THE LOUISIANA CIVIL ENGINEER

ACADIANA BRANCH • BATON ROUGE BRANCH
NEW ORLEANS BRANCH • SHREVEPORT BRANCH
Journal of The Louisiana Section

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March 19-21, 2003

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September 12, 2003

THE LOUISIANA CIVIL ENGINEER

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President's Message

Charles L. Eustis, PE

Now that the joyous Christmas season and New Year's celebration is over, it is time to begin the new year in earnest. First, may I wish you an enjoyable and prosperous new year.

Representing the Section, I attended the most recent ASCE National Convention in Washington, D.C. It was during this convention that I learned the ASCE Policy Statement 465 — Academic Prerequisites for Licensure and Professional Practice—is now being dubbed as the *bachelor's degree plus 30 semester hours credit* or B+30 in lieu of the original requirement of a bachelor's degree plus a master's degree.

The total postsecondary education that fulfills the practice-oriented *body of knowledge* (BOK) required for entry into the professional practice of civil engineering is being redefined as the B+30. The ASCE leadership now apparently feels that the B+30 adequately addresses the rationale for additional educational requirements for civil engineers to adequately enhance public health, safety, and welfare. The additional educational requirements will provide the BOK that should be taught and learned to adequately enhance public health, safety, and welfare. The Body of Knowledge—Curricula Committee of the ASCE Task Committee on Academic Prerequisites for Professional Practice prepared a draft of an executive summary report for review and comment titled "Civil engineers body of knowledge for the 21st century: Preparing the civil engineer for the future." This summary report is available at www.asce.org/pdf/execsummary.pdf. I extracted the following portion:

Body of knowledge—*What* should be taught and learned?

The Committee selected an outcomes approach as the principal means of defining the ***what*** dimension of the Civil Engineering BOK for the 21st Century. The outcomes collectively prescribe the necessary depth and breadth of knowledge, skills, and attitudes required of an individual aspiring to the practice of civil engineering at the professional level (licensure) in the 21st Century. The outcomes prescribe both additional breadth and more technical depth. The 21st Century civil engineer must demonstrate

- ability to apply the *common technical core* of mathematical, scientific and engineering knowledge underlying the role of the civil engineer as the master integrator.
- ability to apply knowledge in a *specialized technical and/or professional area.**
- ability to design and conduct *experiments*, as well as *analyze* and *interpret* field and laboratory data, in more than one of the major recognized civil engineering areas.
- ability to understand the role of—and to use —the techniques, skills, and modern *engineering tools* necessary for engineering practice.
- ability to identify, formulate and solve *engineering problems.*
- ability to *communicate* effectively, that is, to listen, observe, speak, and write.
- ability to participate on and lead *multi-disciplinary teams.*
- ability to understand the *role of the leader* and to use *leadership principles*.*
- understanding of the elements of building, facilities, process and systems *design.*
- understanding of the elements of *project management.*
- understanding of the elements of *asset management.**
- understanding of the elements of *construction.**
- understanding of *business fundamentals* as applied to private, government, and non-profit sectors.*
- understanding of *public policy and administration fundamentals.**
- understanding of and abiding by a commitment to practice according to the *professional and ethical standards* of the engineering profession.
- an appreciation for *culture, environment, history and human behavior.*
- knowledge and appreciation of the relationship of engineering to critical *contemporary issues.*
- recognition of the need for, and an ability and commitment to engage in, *lifelong learning* for personal and professional development.

All of the 11 ABET outcomes are included in the 18 BOK outcomes listed, either verbatim or refined to tailor them more uniquely to civil engineering. The 7 entirely new outcomes (those followed by an asterisk) address specialization, leadership, project management, asset management, construction, business, and public policy and administration. For overview purposes, the practice-oriented BOK can be distributed among three general areas; technical, professional and practice.

Body of knowledge—*How* should it be taught and learned?

Having defined ***what*** constitutes the BOK, the Committee considered ***how*** it should be taught and learned. The three teaching/learning modes are

- undergraduate study typically leading to a Bachelor of Science in Civil Engineering (BSCE)
- practice-oriented graduate study or the equivalent (the 30 semester hours following the BSCE) and
- post-BS engineering experience prior to licensure.

The Committee concluded that the BSCE will be the primary means of initiating the teaching and learning resulting in most outcomes. Furthermore, based on its breadth and depth of knowledge, skills, and attitudes, that the BSCE could provide an attractive and appropriate liberal education for the 21st Century both for those on an engineering track and those aspiring to other professions.

Both upper level undergraduate and graduate-level education, or its equivalent (the 30 semester hours following the BSCE), and a structured post-BS work experience are essential to achieving the BOK. That is, neither experience nor post-BSCE education alone will prepare the holder of a BS degree to sit for the licensing examination and enter the practice of civil engineering at the professional level.

Increased university-employer collaboration can assure that essentially all future civil engineering practitioners have the opportunity to enhance their learning and increase their awareness of the vitality of the profession by participation in additional experienced-based learning. Examples are: cooperative education, internships, summer para-professional employment, and part-time or full-time para-professional employment prior to earning a BS degree.

The Committee learned that a few undergraduate-graduate programs already exist that approximate, in terms of outcomes, the BOK defined in this report. Furthermore, the Committee will be working with selected civil engineering departments that want to be leaders in designing BS and practitioner-oriented master's degree tracks that will provide the prescribed BOK.

About the cover: *This is a photograph from inside of a braced excavation and it is an enlarged segment of Figure 4 in the feature article of this issue. The sequence of its construction progression is illustrated showing the temporary sheet pile wall braced with 2 lines of struts and wales. Incomplete excavation work is shown in the background, while permanent piles are driven in the completed excavation in the foreground with those closest in the view cut off to plan elevation with tension anchors installed.*

Potential damage from dewatering excavations

By Madonna H. Montz, EI

Introduction

The metropolitan New Orleans area is generally below sea level. For this reason it is protected from storm surge and tidal inflow by a continuous levee system that also acts to contain the rainfall runoff in the metropolitan area. New Orleans is one of the rainiest cities in the United States, averaging 58" annually. Because of this, pumping stations are needed to pump the excess storm water that accumulates in the metropolitan New Orleans area over its flood protection levees.

