A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. These students are not afforded the same access to the many summer and pre-college programs that are available in large metropolitan areas. This often affects the students’ decision to further their education and attend colleges or universities. The Summer Transportation Institute is an established program funded by the Federal Highway Administration’s Office of Civil Rights. Currently, the STI targets urban students and thereby misses a large segment of the student population of Texas who are potential members for the transportation work force. By developing and conducting a modified Summer Transportation Institute in selected smaller communities and rural areas an audience not previously exposed to transportation career opportunities is reached. This modified program can be easily implemented for rural Texas students. This modified program was conducted as a pilot program in three locations. These locations are similar in that they were rural or semi-rural and at least 35 miles from a major metropolitan area.
The Texas Rural Summer Transportation Institute

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TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, Texas 77843-3135
ABSTRACT

A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. These students are not afforded the same access to the many summer and pre-college programs that are available in large metropolitan areas. This often affects the students’ decision to further their education and attend colleges or universities.

As the baby boomers begin to retire, the competition among industries for the available workforce will continue to increase. Studies by educational institutions, such as the Texas Higher Education Coordinating Board (THECB), predict increasing shortages in a number of fields. In order to continue to develop a transportation workforce that is composed of the best available people, the transportation industry needs to market career opportunities and educate the workforce about job prospects in the industry. Since 1999, the Texas Transportation Institute (TTI) has expanded its efforts to build dynamic partnerships among the business, industry, and education sectors. One such effort has been the Summer Transportation Institute (STI). Through a joint partnership with educational institutions, including Texas Southern University in Houston, Paul Quinn College in Dallas, Prairie View A&M University, and Palo Alto College in San Antonio, TTI developed and implemented summer institutes for promising high school students. These institutes are designed to prepare some of our “best and brightest” students for academic careers in transportation and engineering.

The Summer Transportation Institute is an established program funded by the Federal Highway Administration’s Office of Civil Rights. Currently, the STI targets urban students and thereby misses a large segment of the student population of Texas who are potential members for the transportation work force. A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. By conducting a modified STI in selected smaller communities and rural areas an audience not previously exposed to transportation career opportunities is reached. Although it is not economically feasible to conduct the current STI format in smaller communities, a modified program can be easily implemented for rural Texas students. This modified program was conducted as a pilot
program in three locations. These locations are similar in that they were rural or semi-rural and at least 35 miles from a major metropolitan area.
ACKNOWLEDGMENTS

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At the Pharr District Offices the authors would like to thank Mr. Mario Jorge, District Engineer for the Pharr District for his wholehearted support of this and other youth programs. We would also like to thank Ms. Amy Rodriguez, who arranged the field trip to the TxDOT offices in Pharr and the entire District staff who provided briefings and participated in our field trip.

Among the staff at TAMUK who assisted with and coordinated part of the institute, we wish to acknowledge the special efforts of Ms. Yvonne Gonzales, Civil Engineering Administrative Assistant; Mr. Richard Diaz-DeLeon, CE Lab Technician; Ms. Martie De La Paz, Director of New and Transitional Students in the College of Engineering; Dr. J. Sai, Dr. M. Faruqi, and Dr. Lee Clapp, professors in the department, Mr. Brian Dyson, Ph.D. candidate in Environmental Engineering; Mr. Richard Stahel, Assistant Director of the Center for Research Excellence in Science and Technology; Admissions Office staff; the Financial Aid Office staff; and the Life Services & Wellness Center staff.
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DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.
EXECUTIVE SUMMARY

A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. These students are not afforded the same access to the many summer and pre-college programs that are available in large metropolitan areas. This often affects the students’ decision to further their education and attend colleges or universities.

As the baby boomers begin to retire, the competition among industries for the available workforce will continue to increase. Studies by educational institutions, such as the Texas Higher Education Coordinating Board (THECB), predict increasing shortages in a number of fields. In order to continue to develop a transportation workforce that is composed of the best available people, the transportation industry needs to market career opportunities and educate the workforce about job prospects in the industry. Since 1999, the Texas Transportation Institute (TTI) has expanded its efforts to build dynamic partnerships among the business, industry, and education sectors. One such effort has been the Summer Transportation Institute (STI). Through a joint partnership with educational institutions, including Texas Southern University in Houston, Paul Quinn College in Dallas, Prairie View A&M University, and Palo Alto College in San Antonio, TTI developed and implemented summer institutes for promising high school students. These institutes are designed to prepare some of our “best and brightest” students for academic careers in transportation and engineering.

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program in three locations. These locations are similar in that they were rural or semi-rural and at least 35 miles from a major metropolitan area.

After the core curriculum was developed it was pilot-tested at two locations: Texas A&M University at Kingsville (TAMUK) in an on-campus setting and at the Texas A&M University Citrus Center in Weslaco which served as an off-campus setting. The recruiting efforts for these two pilot programs were conducted utilizing the relationship the Center for Professional Development team members have forged with cohort school districts that participate in the Texas Rural Systemic Initiative as well as the assistance of the Texas A&M University Admissions Office Resource Center at McAllen.

Because of the distances between the rural school districts targeted in the TAMUK pilot test, it was decided that the TAMUK program would be a residential program. Students selected for the TAMUK program would reside in dormitories on the TAMUK campus during the week and return home on weekends. The Weslaco program remained a day program. This modification during the initial phase of the development of the curriculum led to only minor adjustments in the program.

It is the opinion of the Texas Summer Transportation Institute staff that the programs in Kingsville and Weslaco were complete successes. The project team met the goals and objectives of the program in Texas. The 42 students who attended the programs were exposed to the gamut of career opportunities within the transportation industry, had the opportunity to gain hands-on technical experience, network with professionals to learn more about career choices, and earn college credit.
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1.0 INTRODUCTION

1.1 OVERVIEW

The transportation engineering profession, like every other profession, faces a challenging future. Over the past decade, advances in transportation and technology applications have been staggering, both altering and expanding the list of knowledge, skills, and abilities needed by transportation professionals. This rapidly changing industry needs qualified individuals to design, plan, manage, operate, and maintain the vast infrastructure in place. Such a workforce is necessary for the transportation profession to continue to sustain mobility and economic strength across the nation.

