotes from the student summaries included:

- “I gained further insight and knowledge into my research project involving the integration of environmental justice elements into the Jefferson and Shelby County Intermodal Management System. I was allotted fifteen minutes to give a presentation about my project topic at the Environmental Justice Task Force meeting. I received valuable feedback with regards to further study of the project. This meeting also provided a great networking opportunity. Many members of this Environmental Justice Task Force provided me with contact information to assist me with the project in later stages.”

- “I attended sessions focused on statistics, which also showed various models and analyses. I interacted with authors, which enabled me to get an in depth knowledge of their research. It was a great experience to see many transportation scholars from different parts of the world.”
• “I use a machine for concrete that was designed for asphalt (gyratory compactor). I attended a session on how to analyze asphalt data and obtain the best test the samples, and I learned to solve a major problem we had when testing shear.”

• “The TRB meeting provided me the opportunity to gain knowledge of the most updated research results and the general trends of transportation engineering, such as hot topics and challenges. The paper posters in the exhibit hall provided an opportunity for me to discuss questions directly with the paper authors. I really enjoyed the opportunities to discuss items with the authors and it was greatly helpful for me. At the same time I got to know a few authors of papers on topics similar to my research.”

• “I am extremely grateful for being allowed to visit Washington, D.C., and to attend the Annual Meeting of the Transportation Research Board. Having never visited Washington, D.C., this was the trip of a lifetime for me, to attend the conference as well as to see and learn all about my Nation’s Capitol and the rich history embedded there. I’d like to offer my sincere thanks to the sponsors of this trip for giving me this opportunity.”

Overall, the students took advantage of the opportunity to learn from top researchers and to identify how those research ideas could be incorporated into their work.
Section 5
Conclusions

This project furthered the professional development of a community of students from the three campuses, highlighted the work these students were performing, and provided a means to explore other research work being performed nationwide.

The relevance of this project was far reaching. The project 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 is anticipated to enhance graduate level work being performed at all three campuses.
Appendix A

Abstracts Submitted by Students
Selected to Make Presentations
Roller compacted concrete pavement mix design procedure using the gyratory compactor
By Nader Amer
Department of Civil Engineering, UAB

Abstract
Roller compacted concrete (RCC) pavement with its durability, low-maintenance, and low cost is beginning to gain interest over other applications such as conventional concrete and asphalt pavements. There are some open-ended research topics that need to be addressed before fully understanding the true behavior of RCC. This will depend heavily on the capability of preparing laboratory specimens to duplicate field performance in order to improve RCC pavements. In previous research, the gyratory compactor has proven to be a reliable machine through which the drawbacks of other methods, such as the Vebe apparatus and the hilti hammer, can be overcome.

Work is under way to improve mix design procedures for roller compacted concrete by different entities in Canada, Japan and in the United States. One that is widely used in the States is the mix design procedure created by the US Army Corps of Engineers (USACE). In there procedure, the Vebe apparatus is used to determine mixture proportions. This paper aims to improve mixture proportioning of RCC by using the Brovold gyratory compactor. It has been proven that the gyratory compactor can be effectively used to produce representative RCC test samples that can be tested for both compressive strength or splitting tensile. Knowing the available aggregate and the desired strength, the mixture proportions can be determined after testing RCC samples made using the gyratory compactor. This is achieved by using a set of curves comparing the unit weight and splitting tensile or compressive strength. A RCC mix design procedure using the gyratory compactor will benefit many transportation entities due to the fact that it provides an easier way to evaluate the strength and field density.

Construction companies and departments of transportation all over the United States can benefit from the easy and reliable use of the gyratory compactor through getting reliable results that are not user dependent as in current practices. Furthermore, the gyratory compactor can be used on site due to its lightweight and heavy-duty use, which competes with, or eliminates, the advantage of using the hilti hammer and similar applications. RCC mix design is a basic step in any RCC pavement construction; therefore, it is of interest to all transportation related work, and the use of the gyratory compactor will aim at lowering the cost and improving reliability of pavement construction.
Increasing the awareness of transportation engineering for underrepresented minorities and females
Shalana Brown
Department of Civil Engineering, UAH

Abstract
Minority and female students, in the field of engineering, enrolled in colleges and universities are underrepresented. Therefore, there is a need to create programs to increase the interest of engineering for the underrepresented population. The “Gearing Up for Transportation Engineering - A Summer institute” is such a program. It was developed to increase minority and female interest in civil engineering, specifically transportation engineering. This program brings selected students to a college campus to learn about a variety of transportation engineering topics and engineering as a career.

