



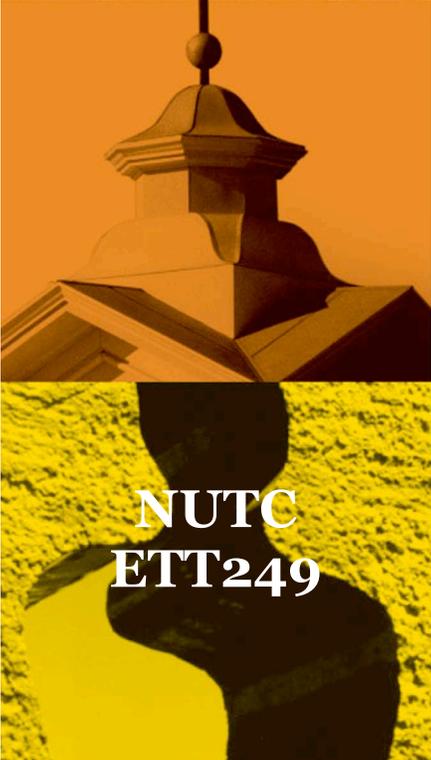
MISSOURI  
**S&T**

# CENTER FOR TRANSPORTATION INFRASTRUCTURE AND SAFETY

## 2009 Summer Transportation Institute

by

Mr. Heath Pickerill, Director



NUTC  
ETT249

A National University Transportation Center  
at Missouri University of Science and Technology

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16. Abstract Missouri LTAP at Missouri S&T has hosted a USDOT Summer Transportation Institute (STI) for the past several years. The program has been very successful and was again offered in Summer 2009. The STI is a 2-week intensive learning experience held during the summer for high school students. It is targeted primarily toward minorities but not limited to them. The follow are the goals of STI: 1) To expose secondary school students to and allow them to participate in a series of academic and practice experiences designed to motivate them toward professions in the transportation industry, and 2) To provide secondary school students with mathematics, science and technological enrichment to enable them to pursue a career in the transportation industry. The overarching goal is to increase the number of youths entering the transportation profession and to aid the university in its recruiting efforts. The students (10 <sup>th</sup> , 11 <sup>th</sup> and 12 <sup>th</sup> graders) are subjected to a health does of campus life.			
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**2009 SUMMER TRANSPORTATION INSTITUTE**

**FINAL REPORT**

*submitted by*  
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S&T**

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## ABSTRACT

The Missouri LTAP at the Missouri University of Science and Technology (Missouri S&T) hosted its tenth U.S. Department of Transportation Summer Transportation Institute (STI). The mission of the institute's program is as follows:

*To contribute to the development of a diverse, well-qualified workforce for the transportation industry by encouraging secondary school students to pursue transportation careers.*

In concert with this mission and with Missouri S&T's unique strengths, the objectives of this effort were to provide an educational experience for high school students which explored a wide variety of aspects of the transportation industry and its role in our society. To that end, the STI curriculum provided educational opportunities for its students in critical areas of transportation. The 23 tenth-, eleventh- and twelfth-grade students who were chosen for the program were exposed to university life, leadership and team-building activities, and a series of guest speakers, hands-on laboratories, and field trips. The institute was comprised of two weeks covering all modes of transportation and was headquartered at the Missouri LTAP Center.

The Federal Highway Administration's money was used as "seed" money to fund the institute, along with funding from the NUTC at Missouri S&T. Staff from Missouri LTAP and Linn State Technical College with minor assistance from the Distance and Continuing Education Department at Missouri S&T conducted the two-week institute. Government agencies and private firms provided substantial support in staff assistance and educational materials as well.

