

# **Advanced Transportation Institute II**

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For

# **UTCA**

**University Transportation Center for Alabama**

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<b>16. Abstract</b>  The second annual Advanced Transportation Institute (ATI2) was conducted to high school students to pursue careers in the field of transportation engineering. The University Transportation Center for Alabama partnered with the Alabama Department of Transportation (ALDOT) to teach a one-week institute at ALDOT's central office headquarters in Montgomery, Alabama. The headquarters location provided access to practicing transportation professionals who served as lecturers, and it provided a real-life transportation, working environment.  ATI was open to rising high school juniors and seniors, with preference given to African Americans and females. Participants came from high schools in west central Alabama from which ALDOT typically recruits. They were nominated to attend the Institute by their high school teachers and guidance counselors, using criteria provided by ALDOT.  Institute presentations, lab experiences, and field trips were designed to give participants a general overview of ALDOT, an introduction to transportation engineering as a career, and hands-on examples and challenges. The comprehensive evaluation conducted at the end of the Institute indicated that the students enjoyed their experiences, and that they were influenced to consider transportation careers.  ATI2 was very successful. The 23 student participants indicated that they enjoyed the experience, that they learned about transportation careers and ALDOT, and that (as a group) they were favorably influenced to consider transportation careers.					
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## **Executive Summary**

The second annual Advanced Transportation Institute (ATI2) was conducted to high school students to pursue careers in the field of transportation engineering. The University Transportation Center for Alabama partnered with the Alabama Department of Transportation (ALDOT) to teach a one-week institute at ALDOT's central office headquarters in Montgomery, Alabama. The headquarters location provided access to practicing transportation professionals who served as lecturers, and it provided a real-life transportation, working environment.

ATI was open to rising high school juniors and seniors, with preference given to African Americans and females. Participants came from high schools in west central Alabama from which ALDOT typically recruits. They were nominated to attend the Institute by their high school teachers and guidance counselors, using criteria provided by ALDOT.

Institute presentations, lab experiences, and field trips were designed to give participants a general overview of ALDOT, an introduction to transportation engineering as a career, and hands-on examples and challenges. The comprehensive evaluation conducted at the end of the Institute indicated that the students enjoyed their experiences, and that they were influenced to consider transportation careers.

An additional ATI2 session was investigated for the ALDOT Fifth Division office in Tuscaloosa. Initial plans were to conduct it using the same recruiting and instructional procedures as used in the Montgomery session. Unfortunately, logistics and support personnel could not be arranged in the short planning period, so the inaugural second session was postponed until 2004.

ATI2 was very successful. The 23 student participants indicated that they enjoyed the experience, that they learned about transportation careers and ALDOT, and that (as a group) they were favorably influenced to consider transportation careers.

## **Section 1 Introduction**

### **Problem Statement**

The University Transportation Center for Alabama (UTCA) has established six goals to guide its development. Two of these goals fall within the areas of human resources and diversity, and are intended to help the State of Alabama cope with future transportation needs.

Large numbers of transportation professionals have retired in the past 5-10 years in Alabama, and the number of young people entering the transportation profession is far below the future need. Also, African Americans and females are underrepresented in the transportation profession, especially at the upper levels. The pool of candidates in these groups is not currently large enough to significantly increase the number of professionals practicing the transportation profession. African Americans and female students are now experiencing “a closing but continuing gap in degree conferral rates...compared to their percentages in the general population” (Black Issues in Higher Education). In other words, the supply is not increasing fast enough to meet the demand.

### **Project Approach**

UTCA determined that its best course of action to expand transportation human resources and to improve diversity was to increase the awareness of high school students about rewarding opportunities in the transportation profession, with preference given to minority and female students.

A summer program called the Advanced Transportation Institute (ATI) was created to allow representatives of transportation agencies and companies, along with practicing transportation professionals, to interact with students in a “real world” situation, and to provide insight into rewarding transportation careers. The institute was intended to be as informative and influential as possible. This required that Institute staff members, ALDOT speakers and other professionals devote time to classroom and laboratory settings to present information, answer questions, and mentor individual students.

UTCA partnered with the Alabama Department of Transportation (ALDOT) in this effort. One of the normal roles of ALDOT’s Professional Engineering, Education and Development (PEED) Bureau is to recruit high school students, especially minorities and females. This made the partnership a win-win effort.

The content of the 2003 Institute (ATI2) was loosely patterned after previous UTCA transportation institutes conducted by Dr. Kathleen M. Leonard at the University of Alabama in Huntsville (UTCA reports 00304, 01326 and 02301), and conducted by UTCA (UTCA report 02113). ATI2 topics were adjusted in response to suggestions from previous Institute attendees

and to fit the availability of the ALDOT presenters and facilities used during the instruction to illustrate the many facets of transportation engineering. In general, the mornings were filled with informative presentations, and the afternoon sessions featured projects, competitions, and field trips. The Alabama Road Builders Association and the Alabama Asphalt Pavement Association served as co-sponsors, and provided mentoring, field trips, mementos, and an award dinner at the conclusion of the week.

## **Section 2**

### **Recruiting Students**

#### **Marketing**

Based on prior efforts, UTCA and ALDOT knew that marketing would be a critical element of the Institute. With ATI2 immediately following the end of the high school academic year, obtaining early student commitments was extremely important. Primary efforts were focused on making the Institute more exciting and memorable for students to maximize its impact and to increase its marketability.

The success of the inaugural ATI was the key to developing marketable material for the Institute. Well in advance of the initial planning effort, each of the participating schools from the 2002 Institute were contacted to get an indication of their willingness to participate. Each of the schools responded with a resounding confirmation. The primary strategy for recruiting was to increase the amount of written material for interested participants. Not only was an announcement sent to publicize the event, but UTCA and PEED Bureau staff also developed and distributed an additional flyer and brochure to show all of the excitement.