The program introduces students to many areas of transportation engineering through experimentation and field trips. These experiments included space transportation, jet engines, propulsion and thrust. Other experiments included alternative energy, the effect of pollution on ozone, and the use of fossil fuels. This particular experiment encouraged a discussion on alternative energy such as battery and solar powered vehicles. Additional topics included learning about traffic signals, street signs, and protocols for paving new streets and building overpasses.

A survey was given at the end of the Institute to measure the success of the program. The results showed an increased awareness and interest in civil engineering, in addition to an increased knowledge of transportation. Programs such as this will help increase the number of minorities and females in engineering.
Verifying the quality of accident analysis data using statistical quality methods and tools
Rachna Narem
Department of Industrial System Engineering and Engineering Management, UAH

Abstract
Accident data was provided in the form of an Excel spreadsheet, having spatial coordinates. A FORTRAN program was written to insert all the accidents on the GIS map, but there were some errors. The accidents in the study area were analyzed by dividing them into different categories depending upon whether the accidents were placed correctly on the road or off the road. Statistical methods like 2*2 contingency tables were used to find whether the data was placed correctly or not. It can be said with 95% confidence that 85% of the accidents were placed correctly. A sensitivity analysis was done to find out the amount of risk involved while analyzing the data. Quality tools like C and U charts were used to find whether the defective points were within the 3 \( \sigma \) control limits, but they were not much help in solving the problem.

A new chart was found by combining the individual C and U charts. Statistical methods like empirical and Poisson distributions were used to find the patterns of the data. Reasons and causes were identified for the 15% error in the data. Attempts were made to solve the problem of errors in recording of the accidents by law enforcement officers, to help avoid future mistakes. Various factors responsible for the accidents were analyzed to find the cause for the recording errors. This analysis, performed to check the quality of the accident data for a small sample area in the State of Alabama, can be applied to the entire state.
Abstract
In case of natural or manmade disasters, emergency preparedness is of utmost importance, to ensure the safety and security of people through an efficient transportation system.

The purpose of this project is to use microscopic simulation as a tool to plan for regulation and use of transportation facilities around the City of Birmingham in case of an emergency. This project, with the use of the CORSIM (Corridor Simulation) micro simulation model, will develop and test emergency response scenarios for the major traffic corridors. The project has been started by coding the proposed transportation network into CORSIM. The geometric and traffic data collected by the Alabama Department of Transportation has also been used to further aid the project. The proposed transportation network includes Interstate highways like I20/59, I20, I59, I459, I65 and also other feeder arterials.

The emergency management tool, which will be developed after coding the proposed transportation network, will be used to test emergency response procedures such as evacuation routing, emergency response routing, and traffic control strategies. A list of manmade and natural disasters has been developed to test different emergency scenarios, like the possible closure of the Birmingham airport due to a terrorist attack, an oil spill in downtown Birmingham, bridge destruction at the interchange of I20/59 and I65, etc. Appropriate preparedness and response measures of effectiveness (MOE’s) are being selected to support the assessment process. Candidate response actions (e.g., route diversion, transit application, emergency vehicle responses) using region-wide and corridor level measures of effectiveness, will be evaluated and recommendations will be developed for best practices and/or needs for further technology deployment.
Abstract
Environmental justice encompasses various principles that have begun to gain significant momentum in the past decade. These principles focus on assessment of areas where disproportionately high and adverse effects are on “minority” and “low-income” populations as defined by United States Department of Transportation. The ultimate goal is to ensure equal and fair treatment in these areas and promote increased involvement of these populations in the transportation planning process. A Geographical Information System (GIS) is used in this project as a transportation planning tool in identifying possible disproportionately high and adversely affected areas.