Youths from across the State of Missouri were recruited. Program brochures and applications were distributed to more than 1,500 high school students who had indicated an interest in engineering; STI staff contacted all high school counselors who have recommended former program participants; parents of former STI participants were again asked to recruit; and the National Society of Black Engineers and local MODOT personnel were also again asked to help to identify and recruit likely candidates. Sixty applications were received and twenty-eight were accepted and of those, twenty-three accepted the award. Applicants were selected based upon their academic standing and their letter of recommendation. The average grade point average of the chosen group exceeded 3.0 on a 4.0 scale. Ten were entering tenth grade in the fall, six were entering eleventh, and seven were entering twelfth. There were ten African American, ten Caucasian, and three Asian students. Nine of the students were female and fourteen were male. Additional demographics details are listed in the attachment.

## **PROGRAM FACULTY AND STAFF**

### **Description of duties**

#### **Director**

Mr. Heath Pickerill served as Director in 2009. He took overall responsibility for the successful and timely completion of all tasks, provided direction and inspiration for the project, supervised project staff, and in general, assured that project goals were met.

#### **Assistant Director**

Ms. Diane Heckemeyer worked with the Project Director and was primarily responsible for maintaining contacts with speakers, assuring that speakers had what they needed to conduct lectures and laboratories, and arranging field trip activities. She also conducted some lecturing. Specific duties include the following:

- Developed curriculum for transportation program;
- Organized resource material;
- Set up and implemented laboratory activities;
- Coordinated of field trips.

#### **Counselors**

The campus centralized the interviewing, hiring, and training and scheduling of all counselors. The centralized staffing was directed by a committee of project directors, and all programs benefited. Their combined scheduling efforts made it possible to offer full-time appointments to counselors for the duration of the summer semester. This in turn resulted in a higher quality of student applicants. The “pooling” of funds also resulted in a savings in staffing costs for STI.

The counselors were primarily responsible for guidance of the STI student participants. They resided in campus housing with the participants, aided the participants in navigating the campus, planned evening and weekend recreational activities, accompanied participants to all activities, and coordinated learning opportunities with the Missouri S&T Career Opportunities Center. They were also responsible for the first level of conflict resolution between participants.

#### **Program Coordinator**

Ms. Kristi Barr served as Program Coordinator. She was responsible for all administrative tasks related to the STI. In addition to preparatory tasks, she saw to day-to-day business—such as counselor scheduling, preparation of handouts, student issues, and evening activities—of STI during its operation. Examples include the following:

- Satisfied needs related to laboratory activities and resource materials;
- Organized recreational activities and meals;
- Arranged startup and closing activities;
- Arranged for all student needs while they were on campus (such as insurance, housing and meals, computer accounts);
- Maintained budgets/financial records for the project.

## Affiliations

Heath Pickerill Director Missouri LTAP	Kristi Barr Program Specialist Missouri LTAP
Diane Heckemeyer Department Chair, Construction & Civil Technology Linn State Technical College	

## ACADEMIC PROGRAM

The institute, headquartered in the Missouri LTAP building, was comprised of a two-week session, which focused on learning tracks dealing with all modes of transportation. Each track began with an introductory session in which speakers from the topic area were asked to speak to the group and field questions. These sessions were followed by a series of in-class activities and field trips, which corresponded with the particular theme.

### **Summary of the 2009 Institute**

The program kicked off on Sunday, July 13 with an orientation, which included the students' parents. The activities of the camp were outlined along with the rules and regulations that were followed. The students were then treated to a welcoming pizza party. Mr. JT Yarnell kicked off the first full day of the camp on Monday by giving the students an overview of the transportation system and introducing them to some of the career possibilities in transportation. He also acted as one of the judges for the egg drop contest, which was an exercise that allowed the students to work in groups to design and construct capsules to hold eggs as they were dropped from the height of one story. The exercise was the first opportunity for the students to interact in a team at the camp and start to develop team building skills. It also encouraged them to be creative given limited resources in their attempt to protect the eggs from breaking. On Tuesday, the Universal Challenge Center provided more opportunities for team building. Not only was the course challenging and educational, but it provided a lot of fun. The students tested their courage on the rock wall, zip line, BASE jump and catwalk. On Wednesday morning, the students learned about the work that MoDOT's environmental staff is involved in on state projects. The students then laid out their own city, with some strategically placed environmentally sensitive areas that had to be considered in the design. This demonstrated the obstacles that often face the environmental staff, as well as transportation officials and designers. Once their cities were developed, the students had to create a highway that went through their city. The final step was for them to present their proposals at a mock public hearing of their peers. On Wednesday afternoon, the students toured some of the transportation related research and development, as well as student projects, on the Missouri S&T campus. They visited the hydrogen fueling station, the hydrogen car design center and the Experiential Learning and Student Design Center where they got to see the solar car and other projects. On Thursday, the students visited Fort Leonard Wood Army