As the baby boomers begin to retire, the competition among industries for the available workforce will continue to increase. Studies by educational institutions, such as the Texas Higher Education Coordinating Board (THECB), predict increasing shortages in a number of fields. In order to continue to develop a transportation workforce that is composed of the best available people, the transportation industry needs to market career opportunities and educate the workforce about job prospects in the industry. Since 1999, the Texas Transportation Institute (TTI) has expanded its efforts to build dynamic partnerships among the business, industry, and education sectors. One such effort has been the Summer Transportation Institute (STI). Through funding provided by the Federal Highway Administration (FHWA) Office of Civil Rights, a joint partnership was formed by TTI with educational institutions, including Texas Southern University in Houston, Paul Quinn College in Dallas, Prairie View A&M University, and Palo Alto College in San Antonio. As a result TTI and their partners have developed and implemented summer institutes for promising high school students. These institutes are designed to prepare some of our “best and brightest” students for academic careers in transportation and engineering.
1.2 BACKGROUND

The original STI program targets urban students and thereby misses a large segment of the student population of Texas, who are prospective members of the future the transportation work force. A considerable number of Texas students grow up in rural or small urban centers that are a significant distance from the large metropolitan areas. These students are not afforded the same access to the many summer and pre-college programs that are available in large metropolitan areas.

This lack of summer programs may affect the students’ decision to further their education and attend colleges or universities. According to data provided by the Texas Higher Education Coordinating Board, statewide in the academic year 2000-2001 approximately 20 percent of Texas public high school graduates enrolled in Texas public universities. However, in rural Texas counties the number ranged from 5 percent (Henderson, Hockley, and Camp counties) to 10 percent statewide.

A 2002 study by Wirthlin Worldwide for the Texas Higher Education Coordinating Board cited past research that found that rural students are less likely to pursue higher education than their urban counterparts. Motivations for college attendance identified by previous research include the following factors: supportive influence by parents and peers, accurate value assessment of higher education, high school activity, and socioeconomic/demographic factors. Many of these factors may be missing for the rural student. Strategies to encourage rural students to attend college recommended by the Wirthlin Worldwide study include: exposure to college atmosphere, college information, mentoring, exposure role models, and information to promote career assessment.

1.3 OBJECTIVES OF THIS STUDY

The major goal of the team during this study was to create a one or two week STI experience that utilizes a core curriculum of activities that can be easily and economically implemented in any region of the State. This core curriculum developed includes: a program that
features speakers, videos, and hands on activities highlighting the importance of transportation and transportation career opportunities; a trip (day trips only) to a regional college or university campus as well as trips regional transportation sites; a program on information about college opportunities that includes one on one mentoring and speakers; and a one-half day graduation and networking opportunity.

After the core curriculum was developed it was pilot-tested at two locations: Texas A&M University at Kingsville (TAMUK) in an on-campus setting and at the Texas A&M University Citrus Center in Weslaco which served as an off-campus setting. The recruiting efforts for these two pilot programs were conducted utilizing the relationship the Center for Professional Development team members have forged with cohort school districts that participate in the Texas Rural Systemic Initiative as well as the assistance of the Texas A&M University Admissions Office Resource Center at McAllen.

Because of the distances between the rural school districts targeted in the TAMUK pilot test, it was decided that the TAMUK program would be a residential program. Students selected for the TAMUK program would reside in dormitories on the TAMUK campus during the week and return home on weekends. The Weslaco program remained a day program. This modification during the initial phase of the development of the curriculum led to only minor adjustments in the program.
2.0 KINGSVILLE 2004 SUMMER INSTITUTE

2.1 INSTITUTE OVERVIEW

The project was advertised at area high schools through the counselors and at the 2004 South Texas Career Expo in Kingsville, TX. Twenty-five students from several area high schools applied. Priority was given to those students with the highest achievement in mathematics and science, particularly those who had participated in science and engineering competitions. Based on these criteria, offers to participate in the institute were extended to twenty students – eight female students (all that applied) and twelve male students. From these twenty students, all agreed to participate, but two of them did not show up on the first day of the institute.

The final group included six female and twelve male students, three of whom were from the 8th grade, seven from the 9th grade, two from the 10th grade, and six from the 11th grade. The racial breakdown of the participants included three African-American, ten Hispanic, and five Caucasian participants. The complete breakdown of all institute participants is included in Table 1. The program provided the participants hands-on problem solving activities to enhance their appreciation for mathematics and science, as well as an introduction to the civil and environmental engineering profession. The project lasted two weeks and included group counseling, advisement on the college application process, financial aid, as well as technical activities. The technical activities emphasized hands-on transportation, civil, and environmental engineering projects, interaction of participants with practicing engineers, and discussion of different engineering disciplines with TAMUK faculty. To provide real life engineering experience, some of the activities included field trips to engineering work sites.
Table 1. 2004 Kingsville Summer Institute Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
<th>High School</th>
<th>Grade</th>
<th>Ethnicity</th>
<th>Gender</th>
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<tr>
<td>Brandon Bailey</td>
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<td>Carlos Correa</td>
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<tr>
<td>Stevan Del Bosque</td>
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<td>Vanessa Del Bosque</td>
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<td>Ricardo Middle School</td>
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<td>Francis Fiemawhle</td>
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<tr>
<td>Adrian Frimpong</td>
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<td>Andrew Frimpong</td>
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<tr>
<td>Juan Gonzales</td>
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<td>Vanessa Johnson</td>
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<td>Kathryn Markert</td>
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<td>Natalie Martinez</td>
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<tr>
<td>David Rodriguez</td>
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<td>Benito Zuniga III</td>
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2.2 INSTITUTE CONTENT

The primary focus of the institute was on civil and environmental engineering. The activities were designed to be hands-on and non-repetitive so that the students’ interest was maintained for the duration of the activity. The activities covered a broad spectrum of the civil and environmental engineering disciplines including transportation, structures, materials, water resources, air pollution, wastewater and water treatment projects as well as field trips to area construction and other sites. Most of the activities consisted of a brief discussion of the related
applications and a hands-on project, which was carried out by small groups. Some of the activities were complemented by field trips to actual engineering work sites. Throughout all projects, the importance of science, mathematics, and computers were emphasized.

The participants resided on campus for the duration of the institute, except for on the weekend. Most of the activities were conducted in the Civil and Environmental Engineering Laboratories at TAMUK. This year the special nightly social activities, such as games, movies, and sports were conducted by The Special Programs group at TAMUK.

2.2.1. Introduction and Advisement - Monday July 5

The participants arrived at the CE laboratory by 10:00 am, as agreed according to the acceptance letter. At that point, the institute directors, Dr. Hector Estrada and Ms. Debbie Jasek, introduced the assistant and the Special Programs personnel. A discussion and overview of the program followed the introduction, with particular emphasis on the importance of diversity of minorities and women in engineering.
The participants were escorted to the dormitory (Lynch Hall); where they were given time to settle-in. At Lynch Hall, the Special Programs personnel gave a presentation about the nightly activities and the dormitory rules. After this, the group had lunch in the cafeteria.

At 1:30 pm, the group convened in room 104, Engineering Complex, to listen and participate in discussions regarding college opportunities. The first presenter was from the Admissions Office. The participants listened to a brief history of the university, followed by a discussion on the university admissions process, and college life in general.
The next speaker was from the Financial Aid Office, who discussed the different financial assistance programs available at TAMUK (30 minutes). The presentation was very informative even for those students not planning to attend TAMUK since most financial aid programs are government sponsored.