The purpose of the proposed project is to develop a comprehensive intermodal management system (IMS) that uses data primarily from the original Intermodal plan that was prepared in 1995 which included all of Jefferson and Shelby Counties as a transportation planning tool. The IMS will be used to address guidelines outlined in legislation such as the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and legislation following thereof. The IMS will also include components assist the Regional Planning Commission of Greater Birmingham (RPCGR) in integrating environmental justice principles in the Civil & Environmental Engineering Department.

The data (i.e. shapefiles and spreadsheets) for this project were primarily gathered from the RPCGB and websites such as the Environmental System Research Institute (ESRI), the United States Census Bureau, the Bureau of Transportation Statistics, and the United States Department of the Interior (i.e., National Atlas). The data was assembled in the most efficient and effective manner to convey the purpose of this project and its targeted goals. The data was queried according to factors based on ethnicity and income, and displayed by census tract on a map.

The criteria for selecting the census tracts in the maps were all census tracts with a minority percentage composition of greater than the total minority average per census tract and a number of persons below the poverty level within that same census tract being greater the 50%. The findings show that 23 census tracts met this criterion in Jefferson County based. The criteria for the projects were based on the aforementioned, but the location of the project had to be within the selected census tracts. The findings showed that 10 intermodal projects met the criteria.
A novel design and experimental study of a rolling contact fatigue testing system
for precision components of advanced vehicles
Dale Schwach
Department of Mechanical Engineering, UA

Abstract
Compared with grinding, hard turning is a novel manufacturing process with substantial benefits in making bearings, gears, cams, shafts, axles, and other precision mechanical transportation components subjected to cyclic loading. Hard turning may induce a relatively deep “surface” compressive residual stress, which is beneficial to sustain a longer component service life. However, “White layer,” a layer of material which appears white under the optical microscope, also often occurs on a machined component surface. The white layer is a phase-transformed layer of a machined part due to thermal damage of the machining process. The net and combined effects of white layer and residual stress on product performance such as rolling contact fatigue (RCF) life are not understood at present. Therefore, the significant benefits of hard turning would not be realized unless this issue is solved satisfactorily.

It is an important next step in the advancement of transportation to test rolling contact fatigue life of hard turned components. A rolling contact fatigue test rig is an important tool used to determine the fatigue life of hard turned components. The objectives of this research are to:
• Critically review rolling contact fatigue (RCF) testing rigs;
• Reveal the compelling issues of the RCF testing rigs for hard turned components;
• Solve the current issues by designing a novel RCF testing system, which is able to perform rolling contact tests on various hard turned components.

The dominant detection method for RCF is vibration through an accelerometer that is mounted either to the test specimen directly or nearby on a RCF test rig. The shortcoming of the vibration based method is that it only monitors the vibration of the entire system and not just the test specimen. Therefore, it is very hard to determine fatigue life of a target specimen and detect the location of the fatigued specimen. Thus, the reliability of the vibration-based method is greatly reduced. In this research, a novel RCF testing system has been designed and setup using an acoustic emission (AE) sensor and the signal processing unit, which accurately determine fatigue life of a test specimen and the fatigue location. The loading condition (pressure and speed) can also be precisely controlled with a load cell. The relationship between fatigue and feature AE signals has been established. The preliminary test results have shown that AE signal is very sensitive to rolling contact fatigue.

The usefulness of this research is that it will (1) significantly advance science and principles of manufacturing and product performance; (2) “maximize” the durability of components in automotive, aerospace, and machine tool industries; (3) substantially boost the competitiveness of related US industries; (4) enhance hands-on experience to solve the interdisciplinary engineering problems; and (5) develop a vehicle-related career through establishing partnership with industries.
Web-based licensing for state airports
Jon Williams
Department of Civil Engineering, UA

Abstract
The state of Alabama currently has 96 public-use airports and 181 private-use airports. The Aeronautics Bureau, part of the Alabama Department of Transportation (ALDOT), oversees the safety aspects of public-use airports. There is only one official “Airport Inspector” to ensure airport safety and to issue annual operating licenses to these airports.