Care was taken to make the distributed material straightforward and informative to increase its effectiveness. The material had numerous pictures illustrating the demographics of the program and to show how different and exciting events planned for ATI2. General information about ATI2 included the following topics:

- The overall objective,
- Method of student nomination and selection,
- Transportation career and transportation educational opportunities,
- ATI activities, laboratories, and competitions.,
- Field trips,
- Institute staff, and
- The overall experience.

The program was advertised as an opportunity to learn about stimulating careers in the transportation profession and to learn how to prepare for college. ATI2 was free of charge to participants to increase the program's attractiveness and to strengthen its reputation.

#### **Selection of Attendees**

Emphasis was placed on acquiring students who had potential, open minds, and genuine interest in the program. ALDOT took this message to school principals and guidance counselors, as well as county school system superintendents from within the typical ALDOT recruiting area. Focus was placed on participating schools from the previous year from Lowndes, Montgomery, and



Wilcox counties. In attempts to increase recruiting, a concentrated effort was placed at schools that were previously recruited but declined to participate in 2002. Additionally, two schools from Elmore County were invited to participate based on prior connections with PEED Bureau staff members. Each school was allowed to recommend up to five students and one alternate to participate in the Institute. The idea was to identify a sizeable pool of candidates to increase participation above the previous year's attendance, and to guarantee 20 to 30 ATI2 participants.

The recruiting process got off to a great start because of the lessons learned from the 2002 ATI. Many questions concerning the number of students to invite and how to allocate the number of invitations to each school were based on the 2002 ATI.

### **Contacts with Students**

During recruiting visits to the target schools, ALDOT provided an informative letter, program announcement, flyer, and an informative brochure. Students selected by the schools completed an application form, which was returned to either ALDOT or UTCA. The application form was a critical element because it allowed UTCA to begin a series of contacts with the students. UTCA contacted the students to inform them of the program's opportunities, to stimulate their interest, and to answer questions. Appendix A contains samples of this correspondence.

First, the participants received a welcoming letter containing information about the Institute and a registration form that they could return to indicate their acceptance of a position in ATI2. Next, phone calls were made as time was available, to confirm each student's degree of interest in the Institute. During these calls, the students' interest in ATI2 was stimulated, questions were answered, and uncertainties of the students and their parents were addressed. A second letter was later sent, which included an acceptance form, a parental permission form, an overview of planned daily activities, and a map with detailed directions to ALDOT headquarters.

To alleviate the concerns of extensive travel, UTCA made travel arrangements for students from two schools, which included housing, travel, meals, and chaperone expenses. Additional correspondence was sent to the affected students and their school's principals or sponsors. At this time, ALDOT agreed to provide daily travel for students from Elmore County, and coordinated the arrangements through a high school faculty member there.

### **Summary of Recruiting**

UTCA and ALDOT were pleased with the recruiting results. Several schools were contacted and many students had an opportunity to respond to the ATI2 invitation. These were busy students with several options on how to spend their summer (leadership conferences, athletic camps, family vacations, etc.). The actual number that attended was 23, which was good, considering that the target number was 20 to 30 students. At some schools, names and confirmation of attendance were received, but problems occurred from not having the application form available for student contact. These issues will be addressed during planning for the 2004 ATI.

## **Section 3**

### **Curriculum and Instruction Issues**

#### **Curriculum Development**

A balanced curriculum with informative sessions was desired, to make the Institute meaningful to all of the students and participants. The intent was important to provide a view of the wide range of transportation employment opportunities, and to illustrate how a technical education could put those jobs within reach.

A draft agenda was derived from the 2002 ATI sessions. In keeping with the strengths of last year's Institute, each day had a theme, or several related themes. For example, one day might emphasize bridge issues, and the next day might feature design issues. The draft schedule was updated to reflect recommendations from the previous year's students, speakers and facilitators. Once the draft agenda was approved, presenters and facilitators for the topics and field trips were identified and secured. The following list of major topics resulted from several iterations between UTCA, PEED, and other ALDOT bureaus (explained in more detail in Table 3-1):

- asphalt plant site visit,
- bridges/bridge design/underwater inspection of bridges,
- roadway materials,
- environmental-archeology,
- intelligent transportation systems,
- professional development/business etiquette,
- roadway design and construction,
- traffic engineering,
- transportation career opportunities,
- transportation safety/safety enhancements, and
- University of Alabama/college admissions overview.

Recommendations from Dr. Leonard, about allowing time for students to bond during break and snack periods, were taken earnestly and placed into the schedule. The starting and ending times (9:00 a.m. - 4:00 p.m.) were arranged so that commuter students could avoid rush hour traffic, and to keep the Institute short enough to prevent overburdening the participants. Efforts were made to simplify each day as much as possible to prevent confusion and to further streamline the schedule. One of the recommendations from 2002 was to allow the students to get outside the ALDOT building for recreation, like a visit to the Montgomery Zoo. This was added to the curriculum and was well received by 2003 students, because it allowed time to relax and encourage further bonding. A copy of each day's finalized agenda, including speakers, may be found in Appendix B.