The Southeastern Louisiana Urban Flood Control Project (SELA Project) was implemented to improve the drainage capacity of the metropolitan area, shown in Figure 1, to cope with flooding caused by extreme rainfall events. Figure 2 is a map of the SELA Project area. The objective is to increase the water-moving capacity through the drainage systems and pumping stations located at their confluence with the flood protection levee system. To achieve this, some earthen canals will be deepened and widened, some earthen canals will be lined with concrete, underground canals will be enlarged, new canals will be built, existing pumping stations will be upgraded, and new pumping stations will be built.

The construction of the concrete-lined open channel and the concrete box culvert drainage structures as shown in Figures 3 and 4 in the urban environment will require

- driving temporary sheet piles to support the excavation
- bracing the temporary sheet pile wall with wales and struts
- dewatering the braced excavation
- driving permanent piles to resist uplift from buoyant forces
- casting the structure and backfilling between it and the sheet pile wall and
- removing the bracing and extracting the sheet piles.

Groundwater fluctuation, and horizontal and vertical ground movement have occurred adjacent to the construction sites and outside of the limits of construction due to the activities associated with this construction. As a result, damage claims have been received from the entities adjacent to the project area citing property damage due to ground movement caused by the construction. To validate the legitimate claims, test sections in Orleans and Jefferson Parishes were studied to determine the impact of the construction on adjacent areas before, during and after construction. To achieve this, a series of instruments were installed at the test sections varying distances from the location of the sheet pile wall. They include piezometers monitoring groundwater elevation, inclinometers monitoring lateral ground movement and Sondex tubing monitoring vertical ground movements behind the retaining structures. The data obtained from this instrumentation will be applied not only to the test sections, but extended to other canals within the same geologic formation to either substantiate or refute the damage claims from the residents.

Metropolitan New Orleans area

For the purposes of this discussion, the metropolitan New Orleans area includes portions of Orleans and Jefferson Parishes as shown in Figure 1. The Orleans and Jefferson Parish areas are both bisected by the Mississippi River, creating what is referred to as the *east bank* and *west bank* areas. Typically, a ridge exists adjacent to the river channel that is at an elevation above sea level. The ground elevation decreases with increasing distance from the river. The ground elevation of most of the metropolitan area forms a depression or a *bowl* that is below sea level. Drainage systems in the metropolitan area are constructed to drain the metropolitan area that alone do not have an outlet at their confluence to drain them by gravity. This would render them useless during major rainfall events causing area-wide flooding. To avoid this, the main drainage canals and box culverts are designed to drain by gravity toward the pumping stations that are used to control the water level in the drainage systems by pumping storm water over the flood protection levee.

Even though the metropolitan New Orleans area typically experiences 58" of rainfall a year, the area experienced severe drought conditions from 1997 through 2000. The metropolitan area began experiencing below normal rainfall during the second half of 1997 and the dry conditions continued into August 1998 when the state of Louisiana was declared a federal disaster area because of drought conditions and extreme temperatures. The metropolitan area endured a moderate drought for most of 1999. In 2000, the state of Louisiana sustained extreme drought conditions with temperatures above normal. It was not until 2001 that the metropolitan area began to experience normal rainfall. These drought conditions are significant to the discussion of the data collected from the 4 test sections on Soniat Canal, Suburban Canal, Napoleon Avenue, and Hollygrove because some damages may have been initially caused by drought-induced ground subsidence. Since construction coincided with the end of the drought, those same damages may have possibly become more extensive. Therefore, it is difficult to differentiate between damages related to the drought and those related to construction activities.

SELA Project

Traditionally, the federal government does not get involved with urban drainage projects. However, on May 8, 1995, the metropolitan New Orleans area was inundated by 20" of rain that caused $1 billion in damages flooding approximately 35,000 residences and 1000s of business and public facilities. The damage from the aforementioned flooding and the similar flooding of May 1978 established the need to improve the drainage capacity of the metropolitan area to effectively reduce the flooding caused by extreme rainfall events; thus, reducing the claims and the resulting significant cost to the Federal Emergency Management Agency (FEMA). The SELA Project was initiated to substantially reduce FEMA's claims liability experienced in the metropolitan area.

The objective of the SELA Project is to develop a financially feasible drainage improvement plan that will enable the metropolitan area to experience a 10-year rainfall event without significant flooding. To accomplish this objective, the stormwater-moving capacity of the drainage canals and the pumping stations would have to be increased. Currently, the project consists of 59 construction contracts on the east bank of Orleans Parish and the east bank and west bank of Jefferson Parish at a total cost of $537 million. The planned construction allows the canal and box culvert improvements to remain within the easement currently provided in the parishes and yet be able to meet the needed stormwater carrying capacity. There is more proposed work in the SELA Project area of Orleans, St. Bernard, and St. Tammany Parishes as shown in Figure 2.

Currently, the Jefferson Parish drainage system consists of a network of subsurface culverts, ditches, canals and pumping stations. The drainage system of East Jefferson Parish consists of a network of lateral east-west aligned canals discharging into major north-south aligned canals at their confluence. The major north-south aligned canals drain to pumping stations at their confluence with Lake Pontchartrain where the excess storm water is pumped into the lake. The east-west canals acting in manifold discharge their storm water into the major north-south canals. The major canals discharge their storm water to five pumping stations that have a combined pumping capacity of over 17,000 cfs.

Madonna Heine Montz, EI, is employed by the U.S. Army Corps of Engineers, New Orleans District in the Geotechnical Branch. Montz earned her BS in Geology, BS and MS in Civil Engineering from the University of New Orleans.† Her work involves the study of groundwater movement and ground movement associated with the SELA projects and the geotechnical review of damage claims associated with them.