The airport inspector is hard pressed to conduct recurring inspections, traveling throughout the state and conducting laborious inspections. The paperwork necessary to prepare the licensing information status for distribution to the public is extensive, and often delays the reporting of the airport licensing status. This delay could become a safety and economic issue.

This project created a revised method of inspecting and licensing public-use airports in Alabama using Web-based technology. The primary objective of the project was to generate an algorithm for airport inspection using appropriate weighting factors for various inspection features, by working in unison with the airport inspector. After developing the algorithm, a spreadsheet program was developed and field-tested on various conditions at different airports.

The spreadsheet program was transferred to ALDOT to be placed online on a secure web page for internal use. A limited version will also be placed in a separate web page for public use. This reduces the inspection paperwork and allows the public to secure the latest licensing status of any airport in the state.

Please see UTCA report number 02101 “Web-Based Licensing for State Airports” for additional information.
Is Greenshield's model valid for the Huntsville Area?
Jeffery Wilson
Department of Civil Engineering, UAH

Abstract
This proposed transportation research project is designed to find out if Greenshield’s Model of traffic startup time at a green signal is valid for the Huntsville, Alabama area. A new model will be developed that fits the way drivers react in Huntsville and then compared to Greenshield’s Model. The new model will be deemed the Huntsville Model. The information for the Huntsville Model will be obtained by video taping a major intersection that has at least 10 vehicles per queue. The camera will be setup so that it can record the changing of the signal phase and the vehicles that are stopped in one lane at the stop bar. This data will then be taken back to the lab and analyzed. The data will be analyzed is by measuring the time it takes for each vehicle in the queue to cross the stop bar as soon as the signal turns green. By doing this, an equation can be developed for each queue that includes the initial startup time for the first through fourth vehicles and the headway for the fifth to the last vehicle. The mean, variance, and standard deviation for the equations will be found within 95 percent confidence. This information will then be used to develop the Huntsville Model. Then the Huntsville Model will be compared to Greenshield’s Model to see how closely they resemble each other. If they are only a half second or so apart then, Greenshield’s Model will still be accepted as accurate. Otherwise, the Huntsville Model will be accepted as accurate for the Huntsville, Alabama area.
Feasibility study of the introduction of a bus transit system between Tuscaloosa and Birmingham
Mohammad Sharif Ullah
Department of Civil Engineering, UA

Abstract
Birmingham and Tuscaloosa are 50 miles apart. Everyday people travel from Tuscaloosa to Birmingham and vice versa for various purposes. The number of commuting people is quite big. Almost all of these people travel drive their own vehicles. Interstate highway 20/59 is the only efficient route for traveling in between these two cities. So, traffic volume in I–20/59 is extremely high. The construction work in I-20/59 has created more a congested condition. All of these facts have made the driving task risky and have lowered the Level of Service of this part of the Interstate highway. So far, the only bus communication between Tuscaloosa and Birmingham is the “Greyhound Bus Service,” and the number of buses is really low. Availability of seats is small, and the timing of departures and arrivals is not coordinated with the peak demand. The current overall efficiency of bus operation and service is poor. So, bus transportation is not successful in reducing the percentage of trips completed in private vehicles.

A regular coordinated bus transit system can help in achieving the following goals.
• Significant reduction of traffic volume on I-20/59.
• Safer, better means of transportation.
• Improvement of the level of service of the Interstate highway.
• Economic means of travel.
• Hassle-free and tension-free rides for the commuters.

The study will involve the following:
• An initial survey in the community to gather information on the number of commuting people, their opinions on bus transit system and other relevant information.
• A capacity analysis of Interstate highway 20/59 between Birmingham and Tuscaloosa to determine the percentage of vehicle types.
• Determination of the percentage of trips that can be captured in busses.
• An economic feasibility study of the introduction of the bus transit system.
• Coordination modeling with the local public transit system in Birmingham and in Tuscaloosa.
• Comparison of the level of service of I-20/59 before and after the introduction of the bus transit system.
Appendix B

Photographs from UTCA Student Seminar

Figure B-1  Example student presenter
Figure B-2  Second example student presenter

Figure B-3  Example student presentation session
B-4  Collective photo of student presenters

Figure B-5  Faculty and students