**Table 3-1: Curriculum topics and session contents**

Session Title	Session Description
Overview/State Employment Opportunities	This presentation offered an overview of ATI2 and presented information about possible employment with transportation-related agencies.
Bridge Overview	This topic reviewed the variety of bridge types, construction methods and materials, and emphasized the importance of bridge inspection.
Computer Bridge Design	This presentation and lab session demonstrated the role of cost-effectiveness in the design of basic truss bridges, using the West Point Bridge Designer® computer software.
Pin and Straw Bridge Design	This lab session was used to show the importance of key design concepts like bridge symmetry, joint placement, and quality of construction.
University Overview	A University of Alabama recruiting specialist gave a short overview detailing college admission procedures, engineering courses, and university life.
Roadway Design	This presentation illustrated the initial phases of roadway design by using computer modeling and simulation.
Asphalt Plant Overview and Field Trip	An introduction to roadway construction was provided by ATI2 co-sponsors. An asphalt plant tour was used to illustrate mix design and plant operation.
Safety Management	This session answered some of the participant's earlier safety questions. It also outlined cost/benefit warrants for traffic improvements.
Materials and Testing	This session reiterated roadway construction materials. Demonstrations were given to show ALDOT's role in inspection and materials testing. At the conclusion of this module, each participant practiced quality control techniques by creating concrete cylinders for testing.
Roadway Safety	The second traffic safety modules detailed the risks involved with everyday driving. A video was also shown to add emphasis.
Safety Design Lab (Egg Drop Competition)	Students designed a safety container using the principles of energy absorption, to protect an egg dropped from the boom of a utility truck. The winning design achieved a 25 foot drop!
Intelligent Transportation Systems (ITS)	A University of Alabama graduate student outlined technology advancements and potential applications of ITS.
Environmental/Archeological Field Trip	This session addressed how proper road design recognizes and incorporates environmental concerns. Students were able to identify animals and plants important to the design process.
Underwater Bridge Inspection	ALDOT divers gave an overview of underwater bridge inspection. Students were able to try on equipment and learn about key requirements and risks.
Professional Development/Business Etiquette	Students were briefed on the importance of using proper etiquette in the business setting. Examples were given to further illustrate key concepts.

## Conducting the Institute

The Institute was held in several adjacent conference rooms at ALDOT headquarters. The rooms were easily accessible to the students and their parents. They also had excellent audiovisual equipment, and had ample space for presentations and student interaction sessions (breaks, snacks, and meals).

Presenters were transportation professionals recruited from the University of Alabama, ALDOT, and the co-sponsors (the Alabama Road Builders Association and the Alabama Asphalt Pavers Association). Assistance with registration (and for all activities during the week) was provided

by members of the PEED Bureau. One or more PEED employees remained with the students throughout the entire duration of the Institute. They were available in the classroom each day, encouraged individual students, transported students to and from the field trip sites, distributed lunches and snacks, and provided presentation materials and other “as-needed” resources.

To make the students feel more welcome and appreciated, packets were given to each participant during the initial registration. This consisted of the following items provided by the sponsors and co-sponsors:

- institute agenda;
- t-shirt;
- pens, pencils, folders, etc.; and
- several other gifts.

During the week, the students were allowed to show their school spirit and to congregate throughout the presentations, but they were placed with members of different schools for the group projects. Most of the sessions were interactive, which allowed students to ask questions and instigate deeper discussion. This was quite effective. Some of the presenters even provided additional mementos to increase their lasting impact on the students. A flexible timetable was used to allow extension of individual sessions so that discussions could address all concerns and questions of the students.

All things considered, the week ran rather smoothly. Students genuinely enjoyed interacting with ALDOT professionals in hand-on situations like concrete mix design/concrete cylinder testing, computer bridge design, and field trips. Group bonding occurred, and the students were very receptive to presentations.

### **Closing Session**

The closing session was the culmination of a week of learning, friendship, and excitement. A barbeque dinner was provided by the co-sponsors, who attended the meal along with invited ALDOT representatives and the participant’s parents. Prior to the meal, a slide presentation was shown, featuring highlights of the students in the week’s workshops, presentations, and field trips. (Sample photos from the slide show may be found in Appendix C).

Following the dinner, certificates and awards were presented for each of the competitions, contributing sponsors, and staff members. Motivational speakers provided insights and accounts of the Institute’s successes. The casual atmosphere and slide show set a positive tone that sent the participants and their parents’ home with wonderful memories of a week well spent.

## Section 4 Evaluation of Institute

The last activity of the Institute was evaluation of the week’s activities. An evaluation form was used to gather information about presentations to students, site visits, lab projects, the general success of the institute, and whether it influenced students to consider transportation careers. A copy of the survey form has been reproduced in the appendix of this report.

### Evaluation of Presentations

There were 16 classroom presentations conducted during the week. Students categorized them on a scale from “great” to “poor.” For evaluation purposes, the subjective scores were changed to numerical values, where five represented the highest score and one represented the lowest score.

The presentation scores have been listed in descending order in Table 4-1. The highest ratings were given to the “University Life/Admissions Procedures” presentation and the “Professional Development/Business Etiquette” presentation. This is unusual for a summer institute, but highly desirable because it indicates that these students were very interested in their future education and professional careers. It also indicates the type of presentations of which they were most appreciative.

**Table 4-1 Evaluation scores for presentations**

<b>Presentation Topic</b>	<b>Mean</b>	<b>Std.Dev.</b>
University/Admissions	<u>4.52</u>	0.95
Prof Devel/Business Etiquette	<u>4.42</u>	0.97
Road Safety/Barriers	<u>4.17</u>	0.82
Safety Management	<u>4.13</u>	0.90
Roadway Design Modeling	<u>4.08</u>	0.93
Traffic Engineering	<u>4.04</u>	<u>0.69</u>
Intro to Straw Bridge Design	4.00	0.90
Intelligent Transportation Systems	3.96	0.91
Intro to Computer Bridge Design	3.91	0.97
Underwater Bridge Inspection	3.88	0.99
Overview Asphalt Plant Field Trip	3.86	0.94
ALDOT Careers	3.74	(1.10)
Intro to Environmental Trip	3.73	(1.16)
Overview of Bridge Design	(3.61)	(1.16)
Intro to Materials and Tests	(3.59)	(1.01)
Project and Plans Design	(3.41)	(1.05)

Field trips and labs with excellent average scores are underlined.  
Field trips and labs with weaker scores are in parentheses.

In addition to mean scores, the table also shows standard deviations. A presentation with a small standard deviation indicates that the students reached a strong consensus on the quality and usefulness of the presentation.

### Evaluation of Field Trips and Lab Sessions

It is fair to say that field trips and laboratories received higher evaluation scores than did the classroom presentations. This is not because the presenters did not do a good job, but probably reflects the fact that high school juniors and seniors enjoy hands-on experiences more than presentations. This point was illustrated in a long narrative that one student wrote on the evaluation form, pointing out that the class room had no windows and that almost all activities occurred in it, and that the students began to feel “cramped” in the classroom by the end of the week. The student encouraged more labs, field trips and out-of-classroom experiences for future Institutes.