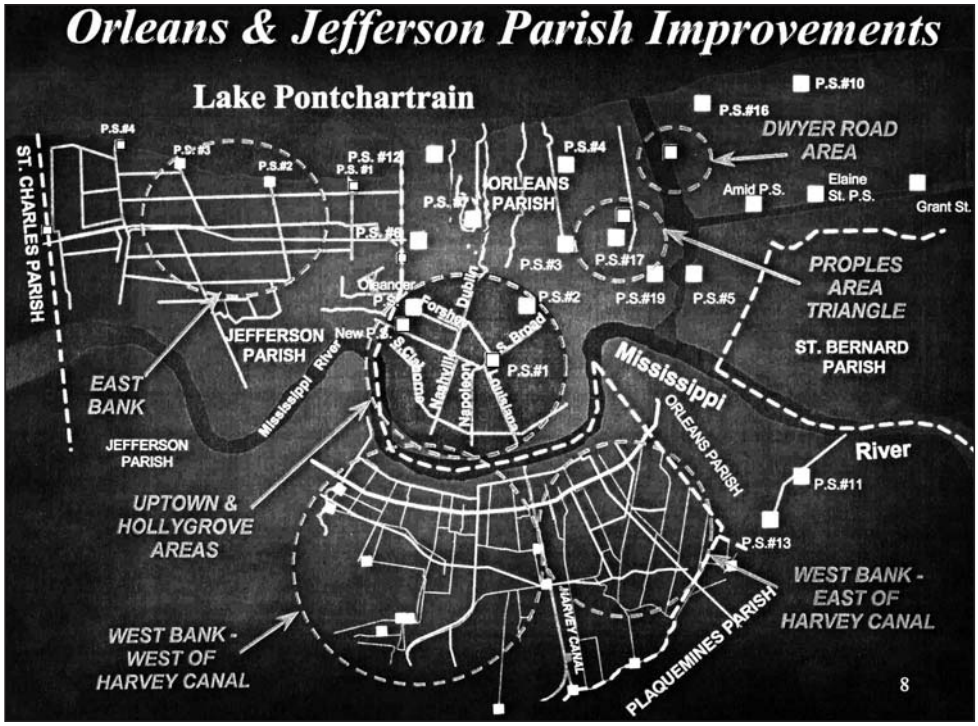

Figure 1. Map showing the general locations of current SELA projects in Jefferson and Orleans Parishes.

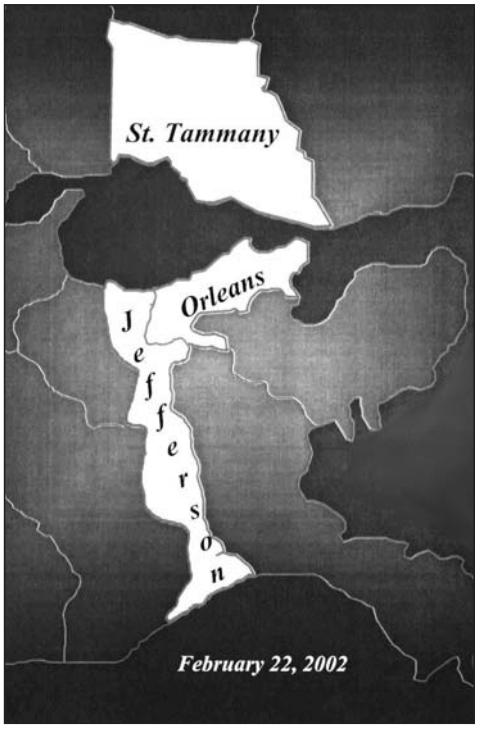

Figure 2. Map of the Southeast Louisiana Urban Flood Damage Reduction (SELA) Project area.

The SELA Project in East Jefferson Parish will increase the Parish's pumping capacity by 4,800 cfs through upgrades to 2 existing pumping stations. The West Jefferson Parish drainage system is subdivided into the East of Harvey and West of Harvey basins that drain into Barataria Bay. The SELA Project in the East of Harvey basin will increase the pumping capacity by 2,000 cfs through the addition of a new pumping station. In the West of Harvey basin, there will be modifications to existing canals and pumping stations.

The existing drainage system in Orleans Parish is a network of subsurface piping that connects to large culverts and canals that are pumped into the Mississippi River. This system consists of hundreds of miles of canals and 21 major pumping stations that serve 55,000 acres of industrial, commercial, and residential properties. The SELA Project in Orleans Parish consists of improvements to 5 major drainage canals, upgrades to 2 existing pumping stations and the construction of a new pumping station with a capacity of 250 cfs.

Foundation investigations

The metropolitan New Orleans area is located in the central portion of the Mississippi River delta plain. The typical subsurface soil profile includes Holocene deposits of natural levee clays and silts, point bar clays, silts, and sands, swamp and marsh clays, and organic material. These deposits are underlain by Pleistocene deposits consisting of oxidized clays and silty clays with some sand lenses that have a lower water content and higher strength than the overlying Holocene deposits.

The geology of Jefferson Parish consists predominantly of organic clays. These clays are subject to swelling and shrinking during periods of wetting and drying, respectively. Due to the cyclic swelling following a period of shrinking,

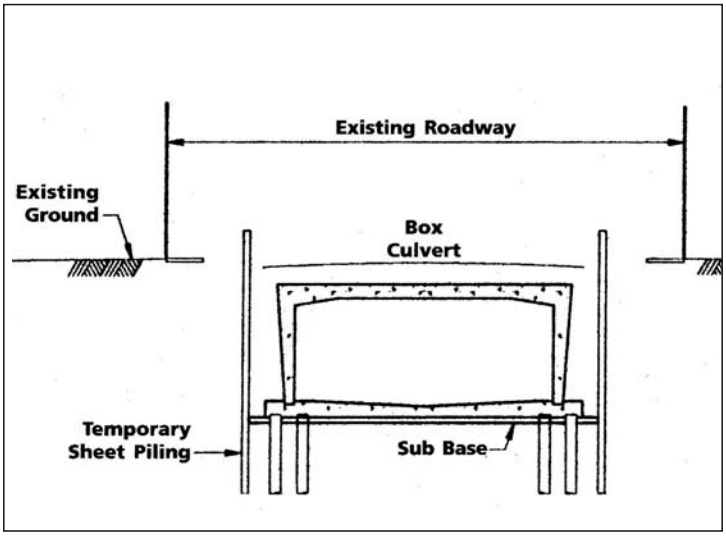

Figure 3. A schematic of the typical construction layout for the concrete box culverts used at Napoleon Avenue and Hollygrove test sections.

Figure 4. The sequence of construction progression at the Napoleon Avenue project is illustrated showing the temporary sheet pile wall braced with 2 lines of struts and wales. Incomplete excavation work is shown in the background, while permanent piles are driven in the foreground with those closest in the view cut off to plan elevation with tension anchors installed.

uplifting forces in these organic clays may induce heaving, cracking, and breakup of buildings on deep foundations or on shallow, slab-on-grade foundations. These clays have low strengths and tend to rapidly consolidate under load. They are also subject to lateral spread consolidation and they suffer permanent loss of volume due to biodegradation of the organic material they contain. The response of these clays adjacent to the construction processes is significant in discussing the potential for damage to adjacent property.