Following Financial Aid was Life Services & Wellness and Student Activities. This discussion was particularly useful since the students were allowed to take advantage of the programs offered by the center during their two weeks at TAMUK. Students received career counseling, nutrition counseling, and other valuable services. Special Programs arranged for participants to receive complementary student identifications, which allowed them to use the sports facilities and other facilities on campus. Most of the participants took advantage of this opportunity, particularly the use of the Olympic-size swimming pool and fitness center. The rest of the presentations concentrated on engineering. Ms. Martie De La Paz, Director of New and Transitional Students in the College of Engineering, led a discussion of the different disciplines in engineering and the additional requirements to be considered for admission into such programs. She also discussed the numerous scholarships available to engineering students.

For the remainder of the afternoon, Dr. Hector Estrada discussed the history of engineering and six of the most popular engineering disciplines at TAMUK (aerospace, chemical, electrical, environmental, industrial, and mechanical engineering). Dr. Estrada concluded the day by giving a presentation about the different areas within Civil Engineering.

2.2.2 Construction Materials - Tuesday July 6

The participants arrived at the Engineering Complex by 10:00 am to begin the day's activities. We started the day by discussing materials for construction including concrete, steel, timber, asphalt, soil, and fiber reinforced composites. Several show-and-tell objects were used to illustrate the use of these materials in construction: concrete canoe, steel bridge for Steel Bridge Competition, lumber, carbon and glass reinforced plastic beams, and asphalt and soil laboratory specimens. The group then went to the CE laboratory to conduct a compression test on a
concrete cylinder. The results of this test gave the participants an appreciation of material strength.

In the afternoon, after a discussion on the ingredients and properties of concrete, the participants were divided into six groups (three members each). Each group was responsible for mixing a batch of concrete and fabricating three concrete cylinders. The object of the activity was to produce the strongest concrete using different aggregates and additives. These specimens were tested in compression on the last day of the institute. The group with the strongest concrete won a prize. For the remainder of the afternoon, each participant worked on fabricating a square concrete steppingstone. The group as a whole also worked on Texas shaped stepping-stones. The participants were very creative embedding marbles and other colored stones in their stepping-stones.
2.2.3. Field Trip to Corpus Christi TXDOT District Office - Wednesday July 7

On Wednesday students and advisors traveled to Corpus Christi to visit the Corpus Christi Area Texas Department of Transportation (TxDOT) offices and laboratories. The group visited the design office and several of the engineers discussed ongoing and future TxDOT projects. After this tour, the students visited the TxDOT laboratories. Here the students learned about asphalt, concrete testing, and the importance of quality control that TxDOT must exercise when overseeing the construction of roadways.

After the interesting and informative trip to TxDOT the group enjoyed a late lunch. They then visited the USS Lexington Museum on the Bay in Corpus Christi for a walk through history. The afternoon was capped off with a viewing of the IMAX presentation on helicopters and how they are used. After this, the group returned to Kingsville.

Figure 4. Visiting the TxDOT Laboratory in Corpus Christi
2.2.4. Traffic Engineering – Spot Speed Study - Thursday July 8

Participants arrived at the Engineering Complex by 10:00 am to begin the day's activities. We started the day by discussing the importance of transportation engineering. The focus of our discussions centered on traffic engineering, crashworthiness and crash survivability. The importance of following speed limits was stressed. The participants then broke off into six groups of three members each. Each group then conducted a spot speed study along Armstrong Ave., near the engineering building, using a radar gun. The radar gun provided by researchers from TTI was used in conformance with the law. Each group obtained 40 to 50 readings (representative) over an hour period.

Because only one radar gun was available, the other teams worked on their concrete stepping stones and concrete cylinders as each team took turns collecting their spot speed data. The data was then analyzed using statistical methods with MS-Excel to determine if posted speed limits are obeyed. Each group produced a cumulative speed distribution curve (so-called S-
We also collected the data from every group and plotted the S-curve. With this curve, the students were asked to identify the average speed and the 85-percentile speed. The results suggest that 85% of the traffic move at five miles over the posted speed limit.

This activity was also a competition, so the Institute Directors, Dr. Estrada and Ms. Jasek evaluated the reports to determine the best report. As prizes, the winners received transportation engineering t-shirts and books from the Texas Transportation Institute.

2.2.5. Mathematics and Science Activity - Friday July 9
The participants arrived at the Engineering Complex by 10:00 am to begin the day's activities. Ms. Debbie Jasek led this activity and she started the day by discussing mathematics and science. The mathematics discussion covered the concepts of patterns in nature and science, and how these patterns can be described mathematically. The group then discussed the importance of geometry and Bernoulli’s principles of aerodynamics.

After lunch, the participants fabricated a tetrahedral kite using the principles of patterns learned earlier in the day. The kites were fabricated using straws, string, glue, and tissue paper. The kites were constructed using nine pyramid-like elements. Each of the elements was constructed using six straws and string to form a pyramid-like system. Tissue paper was then wrapped and glued around two sides of the four-sided pyramid. Finally, nine of these elements were assembled together to make the kite. The kites were then flown later in the afternoon.

2.2.6. Bridge Project - Monday, July 12

The participants arrived at the Engineering Complex by 10:00 am to begin the day's activities. We started the day by discussing structural engineering. This was followed by a workshop on graphical statics, stress, and torque. Next, the participants broke off into six groups to design a balsa wood bridge. Each group was guided through the design of their truss bridge
and after approximately an hour, most students had a general configuration for their bridge and left for lunch.

With guidelines, rules, a balsa wood kit, and a satisfactory design, each team began constructing their bridge. The objective of the activity was to produce the strongest bridge, which was tested using three-point bending on the last day of the institute. The group with the strongest bridge won a prize. For this project, some groups worked several days and produced outstanding truss bridges.

![Building Bridges](image)

**Figure 6. Building Bridges**

### 2.2.7. Environmental Engineering - Tuesday, July 13

The participants arrived at the Engineering Complex to begin the day’s activities. Dr. Joseph Sai led the discussion by introducing the participants to environmental engineering. Students were given the definition of engineering as published by the Engineer’s Council for Professional Development (ECPD). This led to the explanation of the fundamental differences
between engineers and scientists. The need for environmental engineers in environmental systems management was then discussed. The discussions focused on three systems: water resource management, air resource management and solid waste management issues. Students learned about the need to prevent environmental pollution and the role of engineers in designing water treatment facilities to provide safe and potable water, designing of systems for waste minimization and cleanup of contaminated sites.