There were nine field trips and laboratories during the week. Their mean evaluation scores are shown in table 4-2. Five of them scored extremely high, led by the egg drop contest which had the highest mean score of any evaluation topic and the lowest standard deviation of any topic. This event also scored very high in the evaluation of the 2001 Institute, and should be retained for next year. The computer bridge design contest, sign and signal shop tour, straw bridge design contest, and zoo trip all received very good evaluation scores

**Table 4-2: Evaluation scores for field trips and laboratories**

Presentation Topic	Mean	Std.Dev.
Egg Drop Contest	<u>4.71</u>	<u>0.46</u>
Computer Bridge Design	<u>4.57</u>	0.79
Sign & Signal Shop Field Trip	<u>4.43</u>	<u>0.66</u>
Straw Bridge Design	<u>4.33</u>	(1.05)
Zoo	<u>4.22</u>	0.95
Environmental-archeological Site Visit	<u>4.13</u>	(1.10)
Concrete Cylinder Testing	<u>4.13</u>	(1.15)
Materials Lab Field Trip	4.04	0.88
Asphalt Plant Site Visit	(3.65)	(1.23)

Field trips and labs with excellent average scores are underlined.  
Field trips and labs with weaker scores are in parentheses.

The evaluations were refined by asking students to list their favorite and least favorite experiences during the week. Their responses have been listed in table 4-3, in order of frequency of occurrence on the evaluation forms.

**Table 4-3  
Favorite and least favorite sessions**

<p><b>Which were your favorite sessions?</b></p> <p><u>Sessions listed by 33% or more of participants</u></p> <p>Professional development/business etiquette          University/admissions overview          Computer bridge design lab          Egg drop contest          Safety management</p> <p><u>Sessions listed by 20% or more of participants</u></p> <p>Roadway design modeling          Straw bridge design</p> <p><b>Which were your least favorite sessions?</b></p> <p><u>Sessions listed by 33% or more of participants</u></p> <p>Projects and Plans</p> <p><u>Sessions listed by 20% or more of participants</u></p> <p>Overview of bridges          Intro to Materials &amp; Tests          Asphalt plant site visit          Straw bridge design</p>
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In discussing favorite topics, five sessions were each listed by at least one-third of the students. The two sessions mentioned most frequently were “Professional Development/Business Etiquette” and “University Admissions/Overview.” These two topics also gathered the highest average evaluation scores (see Table 4-1). The third and fourth topics listed in Table 4-3 showed up as the two highest rated field trips/labs in Table 4-2. This means that the student evaluations were sincere and consistent.

Table 4-3 also points out another fact – not every presentation or every lab appealed to all students. For example the straw bridge design contest was listed by 20% of the students as one of their “most favorite” activities. The same topic was listed by more than 20% of the students as one of their “least favorite” activities.

The purpose of the evaluation was to try to determine which sessions (highly rated, good presenters) should be included in future versions of the Institute, and which sessions (lowest evaluation scores, highest standard deviations) should be removed or enhanced for the next Institute. The information in Tables 4-1, 4-2, and 4-3 clearly indicates the most effective information presented to the students and can be used to enhance next year’s sessions.

**Evaluation of General Issues**

Another section of the evaluation form requested information about four general issues. As shown in Table 4-4, participants gave an overwhelming endorsement to the efforts of the

Institute staff. The presenters, members of the PEED Bureau, UTCA staff, and others who helped conduct the Institute are to be congratulated.

Likewise, students strongly indicated their overall enjoyment of the week long Institute. Casual conversations during lunch, breaks and field trips confirmed this fact, especially in the final days of the Institute.

**Table 4-4 Evaluation scores for general topics**

Presentation Topic	Mean	Std.Dev.
Institute staff members helpful?	<u>4.58</u>	0.78
Overall experience this week?	<u>4.46</u>	<u>0.59</u>
Food at lunch and breaks?	4.00	(1.22)
Length of sessions about right?	(3.58)	(1.25)

Field trips and labs with excellent average scores are underlined.  
Field trips and labs with weaker average scores are in parentheses.

### Career Influence?

The purpose of the Institute was to influence young men and women to consider transportation careers, and specifically to consider working for the Alabama Department of Transportation. At the beginning of the week, 39% of the participants indicated that they were already considering a transportation career (see Table 4-5). This is a higher percentage than anticipated, and probably reflects the strong ALDOT grass roots recruiting program in the locations from which many of the students were recruited. PEED staff members had visited their schools, and ALDOT District Engineers had made concerted efforts to befriend them and to recruit them.

By the end of the Institute, the number of participants considering transportation careers had reached 78% (double the initial value). This is a strong endorsement of the overall program. Only five of the 23 students remained uninterested in transportation as a profession.

**Table 4-5 Considering a transportation career**

Students: Before → After	No.	%
Yes → Yes	6	26
No → Yes	6	26
Yes → Strongly considering	3	13
No → Strongly considering	3	13
Yes ( No	0	0
No ( No	5	22

Taken as a whole, the information in Table 4-5 indicates that the Institute materials, presentations, field trips, labs, and staff enthusiasm were all effective in achieving the overall goal of the Institute – helping to provide tomorrow’s transportation professionals.



## **Section 5 Expansion of ATI**

### **Background**

Initial (and ambitious) plans for ATI2 included investigation of conducting a second week-long session, at the ALDOT Fifth Division office in Tuscaloosa. The Institute was to include the same successful elements of the 2002 Institute and, if possible due to time, changes or recommendations from the Montgomery offering of ATI2. Personnel were to be utilized from the ALDOT Fifth Division, ALDOT Central Office, and UTCA.

### **Planning, Marketing, and Recruiting**

One of the concerns was that the Fifth Division personnel not be overburdened with the recruiting and planning efforts, because the Division office had many less employees than the ALDOT central office. This would require the PEED Bureau to take the lead on all phases of the session (except recruiting) with some assistance from the Fifth Division staff. The PEED Bureau would also assist with supplying personnel for the actual implementation of the program. UTCA was to assist with recruiting, organize sessions, and supply daily meals and t-shirts, while the Fifth Division was to assist by providing transportation and facilities.