The geology of Orleans Parish also has a predominant composition of organic clay. However, this clay has a greater shear strength than the clay found in Jefferson Parish. A continuous sand stratum is present due to its proximity to the river. There are strata of loose to very dense fine sand and silty sand that vary in thickness from 6' to 19' at the Napoleon Avenue test site. At the Hollygrove test site, there are strata of loose to medium dense sand, clayey sand, and silty sand that vary in thickness from 4' to 7'. The characteristics of the sand strata affect the construction process and the response of the clays to the construction process.

Test sections

The features of the construction process have caused concern for both local residents and the federal government. The residents are concerned about the potential for damages from the settlement of the ground adjacent to the construction resulting from groundwater drawdown caused by the dewatering of the excavation for any extended period of time and from the vibrations caused by the pile and sheet pile driving. The federal government, on the other hand, is concerned because the damages that may occur within the *zone of influence* are considered added project costs because it agreed to pay for the construction-related damages in the zone of influence due to the urgency of the project. Damages as a result of groundwater drawdown are not included in the project cost. This is a first because the federal government is legally protected from such liabilities by a *hold harmless* clause. However, an exception to this clause was granted to expedite this project. To expedite the project, the federal government was immediately granted the servitude for the canals. However, it did not have time to purchase or acquire additional rights-of-way from adjacent residential and business property owners.

In response to the local and federal concerns, the U.S. Army Corps of Engineers planned for 4 test sections. One test section at Soniat Canal was developed to establish the *radius of influence* caused by dewatering. The remaining 3 test sections at Suburban Canal, Napoleon Avenue, and Hollygrove were developed to determine the magnitude and extent of the adjacent ground movement and thereby establish the zone of influence.

Soniat Canal

The Soniat Canal test section is located in the urban area of East Jefferson Parish between West Napoleon Avenue and Veterans Boulevard. It is 1 of 4 test sections along Soniat Canal between West Metairie Avenue and Canal #3. The other 3 test sections are between West Metairie to Lynette, Lynette to West Napoleon Avenue, and Veterans Boulevard to Canal #3. Completed data is currently available and discussed herein for this test section of Soniat Canal. However, the piezometers are still being monitored for the long-term, post-construction effects. Only pre-construction data is available on the remaining 3 test sections since they are not yet under construction.

The improved canal planned for this reach is a U-shaped, concrete-lined channel section designed to carry the required 5,000 cfs while remaining within the existing limits of the right-of-way that are in close proximity to adjacent residences. The excavation for the construction requires a temporary braced, steel sheet pile wall that will remain in place until the reinforced concrete U-frame canal is constructed and backfilled. To provide dry working conditions during construction, the excavation is dewatered resulting in the water table being lowered several feet below the earthen slopes and the bottom of the excavation.

The purpose of this test section and the remaining test sections is to quantify the effects of groundwater drawdown using a set of 3 piezometers, at each test section, located 60', 120' and 185' from the centerline of the canal. There are 2 additional piezometers installed on David Drive approximately 405' from the centerline of the canal and in Lafreniere Park approximately 700' from the centerline of the canal to record ambient groundwater and settlement conditions outside of the radius of influence of the construction. The radius of influence is the outer limit of the cone of depression—the parabolic shape—of the watertable caused by drawdown at its center. The instrumentation locations were selected to produce a complete and reliable picture of the effects of groundwater drawdown produced by the construction dewatering and canal operation. Groundwater monitoring took place before and during construction, and continues after construction to more accurately estimate the areal extent and character of the groundwater drawdown.

The piezometers were installed in September 1998 and readings began immediately. Important dates of construction include installation of the temporary sheet pile wall on 9 January 2001, dewatering of the excavation on 26 March 2001, extraction of the sheet piles on 19 Dec 2001, and canal operation on 16 April 2002.

The current data for the Soniat Canal test section is presented herein; however, the piezometers are still being monitored for long-term, post-construction effects. The pre-construction data indicates that the closest piezometer (60' from the centerline of the canal) is affected by groundwater drawdown. The more remote piezometers (120' and 185' from the centerline of the canal) provided measurements similar to the ambient conditions outside of the radius of influence. During construction, there are no effects from groundwater drawdown in any of the piezometers. The post-construction data, to date, indicates that the ambient groundwater elevation beyond the canal has not been affected by the groundwater drawdown from the dewatering operations or the canal operations.

A record of the incidence and amount of rainfall was maintained at the test site and analyzed indicating that there is a correlation between rainfall events and groundwater elevations in the piezometers as a result of ground infiltration and the recharge from the water in the excavation itself. There is also a correlation between the lack of rainfall and groundwater elevations.

Another aspect analyzed was the recharge of adjacent soil formations from flood events in Soniat Canal that were not necessarily related to the rainfall at the test section. Rainfall in other parts of the city would have caused canals interconnected with Soniat Canal to exceed their capacity. This necessitated breaching the temporary dams protecting the construction site in Soniat Canal to allow the water flow through the Soniat Canal excavation and avoid upstream flooding. The temporary dams were reconstructed following the release. This water flow through the Soniat Canal construction site had an impact on the groundwater elevation readings due to the recharging of the adjacent soil formation by the seepage of water in the excavation through the interlocks of the sheet pile wall.

After analyzing the rainfall data, it appears that the groundwater levels during and after construction did not reach the pre-construction low groundwater levels recorded because increased rainfall was experienced during the construction and operation periods. The post-construction piezometer data, to date, indicate that the groundwater table has yet to return to the pre-construction low levels measured, that took place during drought conditions. As expected, the groundwater profile adjacent to Soniat Canal approaches ambient conditions with increasing distance from the canal. Therefore, the measurements from the piezometers further from the canal centerline are less affected by the variations in water level stages in the canal.

Suburban Canal

This test section is located in an urban area of East Jefferson Parish between Veterans Boulevard and West Esplanade Avenue at the intersection of the canal and Loveland Street, that served as a major thoroughfare for heavy construction equipment accessing the job site. This site was investigated as a result of structures being damaged adjacent to construction with sheet piles on previous jobs and on the beginning phases of the construction of this canal. The purpose of this test section is to quantify lateral and vertical movement of the ground adjacent to the project site. To accomplish this, 3 inclinometers were installed varying distances from the temporary sheet pile wall referred to herein as the temporary retaining structure (TRS) to characterize and measure the lateral movement and 2 of them were equipped with Sondex tubing to measure the vertical movement (settlement). Monitoring of the instrumentation began prior to construction and ended after the extraction of the sheet piles.

The inclinometers and Sondex tubing were installed at this test site during the period of 13-17 March 2000. Inclinometers, I-1, I-2, and I-3,

(Continued on Page 16)

News from the Branches

ACADIANA

By Larry A. Cramer, PE, President

I hope everyone had a happy and joyful holiday season. Since the last newsletter, the Branch Board has continued its efforts to offer interesting and exciting monthly meetings.