The afternoon was spent visiting the environmental engineering labs. Researchers and graduate students visited with the participants and explained and demonstrated some the work being done. At the end of the day, Dr. Lee Clapp, Assistant Professor of Environmental Engineering, gave a presentation about his research dealing with “bacteria farming”, or the application of biological systems for treatment of contaminated sites. This was a very important discussion about diversity in nature and how engineers are exploiting diversity to solve environmental engineering problems.

Figure 7. Learning about Environmental Engineering.
The students were picked-up at the dormitories on Wednesday morning to make the short drive to the Kingsville wastewater treatment plant. Mr. Rick Diaz DeLeon had previously coordinated the visit with the plant engineer, Mr. Charlei Avelar who had agreed to meet us at the plant. Upon arrival, Mr. Avelar conducted a safety briefing for the group before proceeding to tour the plant. The participants had the opportunity to see a “real bacteria farmer” at work, including the different tests to ensure the proper treatment of the raw sewage. The participants were surprised how clean the plant operates, given the nature of the operation.

After the plant tour, the group headed for Corpus Christi to visit the Packery Channel construction site, which had been previously arranged with Mr. Eljio Garza Jr. from the U.S. Army Corps of Engineers. After we arrived at the site, Mr. Andrew Smith, the resident engineer, discussed the project, dredging of the Packery Channel, before the group toured the work site. We then went to the Port Aransas wastewater treatment plant. Since we had already seen the operation in Kingsville, we did not do a tour of the plant in Port Aransas, however we wanted the students to see a different operation, which is maintained at an environmentally sensitive location, with minimum impact to the fragile ecosystems found in the area. In fact, the plant is located in the middle of a wildlife sanctuary, which provides habitat for exotic birds and even alligators. The effluent from the plant provides water to maintain the surrounding wetlands.

On the return trip, the group took a ferry from Port Aransas to Aransas Pass. We discussed how the port operations make the ferry a more cost-effective alternative than a bridge. To convince the group as to why the ferry is more economical than a bridge, we took a tour of the port and assessed the complexity of the port operations. Finally, on the way back to Kingsville, the group stopped by the Navigation Road lift bridge in Corpus Christi, one of the largest lift bridges in Texas. We discussed the operation of the lift bridge to allow ships to pass. After that, the group made the journey back to Kingsville.
Figure 8. Port Aransas Ferry

Figure 9. Corpus Christi Lift Bridge
2.2.9. Environmental Engineering – Analysis of Water - Thursday, July 15

The participants arrived at the Environmental Engineering laboratory on Thursday to begin the analysis of water. Over the weekend, the participants were asked to bring water samples from their home tap, drinking water, and any well water in their town. The testing of the water took the entire day. The activity entailed testing the water from each participant, for content of chloride, reactive phosphorus, salinity, dissolved oxygen, pH, conductivity, and total dissolved solids. First, in the morning Dr. Sai instructed students on laboratory safety procedures and use of equipment for measuring parameters used for establishing drinking water standards. He also discussed the importance of reading chemical labels, understanding the properties of chemicals, emergency procedures, etc.

![Figure 10. Learning Lab Safety Procedures](image)

After the discussion, the participants were divided into groups. Mr. Brian Dyson, Dr. Sai, and Mr. Diaz- De Leon set upped several workstations, one for each of the tests. Each group was then taken to one of the workstations to begin the corresponding water test. As each group
completed a test at a given workstation, they moved on to an open workstation until they completed all the tests. After all the tests were completed, the data collected in the lab was analyzed.

![Figure 11. Testing Tap Water](image)

**2.2.10. Concrete Strength & Balsa-wood Bridge Competition - Friday July 16**

The participants arrived at the CE laboratory by early and full of anticipation on the last day. The day began with the concrete strength and the balsa-wood bridge competitions. The concrete cylinders the participants produced on the second day were tested in compression to determine the strongest concrete. Each of the six groups had three samples tested. Team “II” won the concrete strength competition with load capacity of 37,869 pounds.
Figure 12. Getting Ready to Test the Winning Sample!

Figure 13. Team II's winning Samples
Next up was the bridge strength competition. Each bridge build by student teams was tested for strength. Team “V” won the balsa-wood bridge competition with strength to weight ratio of 1.43 pounds/grams. The members of the winning teams were later presented with prizes at the banquet.

![Testing the Bridge](image)

**Figure 14. Testing the Bridge**
2.3 GRADUATION

The STI staff organized and hosted a graduation ceremony and luncheon on Friday, July 16, 2004. The graduation luncheon was held at the student center. It was attended by Mr. Dock Burke, Director of the Southwest University Transportation Center, Dr. Ramaldo Juarez, President of Texas A&M University at Kingsville, and parents of the student participants. Five students gave a presentation during the luncheon. They used a power point presentation constructed by the students to give an overview of their experience at the institute. Dr. Estrada made a presentation on the use of in-home storm shelters. The directors then presented each participant with a certificate of achievement and an institute T-shirt. After the luncheon, the participants and the directors took photos, before the students headed home to enjoy the remainder of their summer.
Figure 16. Dr. Juarez Addresses the Students

Figure 17. Students and Parents Enjoy the Luncheon
2.4 EVALUATIONS

Students completed evaluation forms at the completion of the program on Friday, July 16. The forms provided the attendees with the opportunity to provide feedback on the speakers, field trips, activities, staff, and the overall program. The intent was to identify where the current program for the Institute had been especially effective and enjoyable to the students and those that might need improvement or alteration in future.

Students indicated that the competitions were the most enjoyable activities, with bridge building being the favorite competition. They indicated that the project activities helped them assisted them in understanding transportation careers. They agreed that the time allowed for the activities was adequate, although some expressed the desire for more activities. The students felt the activities provided them with practical experience related to transportation. The students also stated that they enjoyed the field trips, and the TxDOT area office and the USS Lexington was listed as their favorite field trip.

The responses from the STI attendees indicated that generally the program length, the number of field trips and speakers were appropriate. They did indicate overwhelmingly that the enhancement activities were beneficial. They also confirmed that the program was fun, educational, and that they would like to return if the program were offered again. In all, the 2004 Kingsville STI program was a positive experience by the attendees.
3.0 WESLACO 2004 SUMMER TRANSPORTATION INSTITUTE

3.1 INSTITUTE OVERVIEW

The Weslaco Summer Institute was designed as a pilot study for a one week summer institute. The purpose of the study was to determine whether a meaningful summer institute could be conducted in one week. The research team hoped that if this program was successful, one week programs could be conducted in smaller communities, where 2-week programs might be cost prohibitive.

The project was advertised at area high schools through the Texas A&M University Admissions and Outreach Office in Weslaco/McAllen and at the 2004 South Texas Career Expo in Kingsville, Texas. Fourteen students from several area high schools applied. Priority was given to those students with the highest achievement in mathematics and science, particularly those who had participated in science and engineering competitions. Based on these criteria, offers to participate in the institute were extended to fourteen students (all that applied) – seven female students and seven male students. From these fourteen students, all agreed to participate, but five of them did not show up on the first day of the institute.