Many of the early ATI2 planning sessions were directed at the feasibility of having the additional session in Tuscaloosa. In addition to the general ATI2 planning meetings, supplemental meetings were held specifically for the Tuscaloosa session. A draft schedule emerged, with the students spending alternate days at the Fifth Division complex and on the University of Alabama campus.

ALDOT recruiting in the Fifth Division is done by Division professionals; so recruiting strategies were modified and a potential lead recruiter was identified. A list of candidate high schools, contact information, and other materials were developed.

### **Concerns and Recommendations**

As preliminary planning for the proposed second ATI2 session in Tuscaloosa, it became apparent that there was not enough time to develop the second session, that there were many ALDOT managers who needed to be involved in coordinating the effort, and that there were serious questions about how the session would impact the overall budget and work efficiency of the Fifth Division.

Both UA and ALDOT agreed to cancel the second-session effort for 2004, but to fully investigate if for the 2004 ATI

## **Section 6**

### **Summary and Recommendations**

#### **Noteworthy Areas**

The goal of the ATI2 was to inform and educate high school students and to encourage them to pursue careers in the field of transportation, to improve the transportation human resources and diversity picture in Alabama. With the assistance of the ALDOT PEED Bureau, this was accomplished. Successful elements of the program are detailed below:

- The partnership of UTCA and PEED proved, yet again, to be a very potent method for delivering a very successful Institute. Interactive and informative labs and competitions dealt with actual transportation projects and transportation careers.
- Feedback from the 2002 ATI lead to improvements that greatly contributed to the overall success and efficiency of the program.
- Instructive demonstrations reinforced key concepts.
- Emphasis was placed on career opportunities, and the responsibilities of individual students to prepare for such opportunities.
- Key engineering principals were integrated with business and other non-engineering factors.
- Personal interaction occurred between the students and transportation professionals.
- Mentoring opportunities were sought and emphasized.
- Two professional organizations, the Alabama Road Builders Association and the Alabama Asphalt Pavement Association, enriched the students' experiences during the Institute.
- The end-of-course evaluation showed that students enjoyed the Institute and had been influenced towards careers in transportation.

#### **Areas of Concern**

The Institute was excellent from the standpoint of its characteristics and quality. In addition, the goal of influencing a group of at least 20 students was met, since 23 students participated in the Institute. However, there is still some concern with the timeliness of recruiting. Although the Institute was enthusiastically accepted from the participating schools, there were some problems with receiving application materials. Contact information for the individual participants and chaperones, if applicable, is important and should be received earlier.

Following the conclusion of the Institute, the Professional Engineering, Education and Development Bureau was disassembled and its members were relocated to various ALDOT bureaus and sections. It will be necessary to select another host bureau for the 2004 ATI, and efforts have already begun in that direction.

Initial plans for the ATI2 included possible assistance from the ALDOT Fifth Division to host an additional week of the Institute in Tuscaloosa. Unfortunately, the timing was not suitable, and a lack of sufficient personnel and resources caused a postponement of this concept. The 2004 ATI should make the second week of Institute a particular goal.

## **Recommendations**

- 1) The 2003 Advanced Transportation Institute was very successful, and it should be repeated.
- 2) The partnership with the ALDOT PEED Bureau was very successful, and a similar partnership should be obtained with another bureau as soon as possible.
- 3) The ALDOT central office was an excellent location for the Institute. The instant access to the job environment, materials labs, computers, and practicing professionals was excellent, and should be retained.
- 4) Although the Institute was successful, several improvements should be considered:
  - First, selection of Institute participants should start even earlier, and the recruiting brochure should be updated. Selecting participants earlier will alleviate problems with planning workshops, ordering supplies and materials, determining the costs of transportation and housing, and estimating catering costs.
  - Recruiting can be expanded to additional schools to increase the number of applicants. Contacts with the schools should be conducted earlier and the contact persons should be informed of responsibilities to prevent confusion. By doing this, students can be recruited earlier and applications will be forwarded and processed more quickly.
  - Course evaluations should continue to be used to modify the curriculum. Presentations and lab sessions that were not effective based on the ATI2 evaluation should be cross-examined with those from the 2002 ATI and either deleted or strengthened. Those that were highly effective should be expanded.
  - Speakers, lab instructors and field trip guides should be encouraged to provide written materials to the students. This might be as simple as an outline of the presentation, lab or trip. The written materials could be more specific, and can provide names for the students to contact in the future for additional information or for career guidance.
  - In some cases the lab exercises should be expanded or strengthened. This is especially true of the lab instructions, which should all be in a consistent written form.

## **Section 7**

### **References**

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## **Section 8**

### **Acknowledgements**

Many individuals participated in the planning and execution of the Advanced Transportation Institute. Special thanks is extended to ALDOT, especially to the individuals in the Bureau of Professional Engineering, Education and Development (Bureau Chief Curtis Pierce; Assistant Bureau Chief Carl Smith, Co-Director of the Institute; and to assistants Connie Dennis, Japonica Dennis, Vincent Fails, and Annette Waites, who assisted with registration and the Institute's daily events.)

The speakers, lab session instructors, and others who assisted in presentations and work sessions were deeply appreciated. The names of many of them may be found in Appendix B of this report. One of these individuals should be singled out for praise. Ms. Jaquita Smith from the University of Alabama took time from her busy schedule to deliver a presentation (which was extremely well received by the students) while attending another event in Montgomery.

At the University of Alabama, deep appreciation is extended to Ms. Joy Curry of UTCA and Mrs. Nell Vice of the Civil & Environmental Engineering Department for their assistance with administrative issues.

A special thanks is extended to the superintendents, teachers, guidance counselors, and chaperones who helped select the students and who made travel arrangements so that they could attend ATI2. Finally, as always, we must thank and give our deepest appreciation to the class of students who participated so freely and so fully, and who helped to get the most out of the Institute and to further strengthen its foundation.