On January 29th, the Branch will be participating in the 2003 CAREER Connections Expo at the Cajundome. We hope to encourage, inspire and answer questions that 10th grade students may have about civil engineering. The ASCE Student Chapter at the University of Louisiana at Lafayette will support this effort by displaying some of their engineering and competition projects.

During the month of January the Branch Board participated in the 7th Louisiana Joint Engineering Society Conference that was to be held in Lafayette January 23-24. The Louisiana Engineering Society with the support of the other engineering societies in Louisiana sponsors the Conference. All the members of the Branch Board worked diligently to procure interesting civil engineering topics and speakers for the Conference. Most of the Board members will also help out during the Conference.

The December Branch membership function was a Christmas Social held at Bella-Notte and jointly sponsored with the Lafayette Chapter of the Louisiana Engineering Society. The location and company was warm and inviting. Thanks to all those who turned out to make the evening a joyful occasion and a great success.

Harold Schoeffler was the guest speaker for the November Branch membership meeting held in the newly constructed City Club in Lafayette. He is an active member of the Sierra Club and a vocal proponent of the Teche Ridge alternate route alignment for interstate route I-49 around the City of Lafayette. The proposed Teche Ridge alternate route would begin just north of New Iberia, proceed toward St. Martinville and then turn northward toward Breaux Bridge along the Teche Ridge just west of Bayou Teche. The route would then proceed northwest crossing I-10 just west of Breaux Bridge to intersect with I-49 north of Carencro.

Schoeffler's presentation was very interesting as he identified many of the issues associated with the required upgrading of state route US 90 to Interstate Highway standards through well-populated cities. His presentation of the Teche Ridge alternate alignment generated many questions and comments from the Branch members in attendance. I felt that the comparison Schoeffler made between the Teche Ridge alternate route around Lafayette and the currently approved route through Lafayette was less than objective. A particular concern with the Teche Ridge alternate route is that it does not appear to address the growing traffic congestion problems throughout the City and Parish of Lafayette that the approved route alignment would seem to.

For the October Branch membership meeting, our guest speaker was Deanie Spikes with the Engineering Academy at Northside High School. She detailed most of the current curriculum and discussed how the Academy prepares high school students for college. Spikes, who is a treasured teacher in our community, made an interesting and informative presentation.

In conclusion, I wish you a happy new year.

SHREVEPORT

By Joe E. (Butch) Ford, PE, President

This year is very special for the Shreveport Branch as it celebrates the 50th anniversary of its founding in 1953. The Branch Board of Directors will be planning a special celebration later this fall to commemorate the founding of the Branch.

Kurt M. Nixon, EI, the Branch Treasurer, and I attended the ASCE National Convention in Washington, D.C., as representatives of the Branch. An important part of this convention was the celebration of the 150th Anniversary of the founding of the ASCE. It was a great experience for us considering that we were able to attend some informative technical sessions and network with interesting engineers from all over the United States. We were also able to enjoy the beautiful fall weather being experienced in Washington.

The December Branch membership meeting was a joint meeting with the Shreveport Chapter of the Louisiana Engineering Society. It was well attended and considered a great success. Bobby E. Price, PE, presented the topic, "Professional Ethics." It provided Branch members an opportunity to obtain a professional development unit required to maintain their engineering license in Louisiana.

The featured speakers for the program of the November membership meeting of the Branch were Tommy Clark with Aillet, Fenner, Jolly, & McClelland, and Kent Rogers with the Northwest Louisiana Council of Governments who serves on the I-49 North Task Committee.

They brought us up to date on the status of the planned design and construction of this portion of future interstate route I-49 in Louisiana. The total estimated construction cost for this remaining segment is $360 million. Preliminary design has begun on most of the 11 sections that are planned to be let to contract.

BATON ROUGE

By J. Keith Shackelford, PE, President

The Branch will be receiving applications for student scholarships at its next Board meeting on January 27. The scholarship that will be awarded on a competitive basis is to a student who is a junior or senior in civil or environmental engineering and is in good academic standing in the college of engineering of Southern University or Louisiana State University. The scholarship is awarded during the Engineers' Week banquet that will be held in Baton Rouge on February 19, 2003.

The Board has decided to end its promotional advertisements for ASCE and civil engineering through the local National Public Radio station, WRKF, in Baton Rouge and it is continuing to look closely at public service announcements promoting Branch and student chapter activities on local TV stations.

The preparations for the Annual Spring Conference are beginning to firm up with the execution of the agreement with the Sheraton Baton Rouge Convention Center Hotel. Speakers and topics of interest are still being sought.

At our November 25th Board meeting Christopher P. Knotts, PE, was selected to serve as the ASCE member on the City of Baton Rouge/Parish of East Baton Rouge Engineering Selection Board. With the implementation of the EPA-mandated Sanitary Sewer Overflow Elimination Plan getting under way, the Selection Board should be very busy for the next few years as the City/Parish selects consultants for the engineering of over $600 million dollars of sewer work

With the Christmas and New Year's holiday celebrations, the last month has been relatively slow from a Branch activity standpoint. December 6 was the annual Branch Christmas party. It was well attended with over 100 members and guests present.

NEW ORLEANS

By Daniel L. Bolinger, PE, President

The Branch continued to sponsor the monthly membership meetings and luncheons, and have guest speakers present topics of general interest to the membership in attendance. In addition, the Branch technical committees also sponsored several technical seminars.

In January 2003 William W. Gwyn, PE, will become the chair of the Geotechnical Committee and at this time I would like to thank Peter R. Cali PE, for the fine job he performed as the chair of this committee last year. The Branch looks forward to an active year due to the prestige and professionalism that Bill Gwyn brings to this committee.

The Branch co-hosted two evening dinner events with the New Orleans Chapter of the Louisiana Engineering Society. The first event was held November 20, 2002 at Smilies Restaurant in Harahan. The guest speaker at this event was Blaise M. Carriere, PE, with the Louisiana DOTD. Mr. Carriere gave a very thorough presentation on the history of the Department, the work that the Department does, its accomplishments, and its future goals. This event was well attended and the questions from those in attendance indicated there was significant interest in this presentation.