The final group included four female and five male students, all of the students were in the 10th grade. The racial breakdown of the participants included six Hispanic and three Caucasian participants. The complete breakdown of all institute participants is included in Table 2. The program provided the participants hands-on problem solving activities to enhance their appreciation for mathematics and science, as well as an introduction to the civil and environmental engineering profession. The project lasted one week and included group counseling, advisement on the college application process, financial aid, as well as technical activities. The technical activities emphasized hands-on transportation, civil, and environmental engineering projects, interaction of participants with practicing engineers, and discussion of different engineering disciplines. To provide real life engineering experience, some of the activities included field trips to engineering work sites.
Table 2. 2004 Weslaco Summer Institute Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
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<th>Grade</th>
<th>Ethnicity</th>
<th>Gender</th>
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3.2 INSTITUTE CONTENT

The primary focus of the institute was on transportation and civil engineering. The activities were designed to be hands-on and non-repetitive so that the students’ interest was maintained for the duration of the activity. The activities covered a broad spectrum of the civil engineering disciplines including transportation, structures, and materials, as well as field trips to area construction and other sites. Most of the activities consisted of a brief discussion of the related applications and a hands-on project, which was carried out by small groups. Some of the activities were complemented by field trips to actual engineering work sites. Throughout all projects, the importance of science, mathematics, and computers were emphasized.

3.2.1 Introduction to Transportation and Mathematics – Monday, July 20

The first day began with students meeting at the Texas A&M Agricultural Extension Classroom facility in Weslaco. There students were greeted by Ms. Debbie Jasek and Mr. Rick Margo of the Office of Admissions for Texas A&M University, who served as on-site coordinator for the institute. Once everyone was introduced, Ms. Jasek provided an overview of the weeks activities.
The first activity of the program was an introduction to transportation, its various modes and the technology that is used. This led to a discussion of how transportation affects local economies as well as the careers that are available in transportation. The students then viewed a short film about highway transportation and the development of the Interstate Highway System. After a short break, Ms. Jasek began a discussion about the importance of mathematics and how it is applied in the everyday world. This discussion covered the concepts of patterns in nature and science, and how these patterns can be described mathematically. The group then discussed the importance of geometry and Bernoulli’s principles of aerodynamics.

After lunch, the participants fabricated a tetrahedral kite using the principles of patterns learned earlier in the day. The kites were fabricated using straws, string, glue, and tissue paper. The kites were constructed using nine pyramid-like elements. Each of the elements was constructed using six straws and string to form a pyramid-like system. Tissue paper was then wrapped and glued around two sides of the four-sided pyramid. Finally, nine of these elements were assembled together to make the kite. The kites were flown later in the afternoon.
3.2.2 Field Trip to Texas A&M Kingsville – Tuesday, July 21

The second day began early as the group made the 2 hour trip to Kingsville. Two of the parents, Mrs. Bookout and Mrs. Wilde, made the early morning departure more enjoyable by providing breakfast tacos and juice for the long ride. Along the way students discussed roadside landscaping and looked for wildlife eating near the roadside. Sharp eyed students spotted several deer as well as a coyote.
Once students arrived at TAMUK, they were greeted by Dr. Estrada and members of the TAMUK engineering faculty. Dr. Estrada provided an overview of the Civil Engineering Department. The group then assembled in room 104, Engineering Complex, to listen and participate in discussions regarding college opportunities. The first presenter was from the Admissions Office. The participants listened to a brief history of the university, followed by a discussion on the university admissions process, and college life in general. The next speaker was from the Financial Aid Office, who discussed the different financial assistance programs available at TAMUK. The presentation was very informative even for those students not planning to attend TAMUK since most financial aid programs are government sponsored.
After a quick lunch at the Student Center, Dr. Estrada took the students on a walking tour of the campus. The tour included visits to the library, recreation center, a residence hall, and the engineering classroom facility. The tour then ended at the civil engineering laboratory, where Dr. Estrada gave the students a quick overview on the principles of concrete and materials. He discussed materials for construction including concrete, steel, timber, asphalt, soil, and fiber reinforced composites. Several show-and-tell objects were used to illustrate the use of these materials in construction: concrete canoe, steel bridge for Steel Bridge Competition, lumber, carbon and glass reinforced plastic beams, and asphalt and soil laboratory specimens. The group then watched Dr. Estrada conduct a compression test on a concrete cylinder. The results of this test gave the participants an appreciation of material strength. All too soon it was time to board the van and head back to the Valley and Weslaco.
Figure 22. Weslaco Students Visit TAMUK Engineering

Figure 23. Heading out for a Tour of TAMUK
3.2.3 TxDOT, Los Ebanos, and Concrete – Wednesday, July 22

Wednesday was another early day for the participants; everyone gathered at the Citrus Center and boarded the van for the short trip to the TxDOT District Office in Pharr. When we arrived at the TxDOT office, we were greeted by the District Engineer, Mr. Jorge. Once we settled into the conference room, we were briefed on a number of TxDOT Projects as well as information on traffic safety, bridges, and environmental projects.

![Figure 24. Sharing A Laugh with TxDOT During Briefing](image)
After the briefings the group toured the Pharr District Offices and met a number of engineers and transportation specialists. This tour gave the group a feel about working on projects as a team. Then it was time to visit the TxDOT testing laboratory. There the students met with laboratory personnel who conducted a tour of the facilities and briefed the group on the importance of quality control and testing during construction projects.

The group learned about the composition of hot mix and the important properties of each ingredient. They also watched a compression test for concrete samples, as well as a test for porosity of composition asphalt. This led to a discussion of materials properties and quality control.
After the tour of TxDOT the group stopped for a quick lunch in McAllen, before they headed to their next destination, Los Ebanos. Los Ebanos is a privately-owned hand-pulled ferry across the Rio Grande. This ferry, which is located near Sullivan City, is the last hand-pulled ferry of its kind in the United States. After traveling down several dusty, dirt roads, students were quite surprised to see a full border crossing operations, complete with customs, security, and immigration when the group arrived at the crossing. Some students were also remarked that they were unaware of the existence of the ferry and its unique mode of propulsion.
Figure 27. The Los Ebanos Ferry

Figure 28. The Border Crossing at Los Ebanos
After receiving an impromptu and informative briefing on the ferry and its history by the owner of the property and the Border Patrol Agents, it was time to depart. The group then traveled back to the Weslaco Citrus Center. Once the group arrived back at the classroom, they put into practice lessons learned at the TxDOT offices. After forming into teams, students mixed up batches of concrete and made stepping-stones.