## **Appendix A**

### **Samples of Correspondence with Student Participants**

\*\*\* ANNOUNCEMENT \*\*\*

## **Advanced Transportation Institute 2003**

**June 9-13**

Alabama DOT Headquarters, Montgomery, Alabama

*Sponsored by*

**The University Transportation Center for Alabama, University of Alabama  
The Alabama Department of Transportation**

*And the*

**Transportation Construction and Materials Industries**

High school students (rising juniors and seniors) can learn about career opportunities, programs of study, scholarships, internships, work-study jobs, co-operative employment programs, summer jobs and other useful information. The curriculum will include topics like:

- transportation careers
- the Alabama DOT and its programs
- transportation design and construction, environmental issues, transportation safety, and other related topics.
- visits to designer's offices and to construction sites
- each student will spend a half day "interning" with a transportation professional
- student teams will compete in design contests (bridge analysis and design, innovative vehicles, surveying, and similar topics)
- awards dinner

*For more information contact either of the following individuals:*

Dr. Daniel S. Turner  
University Transportation Center for Alabama  
The University of Alabama  
P O Box 870205  
Tuscaloosa, AL 35487  
(205) 348-9925  
(205) 348-6862 fax  
[utca@coe.eng.ua.edu](mailto:utca@coe.eng.ua.edu)

Mr. Carl Smith  
Professional Engineering Education  
and Development Bureau  
Alabama Dept of Transportation  
1409 Coliseum Boulevard  
Montgomery, AL 36130  
(334) 242-6410  
(334) 353-6524 fax  
(877) 271-5536  
[smithcarl@dot.state.al.us](mailto:smithcarl@dot.state.al.us)

**Figure A-1: Initial announcement**

January 20, 2004

name  
address 1  
address 2

Dear name,

Greetings from The University of Alabama! We would like to thank you for your interest in the annual Advanced Transportation Institute. As you may know, UTCA and the Alabama Department of Transportation (ALDOT) are sponsoring this free program to promote diversity and interest in transportation careers. You have been accepted as an Institute participant because your sponsor identified you as showing a desire to excel in an engineering related career, which means that Transportation Engineering could be your match!

**WHAT:** The Advanced Transportation Institute  
**WHEN:** June 9-13, 2003  
**WHERE:** ALDOT Headquarters, 1409 Coliseum Blvd., Montgomery  
**ATTIRE:** Clothes acceptable at your school (casual)

By taking part you will learn about university scholarships and opportunities; participate in group activities and field trips to become familiar with roads, bridges, traffic safety, and environmental conservation; hear professionals speak about the transportation industry; and even learn how information technology is changing the future of transportation.

*Remember that all activities (even meals) associated with the Institute are free.* You can learn more by reviewing the attached documents: Daily Overview sheet, Student Acceptance form, Parental Permission form, and Travel Directions. The **Student Acceptance** and **Parental Permission** forms should be **returned by May 31<sup>st</sup>**, using the attached envelope.

Even though this packet highlights many of the important details of this weeklong event, you may still have unanswered questions. If so, please feel free to contact us using the address information below.

Sincerely yours,

Daniel S. Turner

cc: Mr. Carl Smith, ALDOT  
Attach: Daily Overview Sheet, Student Acceptance Form, Parental Permission Form, Travel Directions

**Figure A- 2: Letter sent to student participants**



**APPLICATION FORM**  
Advanced Transportation Institute  
June 9-13, 2003

*Alabama Department of Transportation,  
1409 Coliseum Boulevard, Montgomery, Alabama*

Student's Name: \_\_\_\_\_

Student's Phone and \_\_\_\_\_

Home Address Info: \_\_\_\_\_

Student's School: \_\_\_\_\_

Sponsoring Teacher \_\_\_\_\_

or Counselor

Anticipated Graduation Date \_\_\_\_\_

Briefly describe why you are interested in a transportation career, or why you want to attend the Institute: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Return this form to your teacher or counselor (the person who gave you the form).** They will fax or mail it to the University Transportation Center for Alabama at the following address to the following address by May 9, 2003.

Dr. Daniel S. Turner, Director  
University Transportation Center for Alabama  
The University of Alabama  
P O Box 870205  
Tuscaloosa, AL 35487  
(205) 348-9925

**Figure A-3: Application Form**

--- Travel Directions ---

**ADVANCED TRANSPORTATION INSTITUTE**

Sponsored by  
**The University Transportation Center for Alabama**  
**The Alabama Department of Transportation**  
June 9-13, 2002

**First Meeting:** Monday, June 9, Registration from 8:30 until 9:15 a.m.

**Where:** Alabama DOT headquarters building  
Conference Rooms 5-6

**Directions:** From the North: Take Me-65 to Northern Blvd.; go east about 4.5 miles to Coliseum Boulevard; turn right onto the Boulevard for one mile; the building will be on your right.

From the South: Take I-65 through the City of Montgomery until you arrive at Northern Blvd; from there follow the directions in the preceding paragraph.

From the East: Take I-85 to Eastern Blvd., turn north and follow the Boulevard about 7 miles to Coliseum Boulevard; turn left and go one mile; the building will be on your right.