The second event was held December 13, 2002 at the World Trade Center's Plimsoll Club in New Orleans. The guest speaker at this event was André Trevigne, a radio personality with WWL Radio, a local New Orleans Radio station. This event is attended by the members of both societies and their spouses. It ushers in the year-end holidays and continues to be a very enjoyable evening and relaxing reward for the efforts of all the professional engineers and their spouses throughout the year.

The Branch will host a luncheon January 29, 2003, at Andrea's Restaurant located at 3100 19th Street, in Metairie. The guest speaker scheduled for this luncheon is Roy Williams, the Director of Aviation for Louis Armstrong International Airport. Mr. Williams' topic will be on the current growth and the future plans for the Airport. This should be a very interesting powerpoint presentation.

The structures committee hosted an evening seminar December 2, 2002 in the University of New Orleans Engineering Auditorium. This seminar was on *Light Cold-formed Members in Structural Design* presented by Melvin Loseke, PE, with Loseke Technologies and the Light Gage Structural Institute.

The structures committee plans another evening seminar on February 6, 2003 on the *World Trade Center Collapse Analysis* by Gene Corley, SE. This seminar will focus on the World Trade Center Building Performance Study—Data Collection, Preliminary Observations, and Recommendations.

The Younger Members Committee continues to host events that are of strong interest to the younger members segment of the Branch. On October 23, 2002 the younger members held an event at the Red Eye Bar & Grill. On January 22, 2003, the younger members will hold another event at the Buddha Belly at 4437 Magazine Street in New Orleans at 6:00 pm. All younger members are invited.

As President of the Branch I was honored with the opportunity on November 21, 2002 to participate as one of 4 judges for the Best Concrete Projects Awards Competition sponsored by the Louisiana Chapter of the American Concrete Institute. The awards for the entries will be given at the Annual Concrete Awards Banquet and Installation of Officers scheduled for January 17, 2003 at the Metairie Country Club.

The New Orleans Branch will send a Younger Member delegate, Christopher Sanchez, to the Zone II Workshop for Section and Branch Leaders. Chris currently serves on the Branch Board of Directors as its Secretary. This ASCE National Workshop will be held January 31 through February 2, 2003 in Jacksonville, Florida.

Information for future Branch meetings, seminars and the 2003 Conference will be available on the Branch website http://www.asceno.org/—or on the Branch seminar site—http://www.cpdseminars.com/.

Please remember that this society is your society and that if you wish to have seminars on specific topics please let your Board members know. In this way the Branch can make the effort necessary to procure and host seminars of interest to its members.

— Calendar of Events —

March 6-7, 2003	**ASCE seminar* on structural condition assessment of existing structures in New Orleans.**
March 6-7, 2003	**ASCE seminar* on structural renovation of buildings in Atlanta, Georgia.**
March 13-14, 2003	**ASCE seminar* on pumping systems in New Orleans**
March 17-18, 2003	**ASCE seminar* on wetlands and 404 permitting in Dallas, Texas.**
March 19-21, 2003	**Section Annual Spring Meeting and Conference in Baton Rouge hosted by the Baton Rouge Branch.**
March 27-29, 2003	**Deep South Conference of ASCE student chapters in New Orleans hosted by Tulane University.**
September 11-12, 2000	**13th Annual Louisiana Civil Engineering Conference and Show in New Orleans sponsored by the New Orleans Branch.**
September 12, 2003	**Section Annual Meeting in New Orleans hosted by the New Orleans Branch.**

*** For more information, call ASCE toll free at (800)548-2723 or visit the ASCE web page www.asce.org.**

Section wins newsletter award

President Charles L. Eustis, PE, was notified December 6, 2002 that the Section was awarded the 2002 National Outstanding Newsletter Award for Large Sections. The award was presented during the Zone II Leadership Conference on January 1 in Jacksonville, Florida, by ASCE President Thomas L. Jackson, PE. The Section received the 2001 Award making it the second time in a row to receive it. The Section is one of 18 in the large section category.

The judging components for this competition require a lot to come together: The subject *content* contributed by the Section's elected leadership and our feature article and other volunteer writers, the excellent typesetting and proofreading provided by the people at Franklin Press, our printer and publisher in Baton Rouge, and the organization and general content of the journal maintained and set by the editor.

Student Chapter News

Tulane University
By Kirsten Baldwin Metzger

***Envisioneering* the future**

The Chapter had a busy and productive first semester. With President Jenny Snape at the helm, the Chapter has organized field trips, participated in service projects, held stimulating membership meetings and socialized at parties. The Chapter also began its preparations to host the 2003 Deep South Regional Student Conference. If this sounds busy, you should take a look at what is on the Chapter's spring calendar!

By far, the largest project undertaken by the Chapter this year is hosting of the 2003 Deep South Regional Student Conference. The Conference is scheduled for March 27-29 and it will feature the traditional regional steel bridge competition, regional concrete canoe competition, an environmental design competition, the Daniel W. Mead Contest paper presentations for students, and a surveying competition. Along with the technical competitions that allow the members of each participating student chapter to showcase their civil engineering skills, students will also have the opportunity to take part in a variety of social and service activities that will allow them to explore the always vibrant New Orleans community. Our chapter is in the process of seeking Conference sponsors and recruiting judges for the aforementioned competitions. Anyone interested in helping our chapter can contact either of our conference chairs, Kirsten Baldwin Metzger kbaldwi@tulane.edu or Sarah Oral soral@tulane.edu.

This fall, the chapter participated in a project called *CANstruction.* In the spirit of community service and friendly competition, our team designed and built a model of the Golden Gate Bridge out of donated canned goods in the Riverwalk Mall. All teams' structures were judged at the conclusion of the competition, and after a week on display, the canned goods were donated to a local food bank. The team's effort won an honorable mention.

In addition to the aforementioned projects, the Chapter has been diligently working on the traditional ASCE favorites. Our steel bridge team has taken on the challenge of the revised national rules for the competition. The concrete canoe team is consulting with professors and professional engineers in the community to put together a great canoe for the competition.

The chapter made field trips to Hanson Pipe and Products, the new addition to the Tulane A. B. Freeman School of Business and the New Orleans Superdome. It may appear from the efforts mentioned that our chapter's members are overly busy people. However, never fear, we still found the time to take a break from all the plans and projects to hold our annual Halloween party and the end of the semester bash.

The Chapter particularly wishes to thank the local engineering community for its assistance with our projects. We look forward to a wonderful spring semester!