3.2.4 Automobiles, Light Houses, Lift Bridges, and Airplanes – Thursday, July 23

Thursday, the group met at the Citrus Center for a quick discussion of the history of transportation on the Rio Grande Valley area. The participants then departed for their first stop of the day, Knapp Chevrolet in Harlingen. There the group took a quick tour of a display of vintage cars and automobile memorabilia. As students viewed the vintage cars and fashions, discussions on technology and gas prices quickly ensued. Students noted the lack of automatic transmissions, cruise control, and stereo systems were the rule in the 1950’s.

Figure 29. Vintage Cars on Display
The next stop on a tour of transportation history was the Texas Air Museum at Rio Hondo. This self-styled museum was informal and packed with transportation and military history. Students were able to view everything from World War I and World War II military aircraft, tanks, Model T ambulances, and naval displays. The hands on feel to the historical displays and the personal narration by the owner made the tour a great experience. Students especially enjoyed the area where they were able to experience the feel of climbing into a World War II cockpit or viewing the world from the conning tower of a helicopter assault carrier. All too soon, it was time to head to Port Isabel. On the way to Port Isabel, the group viewed the lift bridge at Rio Hondo. It is one of the 2 remaining lift bridges in Texas.

![Figure 30. WWI Military Ambulance](image-url)
Figure 31. Experiencing the Captain's View from the Ship

Figure 32. Group Picture with a Sherman Tank
Once the group arrived at Port Isabel, it was time for lunch and a quick break from traveling. After enjoying a seafood lunch, it was time for the group to explore the Lighthouse. Constructed in 1852, the Point Isabel Lighthouse was built to protect and guide ships through Brazos Santiago and the barrier islands. In 1952, the Lighthouse was opened as a State Park and remains the only lighthouse on the Texas coast open to the public.

![Figure 33. Port Isabel Lighthouse](image)

After a climb to the top of the lighthouse and a quick view of the Laguna Madre and the South Padre Island Bridge, the next stop for the group was the Treasures of the Gulf Museum. The Treasures of the Gulf Museum puts the spotlight on three Spanish ships. This part of Texas was discovered by Spanish explorers who arrived at the area by ship. The three ships featured in this museum were shipwrecked in the Gulf of Mexico. Meeting their fate in 1554, during a storm and sinking just 30 miles north of Port Isabel, the shipwrecks are brought to life with murals, artifacts and hands-on activities.
Figure 34. Are We Finally at the Top?

Figure 35. The View is Worth the Climb!
After touring the museums, the group gathered for a discussion on the Queen Isabella Causeway. Ms. Jasek briefed the group on a TxDOT sponsored research project that she had participated in regarding the Causeway and Brown Pelicans. The students then viewed the implementation actions taken by TxDOT. These actions included the installation of a weather station, signage, and the use of DMS to warn motorists of the possibility of Pelicans on the bridge deck during inclement weather. The final stop of the day’s trip was a site on South Padre Island, where dune stabilization and reclamation was underway. Students observed how blowing sand covered portions of the road, causing problems for motorists. They then viewed and discussed the actions underway to attempt to alleviate the problem. After a quick look at the beach, the group made the trip home.

Figure 36. The Queen Isabella Causeway
Figure 37. Discussing Dune Reclamation

Figure 38. Group Picture at South Padre
3.2.5 Careers, College, and Course Wrap Up – Friday, July 24

The final day of the Weslaco program began with a discussion of transportation careers and the importance of a college degree. A presentation by Mr. Rick Margo about college admissions was the focal point of the discussion. After a quick break the students participated in a program evaluation and a course wrap-up. The group then joined their parents at a local restaurant for a graduation luncheon and brief ceremony.

3.3 GRADUATION

The STI staff organized and hosted a graduation ceremony and luncheon on Friday, July 24, 2004. The graduation luncheon was held at a private room at the Golden Corral Restaurant in Weslaco. It was attended by STI staff members, students, and parents of the student participants. Students gave a brief presentation during the luncheon, which provided an overview of their experience at the institute. The directors then presented each participant with a certificate of achievement and an institute T-shirt. After the luncheon, the students headed home to enjoy the remainder of their summer.

3.5 EVALUATIONS

Students completed evaluation forms at the completion of the program on Friday, July 24. The forms provided the attendees with the opportunity to provide feedback on the speakers, field trips, activities, staff, and the overall program. The intent was to identify where the current program for the Institute had been especially effective and enjoyable to the students and those that might need improvement or alteration in future.

All of the students indicated that the program was simply too short. They stated that the program needed to be longer in order to not feel rushed. They indicated that the trips were the most enjoyable activities, with the TxDOT tour being the favorite field trip. They also enjoyed the project activities. They indicated that the project activities helped them assisted them in understanding transportation careers. They agreed that the time allowed for the activities was
adequate, although some expressed the desire for more activities. The students felt the activities provided them with practical experience related to transportation. They did indicate overwhelmingly that the enhancement activities were beneficial. They also confirmed that the program was fun, educational, and that they would like to return if the program were offered again. In all, the 2004 Kingsville STI program was a positive experience by the attendees.
4.0 THE 2005 KINGSVILLE PROGRAM

4.1 Overview

Originally the project had budgeted and planned for three STI programs in 2004. Due to scheduling problems, the third institute was canceled. It was decided that the money earmarked for the program would be used to fund a 2005 STI in Kingsville. The 2005 Kingsville program took place July 6-15, 2005 on the TAMUK campus. This residential institute had a diverse schedule, which incorporated a combination of lectures, hands-on exercises, facility tours, and activities.

The project was advertised at area high schools through the counselors and at the 2004 South Texas Career Expo in Kingsville, TX. Eighteen students from several area high schools applied. Priority was given to those students with the highest achievement in mathematics and science, particularly those who had participated in science and engineering competitions. Based on these criteria, offers to participate in the institute were extended to all eighteen students who applied – eight female students and ten male students. From these eighteen students, all agreed to participate, but three of them did not show up on the first day of the institute.

The final group included six female and nine male students, all of whom were in high school. The racial breakdown of the participants included seven Hispanic, and eight Caucasian participants. The complete breakdown of all institute participants is included in Table 3. The program provided the participants hands-on problem solving activities to enhance their appreciation for mathematics and science, as well as an introduction to the civil and environmental engineering profession. The project lasted two weeks and included group counseling, advisement on the college application process, financial aid, as well as technical activities. The technical activities emphasized hands-on transportation, civil, and environmental engineering projects, interaction of participants with practicing engineers, and discussion of different engineering disciplines with TAMUK faculty. To provide real life engineering experience, some of the activities included field trips to engineering work sites.
### Table 3. 2005 Kingsville STI Participants

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<tr>
<th>Name of Student</th>
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</table>

#### 4.2 INSTITUTE CONTENT

The primary focus of the institute was on civil and environmental engineering. The activities were designed to be hands-on and non-repetitive so that the students’ interest was maintained for the duration of the activity. The activities covered a broad spectrum of the civil and environmental engineering disciplines including transportation, structures, materials, water resources, air pollution, wastewater and water treatment projects as well as field trips to area construction and other sites. Most of the activities consisted of a brief discussion of the related applications and a hands-on project, which was carried out by small groups. Some of the activities were complemented by field trips to actual engineering work sites. Throughout all projects, the importance of science, mathematics, and computers were emphasized.