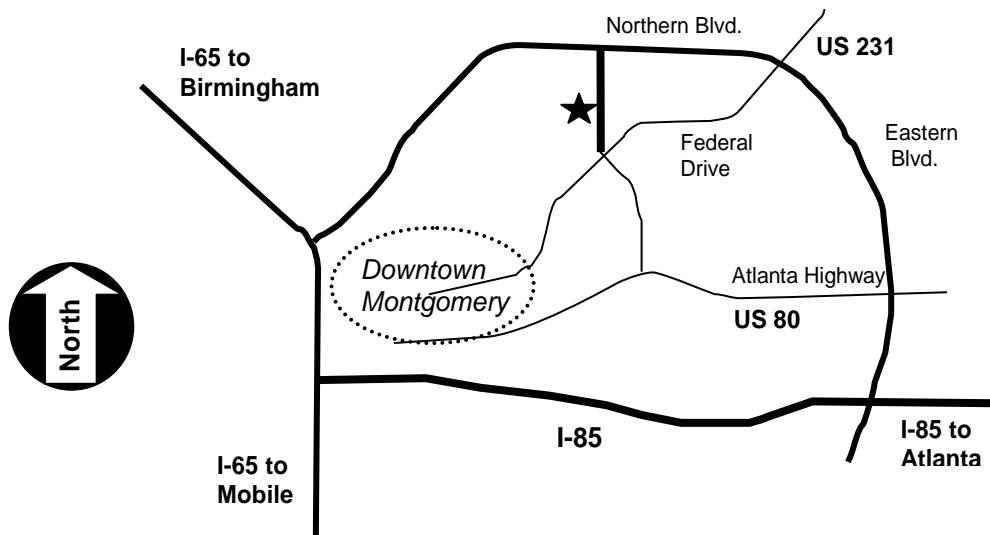


Figure A- 4: Travel directions sent to student participants

## **Appendix B**

### **Institute Daily Curricula, Instructors, and Locations**

## Advanced Transportation Institute Daily Curricula

**Table B-1 Monday ATI curriculum**

<b>Time</b>	<b>Event</b>	<b>Location</b>	<b>Facilitator</b>
8:30-9:00 AM	Check-in / Refreshments	ALDOT	
9:00-9:30 AM	Icebreaker, Program Overview	Conference Room	Carl Smith, ALDOT PEED Bureau Dr. Dan Turner, UA
9:30-10:30 AM	ALDOT Speaker – ALDOT Careers	Conference Room	Irene Moore / Pat Alford, ALDOT Personnel Bureau
10:30-10:45 AM	Break (refreshments)	Conference Room	
10:45-11:45 AM	University/Admissions Overview	Conference Room	Jacquita Smith, UA Admissions
11:45-12:00 PM	Class Photo	Outside	LaShonda Dear, ALDOT Media Photographer
12:00-12:45 PM	LUNCH	Conference Room	
12:45-1:45 PM	ALDOT Speaker – Bridge Presentation	Conference Room	Randall Mullins, ALDOT Bridge Bureau
1:45-3:30 PM	Start Project 1-A: Computer Bridge Design Start Project 1-B: Straw Bridge Design	Conference Room	Ralph Davis, ALDOT Bridge Bureau Dr. Dan Turner, UA
3:30-4:00 PM	Wrap Up Discussion –‘What We Learned’	Conference Room	Dr. Dan Turner, UA
4:00 PM	Depart		

**Table B-2 Tuesday ATI curriculum**

<b>Time</b>	<b>Event</b>	<b>Location</b>	<b>Facilitator</b>
9:00-9:15 AM	Daily Overview and Ice-Breaker	Conference Room	Walter Anderson, UA
9:15-10:15 AM	Roadway Design Modeling	Conference Room	Ivy Harris, ALDOT Design Bureau
10:15-11:00 AM	Materials demo (Concrete & Asphalt)	Materials and Tests Lab	Lynn Wolfe, ALDOT Materials & Tests Bureau
11:00-12:00 PM	Project 2: Concrete Analysis Design - Cylinder Mix	Materials & Tests Lab	ALDOT Materials & Tests Bureau
12:00-12:30 PM	LUNCH-Overview of Field Trip (Road Construction)	Conference Room	Alabama Road Builders Assn, and Alabama Asphalt Pavement Assn
12:30-3:30 PM	Extended Field Trip (Bridge, Road Building, and Paving Projects)	Asphalt mix plant and sand-gravel borrow pit	Alabama Road Builders Assn, and Alabama Asphalt Pavement Assn
3:30-4:00 PM	Return to ALDOT HQ; Wrap Up Discussion – ‘What We Learned’	Conference Room	Dr. Dan Turner, UA
4:00 PM	Depart	Conference Room	

## Advanced Transportation Institute Daily Curricula (continued)

**Table B-3 Wednesday ATI curriculum**

<b>Time</b>	<b>Event</b>	<b>Location</b>	<b>Facilitator</b>
9:00-9:15 AM	Daily Overview and Ice-Breaker	Conference Room	Walter T. Anderson, UA
9:15-10:15 AM	Safety Management	Conference Room	Craig Thomas, ALDOT Multimodal Bureau
10:15-11:45 AM	ZOO	Montgomery Zoo	Walter T. Anderson, UA
11:45-12:30 PM	LUNCH – (During Zoo Visit)	Montgomery Zoo	Walter T. Anderson, UA
12:30-1:00 PM	Return to ALDOT HQ		
1:00-1:45 PM	Road / Safety Barriers	Conference Room	Dr. Dan Turner, UA
1:45-3:30 PM	PROJECTS: Continue 1-A and 1-B; Start 3: Safety Project – Egg Drop	Conference Room	Dr. Dan Turner, UA
3:30-4:00 PM	Test egg drop devices; Wrap Up Discussion - 'What We Learned'	Outside	Dr. Dan Turner, UA
4:00 PM	Depart		

**Table B-4 Thursday ATI curriculum**

<b>Time</b>	<b>Event</b>	<b>Location</b>	<b>Facilitator</b>
9:00-9:15 AM	Daily Overview and Ice-Breaker	Conference Room	Walter T. Anderson, UA
9:15-10:15 AM	Intelligent Transportation Systems	Conference Room	Walter T. Anderson, UA
10:15-10:30 AM	Break (refreshments)	Conference Room	
10:30-12:00 PM	Traffic Engineering (Sign Shop Visit)	Conference Room	Stephanie Traywick, ALDOT
12:00-1:00 PM	LUNCH - Overview of Field Trip (Environmental)	Conference Room	James Blanding, ALDOT Pre-construction Bureau
1:00-1:30 PM	Travel to environmental site	Field Trip	
1:30-3:30 PM	Environmental/archeological field trip	Field Trip	Marie Kyser, ALDOT Pre-construction Bureau
3:30-4:00 PM	Return to ALDOT HQ; Wrap Up Discussion - 'What We Learned'	Conference Room	Walter Anderson, UA Carl Smith, ALDOT PEED Bureau