Louisiana Tech University
By Leslie Chauvin

Louisiana Tech University started 2003 with a busy schedule in mind. The annual Civil Engineering Winter Banquet was planned by the Chapter for January 30 in the Louisiana Tech Student Center in conjunction with the student chapters of the Associated General Contractors, Chi Epsilon, and the North American Society for Trenchless Technology.

Patricia D. Galloway, PE, the national ASCE President-elect, was the keynote speaker for the Winter Banquet. Her topic was about how important leadership is to civil engineering students and encouraging student chapter members to get involved in professional organizations and their community.

The 2 traditional faculty awards, Professor of the Year and Crying Towel Award, were given to civil engineering faculty members. The Crying Towel Award is traditionally given to the professor that causes the most heartache and pain to civil engineering students throughout the year. Several student awards will be given out, including the Outstanding Civil Engineering and Construction Engineering Technology students. The Shreveport Branch also awarded scholarships to 2 students.

The Chapter was represented by Kristen B. Fletcher, a civil engineering junior, and Christopher N. Walters, a freshman, during the Zone II Workshop for Student Chapter Leaders. It was held January 31 through February 2, 2003 in Jacksonville, Florida.

Jack Painter, Tech faculty member, made a presentation titled "Civil Engineering, the Greatest Profession" during the December monthly Chapter membership meeting. Mike Anderson, a Tech graduate and Texas DOT area engineer, spoke about highway engineering during the January 13 membership meeting. The agenda for the February 10 membership meeting will include the election of the 2003-2004 officer and a discussion presented by Cheryl B. Myers of the Career Center.

Chapter members are currently preparing to participate in the Deep South Conference scheduled in late March and to be hosted by the Tulane University Student Chapter. The Chapter plans to participate in the planned steel bridge, surveying, environmental, and Daniel Mead paper competitions.

The Annual Hackers' Classic Golf Tournament is scheduled for May 3 at the Louisiana Tech Golf Course. Tickets are $50/person with 4-member teams competing. The golf tournament is the University's biggest fundraiser. For more information about sponsoring or participating in the tournament please e-mail lesliechauvin@yahoo.com.

- Observation -

Macro-trends:

Globalization of engineering through the use of information technology has made the performance of clear-cut, routine engineering and plan preparation work independent of place. Once the site-specific issues and the resulting basic parameters of a facility such as box size, functions, local code and aesthetic requirements, and the floor plan are settled, what remains is the clear-cut engineering work. It can be farmed out real-time to engineers anywhere in the world, any time. Anywhere becomes somewhere where the comparable labor/automation costs are a minimum. It would appear that this global independence of place will cause clear-cut engineering work to migrate to low income/high technology sources shifting and then leveling this market.

The bulk of the clear-cut, routine engineering technology that engineering students spend semesters assimilating are in the very latter days of being automated into mind-numbing application software that sucks nearly all of the life, labor and thought out of the process. It only leaves the nagging concern that uneducated technicians and inexperienced engineers with a false sense of security may disastrously misuse the software through not understanding the boundary conditions of a problem or the limitations of the software. Application software use has all but eliminated routine manual computation from the clear-cut engineering, reduced computation time to a negligible fraction of what it was, and expanded the technological application of scientific principles leaving few application limitations.

The engineering profession evolved over the centuries from an empirical technology and art form practiced by a select few to a science-based technology practiced by the many. The manual computational requirements required many technologically competent engineers to pursue the work. Most engineers in the U.S. appear to be satisfied with the baccalaureate degree as the degree required for their entry into the profession while in the remaining professions it is a pre-professional school degree. Notwithstanding the limitations of engineering education, practice may be moving back toward a select few who are exceptional, socially viable people where experience, advanced education, imagination and leadership will be the professional currency in the site-specific engineering. The remaining clear-cut, routine engineering may no longer be considered engineering any more than surveying or drafting are today.

- Editor

Section News and Information

Highlights of the November Board of Directors meeting

Proposed revisions to the ASCE Constitution to revise its form of national governance to include representation of the institutes on the Board of Direction are on track for "debate" and implementation by 2005. The opposition of the previous Section Board to directors representing the technical institutes and to directors that do not represent unique and discrete segments of the ASCE membership—thereby compromising representative governance in the ASCE and partially disenfranchising regional interests—are no longer issues. There is still some concern about the non-ASCE members and the other than civil engineers in the institutes that may become directors.

The Section's website is being professionally redeveloped. Planned features of the redeveloped site were discussed in general. There are plans to publish the current and back issues of the Section journal in pdf files that can be copied. Also there will be a password protected area to publish the unapproved minutes of the Board of Directors meetings for the review of Board members prior to future meetings and other tentative information. This would be in lieu of the logistics of assembling and mailing these voluminous documents to each of the individual Board members prior to Board meetings.

Planning for the Section's 2003 Annual Spring Meeting and Conference to be hosted by the Baton Rouge Branch is moving forward. The conference site will be the Sheraton hotel in conjunction with the Argosy Casino facilities in downtown Baton Rouge. There will be an attempt to get substantial participation from the Louisiana DOTD in the development and presentation of technical sessions that would be consistent with the professional development needs of its civil engineer employees.

The *Top Ten* program initiated by the Section to commemorate the ASCE 150th anniversary is and has been on hold. However, there are intentions to continue the effort. This program was to identify and recognize 10 of the most outstanding civil engineering projects and 10 of the most outstanding civil engineers in Louisiana. The 10 outstanding civil engineers portion of the program was dropped early on. However, the candidates for outstanding civil engineering projects were accumulated and judged but never assembled and awarded.

The redevelopment and publication of the Section Operating Guide had been tentatively placed on hold. However, the work toward its completion has been reactivated.

The branch application forms—a component of the Section's State Public Affairs Grant application—were due to the Section's Secretary-Treasurer in 3 days. They will be submitted as the Section's application to the national ASCE for consideration.

The Baton Rouge Branch and the Section received a certificate of appreciation and a report of activities from the Dean of Engineering at Southern University, Chukwu Onu, for their support of the 2001 Summer Institute sponsored by Southern University on its Baton Rouge campus.

The Institute was intended to present the civil engineering profession to the participating students as a viable career opportunity.

It was noted that the Section was well represented in leadership and honors during the recently held ASCE national convention in Washington, DC. Thomas L. Jackson, PE, is the President of the ASCE, Kam K. Movassaghi, PE, received the ASCE Edmund Friedman Professional Recognition Award, and Pamela G. Miller, PE, received the Edmund Friedman Young Engineer Award for Professional Achievement.