The participants resided on campus for the duration of the institute, except for on the weekend. Most of the activities were conducted in the Civil and Environmental Engineering
Laboratories at TAMUK. This year the special nightly social activities, such as games, movies, and sports were conducted by counselors who are undergraduate civil engineering students at TAMUK.

**4.2.1 Introduction and Advisement – Wednesday, July 6**

Students and program staff gathered at the McNeil Engineering Building for the beginning of the 2005 Kingsville STI and Engineering Summer Camp. After a welcome by Dr. Hector Estrada, the program coordinator and Ms. Debbie Jasek, the program director; the students accompanied by their parents checked into the dormitories. Parents said goodbye and the students took a short tour of campus. Students then picked up meal cards and headed to the Student Union Building for lunch.

The afternoon sessions began with speakers from the TAMUK admissions office who discussed the Texas Common Application for College and from the Financial Aid Office. The students then had a short meeting with advisors from life services and the wellness center about living on campus during the summer camp and the facilities that were available to the students during that time.
Finally students were able to discuss transportation and engineering. Dr. Estrada and other members of the faculty led a spirited discussion about engineering as a profession and how it relates to transportation. The students discussed various career paths for engineers including environmental, structural, transportation, and civil engineering. The group then went to dinner and enjoyed an ice-breaker for the night’s activity.

4.2.2 Materials and Concrete - Thursday, July 7

The next day’s the focus was concrete and materials. After a discussion about materials and lab tests regarding tensile and compression strength on timber, concrete and other materials, the group paused for lunch. After lunch the students divided into groups and began concrete production. Each group mixed a batch of concrete and fabricated four test cylinders of concrete. These cylinders were then placed in a cure room and they were then tested the last day of the
institute. A special concrete group activity was then conducted, where the entire group mixed and fabricated concrete stepping stones.

Figure 40. Mixing Concrete
4.2.3 Transportation, Traffic, Math, and Rockets – Friday 8

On July 11th the group began with a discussion on transportation engineering with an emphasis on traffic engineering, traffic flow, speed studies and intersection studies. A discussion of how speed limits are set and enforced then ensued. After lunch the STI divided into groups and used a laser gun to conduct a small spot speed study on Armstrong Avenue in Kingsville.

The afternoon also included activities in Science and Math. Students discussed numbers in nature and the Fibonacci mathematical series. The students listened to presentations about Bernoulli’s principles of lift and aerodynamics as well as a short video on the space program. A hands on activity included building water bottle rockets to be fired on a rocket launcher. Firing water bottle rockets on a hot Friday afternoon was a popular activity enjoyed by all.
Figure 42. Testing the Launcher

Figure 43. After the Rocket Launch
On Monday July 11, the group assembled in the Materials Testing Lab to listen to a series of discussions on mathematics, and environmental engineering. Dr. Joseph Sai led the discussion by introducing the participants to environmental engineering. Students were given the definition of engineering as published by the Engineer’s Council for Professional Development (ECPD). This led to the explanation of the fundamental differences between engineers and scientists. The need for environmental engineers in environmental systems management was then discussed. The discussions focused on three systems: water resource management, air resource management and solid waste management issues. Students learned about the need to prevent environmental pollution and the role of engineers in designing water treatment facilities to provide safe and potable water, designing of systems for waste minimization and cleanup of contaminated sites. The group toured the environmental engineering laboratory and the mechanical engineering facilities. They then moved to the computer laboratory for a quick workshop on structures.

After lunch the students divided into groups and built balsa wood bridges. The West Point Bridge Building model was used as a guideline for this activity. With guidelines, rules, a balsa wood kit, and a satisfactory design, each team began constructing their bridge. The objective of the activity was to produce the strongest bridge, which was tested using three-point bending on the last day of the institute. The group with the strongest bridge won a prize. For this project, some groups worked several days and produced outstanding truss bridges.
Figure 44. Laying out the Design of a Truss Bridge

Figure 45. Teams Building Bridges
On Tuesday, July 12, the STI had an early start for a field trip to South Padre and Brownsville. The theme for the day was exploring the past and discovering how transportation influenced the settlement and economy of South Texas. The first stop for the group was the Light House at Port Isabel. Constructed in 1852, the Point Isabel Lighthouse was built to protect and guide ships through Brazos Santiago and the barrier islands. In 1952, the Lighthouse was opened as a State Park and remains the only lighthouse on the Texas coast open to the public.

![Port Isabel Lighthouse](image)

**Figure 46. Port Isabel Lighthouse**

After a climb to the top of the lighthouse and a quick view of the Laguna Madre and the South Padre Island Bridge, the next stop for the group was the Treasures of the Gulf Museum. The Treasures of the Gulf Museum puts the spotlight on three Spanish ships. This part of Texas was discovered by Spanish explorers who arrived at the area by ship. The three ships featured in this museum were shipwrecked in the Gulf of Mexico. Meeting their fate in 1554, during a storm
and sinking just 30 miles north of Port Isabel, the shipwrecks are brought to life with murals, artifacts and hands-on activities. Also featured at this museum are a Discovery Lab and a Ship Theatre.

Figure 47. View of the Queen Isabella Causeway, the Longest Bridge in Texas

After a quick lunch, the group then traveled to Brownsville, along the way the group saw the Shrimp Turning Basin at Port Isabel. Over 168 trawling vessels are located at the Port Isabel facilities. Those boats have created the base employment in catching, processing and marketing Texas Gulf Shrimp that drives the local economy. Currently 40 percent of all the shrimp caught in the Gulf of Mexico are processed and marketed from Port Isabel.

Arriving at Brownsville the students traveled to the Brownsville International Airport. There the group visited the Rio Grande Valley Wing of the Commemorative Air Force (CAF). The CAF is comprised of over 11,000 members nationwide, several hundred of whom serve as pilots and flight or maintenance crew members committed to preserving World War II American aviation heritage. The CAF is responsible for operating a fleet of more than 140 airplanes known
as the Ghost Squadron. The CAF is an all-volunteer organization, with members from all walks of life. Privately funded and totally self-supporting, this nonprofit, tax-exempt group is dedicated to preserving the military aviation heritage of World War II. Members of the CAF met with the students and opened their Museum and Hangers for a private showing. The Rio Grande Valley Wing has over 16 aircraft and 4 rooms of memorabilia from World War II.