## Advanced Transportation Institute Daily Curricula (continued)

**Table B-5 Friday ATI curriculum**

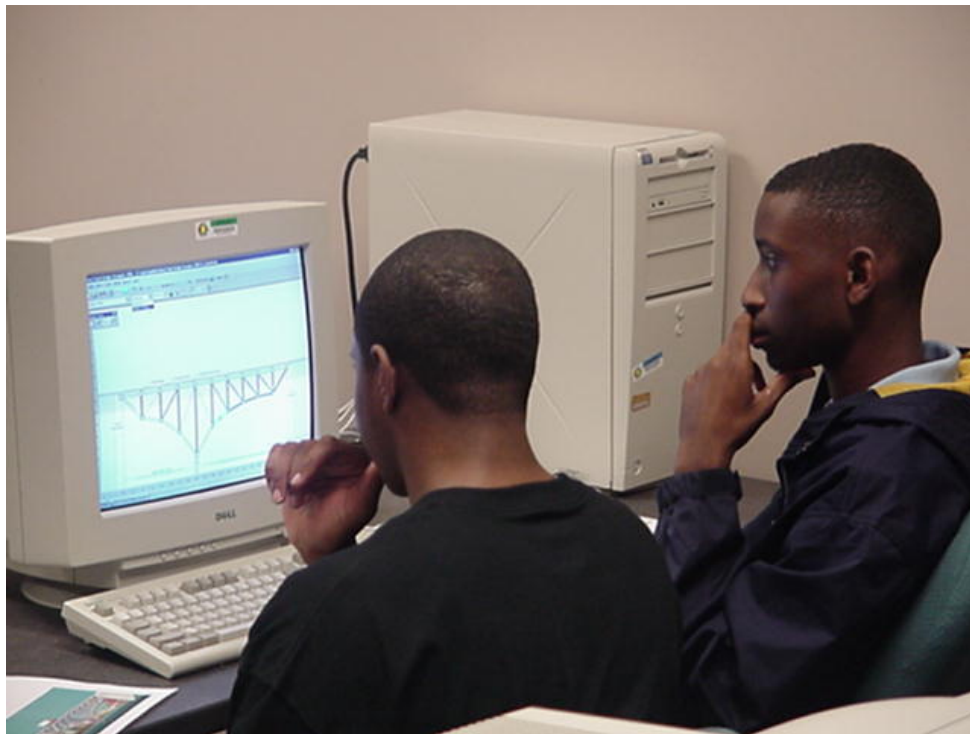
<b>Time</b>	<b>Event</b>	<b>Location</b>	<b>Facilitator</b>
9:00-9:15 AM	Daily Overview and Ice-Breaker	Conference Room	Jim Begley, ALDOT Personnel Bureau
9:15-10:15 AM	Professional Development/Business Etiquette	Conference Room	Ivy Harris, ALDOT Design Bureau
10:15-11:15 AM	Underwater Bridge Inspection	Maintenance Building	Bill Waddail, ALDOT Diver
11:15-12:00 PM	PROJECT 2: Strength test of concrete cylinders	Materials & Tests Lab	Bart Pickett, ALDOT Materials & Tests Bureau
12:00-12:45 PM	LUNCH	Conference Room	
12:45-1:45 PM	Project and Plans Design	Conference Room	
1:45-3:30 PM	PROJECTS 1-A & 1-B: Conclude and test bridge designs	Conference Room	Steve Walker, ALDOT
3:30-4:30 PM	Closure- Summary of Institute, comments by students, evaluation	Conference Room	Dr. Dan Turner, UA
4:30-5:30 PM	BREAK		
5:30-7:30 PM	Closing Session / BBQ Dinner by Alabama Road Builders Assn and Alabama Asphalt Pavement Assn	Conference Room	Jeff Brown, ALDOT Research & Development Bureau Dr. Dan Turner, UA

## **Appendix C**

### **Examples of Photos Taken During Institute**



**Figure C-1: AT12 Group photo**



**Figure C-2: AT12 Computer bridge design competition**





**Figure C-3: Classroom presentation**



**Figure C-4: Egg drop competition begins**

**Appendix D**  
**Evaluation Form**

**Advanced Transportation Institute – Evaluation Form**

**PRESENTATIONS**

Monday

- Overview of ALDOT
- Bridges Design
- Intro to Computer Bridge Design
- Intro to Straw Bridge Design

Great	Good	Ave.	Fair	Poor

Tuesday

- University Presentation
- Roadway Design by Computer
- Overview of Field Trip


Wednesday

- Safety Management
- Introduction Materials and Tests Introduction
- Road Safety/Barriers


Thursday

- Intelligent Trans Systems
- Transportation Planning


Friday

- Computer/Information Management Careers
- Underwater Bridge Inspection
- Transportation Careers
- Risk Management at ALDOT


**SITE VISITS**

- Asphalt Plant Site Visit
- Soil-Gravel Pit
- Environmental-archeological Site Visit


**LAB PROJECTS**

- Computer Bridge Design
- Straw Bridge Design
- Concrete Cylinder Testing
- Egg Drop Contest


**GENERAL QUESTIONS**

- How good was your overall experience this week?
- How good was the food at lunch and breaks?
- Were the Institute staff members helpful?
- Was the length of the sessions about right?


Which were your favorite three sessions? \_\_\_\_\_

Which were your three least favorite Sessions? \_\_\_\_\_

Were you considering an engineering/transportation career prior to the Institute? \_\_ yes \_\_ no \_\_ maybe

Are you considering engineering/transportation now? \_\_ yes \_\_ no \_\_ maybe

Would you recommend to your friend that they attend the 2003 Institute? \_\_ yes \_\_ no

**If you wish to make recommendations** for improving the Institute, please write your comments on the other side of the form. **THANK YOU FOR A GREAT WEEK!**