Installation. They spent the entire day learning about the important role transportation plays in the military. In addition, the students had the opportunity to experience several other activities, which included large vehicle driver simulators, the Fort Leonard Wood Engineering Museum, the Missouri National Guard Blackhawk Helicopter Facility, bridge training and engineer equipment training areas, Forney Air Field and finally a high speed evasive driving course which proved to be the highlight of the busy day. On Friday morning, the students traveled to Linn State Technical College. On Friday afternoon the students got to practice heavy equipment operations skills on computerized simulators, as well as on real equipment used in the Heavy Equipment Operations program at Linn State Technical College. On Saturday, Ms. Heckemeyer taught the students about construction specifications and how a project owner and contractor must work together to build a quality project. The students then had the opportunity to perform an aggregate sieve analysis and a soil compaction test. This gave them a chance to get their hands dirty while learning about the properties of materials used in road construction. On Sunday, the students traveled to St. Louis for the day. They started with a tour of the transportation museum and then took a ride on Amtrak from Kirkwood to Hermann.

Monday, July 21 was “highway safety” day at the Missouri State Highway Patrol headquarters in Jefferson City where they visited the Missouri State Highway Patrol museum. The students also watched a movie on road safety and then had the opportunity to experience the seatbelt “convincer”, a simulator that demonstrates the importance of wearing seatbelts. The students also were able to use drunk-driving goggles and then attempt to pass a field sobriety test. This demonstrated to them how dangerous impaired driving is to them and to others on the road. The students then visited the Missouri Department of Transportation (MoDOT). Ms. Jackie Rogers with MoDOT’s Highway Safety Division taught the students about safe driving behaviors. Mr. Jon Nelson taught them about roadway striping and traffic signals and other high-tech traffic engineering. On Monday afternoon the students were involved in various activities at Linn State. First, Mr. Mike Pruett gave a demonstration on cyber security. Then Mr. Jim Brandon explained the timeline of the automobile and showed the students many valuable tips in the Auto Mechanics facility. The day ended with a visit to the Aviation Department where Mr. Mel Williams and Mr. John Bergthold started a jet engine and allowed the students to climb inside various aircraft. On Tuesday morning, the students went to MoDOT’s materials lab. They were given the opportunity to make their own retaining walls and cement cookies and watch a steel bar being pulled apart during a strength test. They also made an asphalt puck using just a hammer and watched several demonstrations with things like iodide compounds and liquid nitrogen in the chemistry lab. On Tuesday afternoon, they toured a roadway construction project at the Highway 50 West expansion in Jefferson City. The students finished a busy day by learning about highway work zones at one of MoDOT’s offices. Mr. Terry Imhoff spoke about the challenges associated with overseeing construction. On Wednesday morning, the students returned to Jefferson City to hear Mr. Brad McCloud talk about the field of surveying. They got the chance to use surveying equipment used by field surveyors. The students then visited MoDOT’s District 5 office where they learned how traffic lights are timed and got to use equipment used by MoDOT to collect data on the amount of traffic in an intersection. Later, the students were able to learn various facts about road maintenance in a fun way by participating in a timed scavenger hunt hosted by Mr. Scott Sotlemeyer. That afternoon the students went to MoDOT’s Creek Trail Drive office to watch a “No-Zone” demonstration by Wal-Mart of an eighteen-wheeler which allowed them to see exactly where blind spots are located for semi

drivers and helped them realize the importance of keeping a safe distance when driving behind semi-trucks. On Thursday morning the students took a trip to MoDOT's bridge maintenance shop to meet Mr. Jerry Goodman. He took the students underneath four different bridges to complete an inspection. On Thursday afternoon the students concluded their learning activities at MoDOT's sign production shop. They were able to see how roadside signs are made and were amazed at how large the signs actually are. On Friday, the final day of the camp, the students joined their parents along with faculty and staff at the closing program.