Students were able to talk to local World War II pilots, view aircraft in various stages of restoration and come away with an understanding of the role of aircraft in World War II. Aircraft viewed by students included the DH 94 Moth Minor, the PT 26 Cornell, the 16 B Finch, the Focke Wolfe 44 Stieglitz, and the North American AT 6 Harvard. After a quick tour of the airport, the group began the trip back to Kingsville.

Figure 48. Aircraft at the CAF Hanger
4.2.6 Port of Corpus Christi and TxDOT – Tuesday, July 13

On July 13th the STI was once again on the road. This time the group headed to Corpus Christi. The first stop was the Port of Corpus Christi. There the students met with members of the Port Operations for an overview on the Port and the current expansion of the port capabilities. The group then visited the seawall construction site and discussed the impact of the construction on the environment and traffic in Corpus Christi. After a lunch break the STI group headed to the TxDOT District Office. There they met with TxDOT engineers and laboratory personnel to find out about career opportunities with TxDOT as well as plans for implementation of Intelligent Transportation Systems (ITS) architecture at the District level.

![Figure 49. Visiting TxDOT](image-url)
4.2.7 San Antonio TransGuide and Blue Eagles – Thursday, July 14

On Thursday, July 14th, the STI had another early start and traveled north to San Antonio. The first stop for the San Antonio field trip was Stinson Air Field. There the STI students met members of the Blue Eagles. The Blue Eagles are the helicopter unit of the San Antonio Police Department. Escorting Officer Eddie Ramirez, the students were briefed on the mission of the Blue Eagles and how the unit was assembled. The group then watched a video that showed the unit in action, finding a missing child at night, following a car attempting to flee a robbery, and assisting ground units searching for a stolen vehicle. After the video, students toured the helicopters and the hangar used by the Blue Eagles.
The group then stopped for lunch and proceeded to TransGuide, which is the San Antonio Traffic Management Center. There the students met Ms. Laura Lopez, the Public Relations Official for TransGuide, and Ms. Julie Sawyer, a TxDOT Engineer. The students toured the traffic management center and met transportation professionals and saw ITS in action. After the group returned to TAMUK, they were treated to a pizza party and a movie to celebrate their last night on campus.
4.2.8 Competitions, Evaluations, and Closeout – Friday, July 15

Friday morning began with the competition testing for the concrete cylinders and the balsa wood bridges. Both of these items were tested for strength with the team constructing the strongest concrete and bridge winning an award. After the testing the students completed their evaluations and checked out of the Dormitories. Students then met their parents and attended the graduation luncheon hosted by the TAMUK Engineering Department.
Figure 53. Testing Concrete Cylinder Strength

Figure 54. Testing Bridge Strength
4.3. GRADUATION CEREMONY

The STI staff organized and the TAMUK College of Engineering hosted a graduation luncheon and ceremony for the Kingsville STI participants, which was held on Friday, July 15, 2005 on the Texas A&M University at Kingsville campus. Transportation professionals and the faculty of TAMUK, along with family and friends, were invited to attend the ceremony. Ms. Debbie Jasek, STI Project Director and Dr. Hector Estrada, TAMUK Project Coordinator greeted graduates and their guests.

The keynote speaker for the ceremony was the Mr. Docke Burke, Director of the Southwest University Transportation Center (SWUTC) which provided additional funding for this year’s Kingsville Institute. After the ceremony, a luncheon was held and students were provided with the opportunity to network with transportation professionals and TAMUK faculty.
The intent of the reception was to emphasize the importance of networking and professional contacts in reaching self-appointed goals.

4.5 EVALUATIONS

Students completed evaluation forms at the completion of the program on Friday, July 15, 2005. The forms provided the attendees with the opportunity to provide feedback on the speakers, field trips, activities, staff, and the overall program. The intent was to identify where the current program for the Institute had been especially effective and enjoyable to the students and those that might need improvement or alteration in future.

Students indicated that the competitions were the most enjoyable activities, with bridge building being the favorite competition. They indicated that the project activities helped them assisted them in understanding transportation careers. They agreed that the time allowed for the activities was adequate, although some expressed the desire for more activities. The students felt the activities provided them with practical experience related to transportation. The students also stated that they enjoyed the field trips, and the TxDOT area office and the Blue Eagles were listed as their favorite field trips.

The responses from the STI attendees indicated that generally the program length, the number of field trips and speakers were appropriate. They did indicate overwhelmingly that the enhancement activities were beneficial. They also confirmed that the program was fun, educational, and that they would like to return if the program were offered again. In all, the 2005 Kingsville STI program was a positive experience by the attendees.
5.0 FINDINGS AND RECOMMENDATIONS

It is the opinion of the Texas Summer Transportation Institute staff that the programs in Kingsville and Weslaco were complete successes. The project team met the goals and objectives of the program in Texas. The 42 students who attended the programs were exposed to the gamut of career opportunities within the transportation industry, had the opportunity to gain hands-on technical experience, network with professionals to learn more about career choices, and earn college credit.

5.1 FINDINGS

As previously noted 42 students attended the programs sponsored by the Southwest University Transportation Center. Of these students 26 were male students and 16 were female. Although the number of males was greater than female, the percentage of females attending the institute (38 percent) was significantly higher than the percentage of female students pursuing engineering degrees in college (18 percent). The racial break down of attendees was 3 African-Americans, 25 Hispanic, and 14 Caucasian. The students attending the STI came from 12 different cities and 19 different schools.

Although a formal follow-up study has not been conducted for the students who attended these programs, an informal check of the students reveal initial success. Most of the students are still attending high school. Of the students who have graduated there are 12 who are attending college. Six students are attending Texas A&M University at Kingsville, five are attending Texas A&M University at College Station, and one is attending the University of Texas at San Antonio. Of those attending College 2 are majoring in engineering, 6 are majoring in science, 3 are undeclared majors, and 1 is majoring in liberal arts.

5.2 RECOMMENDATIONS AND FINAL REMARKS

Notwithstanding the above-mentioned successes, some improvements could be made to the STI program in future years to ensure the smooth operation of the institutes. It is disheartening to note that STI reaches only a small portion of the population of Texas. The vast portion of Texas students, including some of the neediest (students in rural south Texas)
does not have access to such outreach programs. At current funding levels it has been impossible for the partnership to expand into these areas in Texas. To foster comprehensive approaches and build effective coalitions that address transportation educational and career opportunities for the next century, the STI program should support the establishment of comprehensive regional centers. This would call for the establishment of coalitions of college, universities, school districts, business, industry, and other organizations that can contribute to a more broad-based recruitment program for transportation education, career development, and advancement. Moreover, given the growing diversity of the population and the limited engineering and transportation programs in some colleges and universities, every effort must be made to form a basis for balancing educational access and career development opportunities by forming partnerships with other public and private institutions. Such partnerships can strengthen the STI program and ensure its ultimate success.