### **Other Related Activities**

#### **Enhancement - Ropes and Challenge Course**

The Ropes and Challenge Course at the Universal Challenge Center in Salem, MO provides a set of training tools meant to promote human development through Experiential (Adventure) Education. The tools include group problem-solving games and initiatives, low elements (1-2 feet from the ground), and high elements (30-40 feet up). These activities and physical challenges are used as metaphors to promote development. The Universal Challenge Center has one of the largest and best equipped courses in the Nation featuring state of the art construction and nationally established safety standards. Its accredited staff is experienced in outdoor education, human development, and group dynamics. STI students spent one day receiving some valuable highlights of the course, which are typically several days in length. The UCC Ropes Course tested personal courage, teamwork, and group support as the students faced challenges involving climbing and traversing obstacles high in the air. The hope is that students were left with lasting impressions of their experiences that they can draw upon to meet future challenges. The activities are not merely physical challenges, but metaphors for the issues faced in life, both personally and professionally. The course consists of several challenges on which students actually experienced the need to trust team members. Activities included:

- Tank
- Ski-walk
- Tire Swing
- Cable walk
- Spider web
- Flying Fox Zip Line - After climbing to the take-off platform, participants were secured to a pulley that carried them the length of Zip Canyon.
- The Rock Climb A vertical climb using "rock" hand and foot-holds is both a physical and mental challenge. Strength, coordination, and strategy were needed to meet this element.

This was an excellent experience for these young people to build better camaraderie and teamwork skills among the participants.

#### **Introduction to College Life**

The registrar from UMR Admissions provided students information on how to apply to college, what to look for when applying, and financial aid—how to qualify and apply for it. Missouri S&T students later gave the STI students a tour of campus.

## **SPORTS AND RECREATION PROGRAM**

### **Missouri S&T's Multipurpose Building**

This facility has an Olympic-size swimming pool and full facilities for tennis, weight lifting, basketball, etc. Students were provided with several free evenings during which many availed themselves of these facilities.

### **The Centre**

This facility had many areas of recreational entertainment for the students. It allowed them to swim, play basketball, and have a place to hang out for relaxation.

## **MARKETING**

Youths from across the State of Missouri were recruited. Program brochures and applications were distributed to more than 1,500 high school students who had indicated an interest in engineering; STI staff contacted all high school counselors who have recommended former program participants; parents of former STI participants were again asked to recruit; and the National Society of Black Engineers and local MoDOT personnel were also again asked to help to identify and recruit likely candidates.

### **The STI Parents Program**

This program has essentially two goals: (1) to maintain contact with parents and alumni, which it is hoped, will facilitate tracking and (2) to aid in recruiting each year. Solicitation of additional parent participants continued this year.

## **CLOSING PROGRAM**

The two-week camp ended with a closing ceremony for all parents, students, faculty, staff, advisory committee members and dignitaries. Sixty people attended the event held on the campus of Missouri University of Science and Technology in McNutt Hall. The program started at 11:30 AM and included cake and punch. Diane Heckemeyer, STI Assistant Director, gave welcoming remarks. She urged the students to use the information they gained and their experiences from the institute in positive ways. After her remarks, she presented certificates to each participant, as well as various prizes. This was followed by PowerPoint presentations for the parents detailing all of the activities from the entire two weeks.

Closing comments by Ms. Heckemeyer included expressions of appreciation to the STI sponsors, Advisory Committee and staff. She gave a special thanks to the parents for taking the initiative to involve their children in the STI and appealed to the students to use their experiences at the institute when making career decisions. The students who attended were an excellent representation for the institute. The luncheon adjourned at 1:00 PM.