Highlights of the January Board of Directors meeting

The redesign of the Section website is in the last stages of development and should be up and running shortly. There was an extensive discussion about providing advertiser names or business card ads on the new website at the advertisers' option with the additional option of click-on web links. It is anticipated that there will be an increase in advertising rates in the journal that have held constant for 11 years. The products and services and professional listings in the business card format will retain different advertising rates. Part of the increase will be justified by the website listing that will be offered as an option to the journal advertisers.

The Section Operating Guide is still not completed. However, it will be published on the Section website once it is completed. The responsibilities, time frames and deadlines for routine annual section level activities to be completed will be provided. This will hopefully generate calendars for Section officers, directors and committee chairs to know and complete their business in a timely manner.

The Annual Section Spring Meeting and Conference to be hosted by the Baton Rouge Branch was discussed extensively by Roy A. Waggenspack, PE, chairman of the Branch Spring Conference Committee. It was noted that the Section Annual Spring Meeting of the membership should be scheduled preferably on Thursday—the first full day of the Conference—prior to the Ethics session and possibly in conjunction with the planned luncheon. This would be to assure the maximum opportunity for Section members available to participate in the election of officers and directors for the 2003-04 administrative year.

A belief was stated that a proactive legislative program should be pursued in close cooperation with the Louisiana Engineering Society's legislative program. It was observed that if engineers do not take the initiative in the legislative and rule making needs of the engineering profession someone else will. There are a broad number of *housekeeping* measures proposed by the Professional Engineering and Land Surveying Board. However, after a review of these measures, it was felt that some of them go well beyond "housekeeping" and need to be reviewed carefully by the leadership in the profession. There are rumors that the organized architects in Louisiana will once again be sponsoring a bill or bills to legally limit the opportunities for civil engineers to participate as a principal in the design of buildings.

There will be several representatives from Louisiana attending this year's ASCE Zone II Management and Leadership Conference. Pamela G. Miller, PE, from the Section, C, Eric Hudson, PE, from the Shreveport Branch, Thomas T. Roberts, PE, and David M. Burkholder, PE from the Baton Rouge Branch are planning to attend.

The Nominating Committee presented an incomplete proposed slate of official nominees for the officers and directors of the Section. It had been unsuccessful to date in obtaining a candidate for the office of Secretary-Treasurer. The Board adopted the incomplete slate as follows:

- Barbara E. Featherston, PE, President-Elect
- Norma Jean Mattei, PE, Vice President
- TBA, Secretary-Treasurer
- Thomas A. Stephens, PE, Director-at-Large
- Gustave S. "Gus" Cantrell, PE, Director-at-Large
- Patrick J. Landry, PE, Director-at-Large
- Joe E. "Butch" Ford, PE, Director-at-Large, and
- J. Keith Shackelford, PE, Director-at-Large.

As President-Elect, Pamela G. Miller, PE, agreed to succeed to the office of President.

The members of the Section that advance to Life Member status this year and who choose to receive their Life Member certificates during the awards banquet at the Section Annual Spring Meeting and Conference will be interviewed by a group of younger members who will assemble their basic biographical information needed by the master of ceremonies who will present their certificates. They will also attempt to gather some of their special thoughts and philosophy about life and the profession that may be shared with their colleagues during the ceremonies. C. Eric Hudson, PE, Thomas T. Roberts, PE, Aurora N. Luscher, EI, and Pamela G. Miller, PE have volunteered to conduct the interviews and Michael N. Dooley, PE has agreed to act as the

(Continued on Page 15)

Registration Form
2003 Annual Spring Meeting and Conference
March 19 - 21, 2003
Sheraton Baton Rouge Convention Center Hotel

Registration Fees [1]	**Number**	**Cost**	**Sub-total**
Members Preregistered [2]	_____	@ $100.00 =	$ _____
Members Not Preregistered	_____	@ $125.00 =	$ _____
Non-Members	_____	@ $150.00 =	$ _____
Spouses	_____	Free	$ 0.00
Students	_____	@ $5.00 =	$ _____
Wednesday Evening - Welcome Ice Breaker			
Registered Conference Attendees	_____	Free	$ 0.00
Spouses and Non-Registered Guests	_____	@ $10.00 =	$ _____
Thursday and Friday Luncheons			
Members Registered	_____	Free	$ 0.00
Non-Members Registered	_____	Free	$ 0.00
Spouses and Non-Registered Guests	_____	@ $20.00 =	$ _____
Students	_____	@ $10.00 =	$ _____
Thursday Awards Banquet			
Members Registered	_____	Free	$ 0.00
Non-Members Registered	_____	Free	$ 0.00
Spouses and Non-Registered Guests	_____	@ $20.00 =	$ _____
Students	_____	@ $5.00 =	$ _____
Award and Life Member Recipients	_____	Free	$ 0.00
Award Recipient's Spouse	_____	Free	$ 0.00
		Total Fees Remitted =	$ _____

[1] Registration fees are required for anyone attending the Conference seminars on Thursday or Friday.
[2] Preregistration discounts apply only if registration form and payment are received by March 3, 2003.

Name: _____ ASCE Membership No.: _____

Spouse's Name (if attending) _____ Home Telephone No.: _____

Company/Employer: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Mail this Form to:

ASCE Baton Rouge Branch
Attn: Roy A. Waggenspack, PE
c/o Owen and White, Inc.
Post Office Box 66396
Baton Rouge, LA 70806

For questions concerning the Conference contact Roy Waggenspack:

(225) 926-5125 or
roy@owenandwhite.com

Make checks payable to: **ASCE Baton Rouge Branch**

Hotel accommodations: Sheraton Baton Rouge Convention Center Hotel, 103 France Street, Baton Rouge, LA 70802, telephone: (225) 242-2600, facsimile: (225) 242-2601. Room block in the name of ASCE will be held until February 17, 2003. Rooms (double or king) are $85.00 + tax.

Schedule of Events (Tentative) *
2003 Annual Spring Meeting and Conference
Baton Rouge, Louisiana

Wednesday, March 19,2003
6:00 pm - until — Welcome Ice Breaker (Social)
Thursday, March 20, 2003
7:30 am - 9:00 am — Registration in Garden Atrium
9:00 am - 11:30 am — Three Concurrent Technical Sessions
12:00 noon — Luncheon in Ascension Room
1:15 pm - 4:15 pm — Three Concurrent Technical Sessions
6:00 pm - 8:00 pm — Social and Awards Banquet
8:00 pm - until — Music Entertainment
Friday, March 21, 2003
9:00 am - 11:00 noon — Two Concurrent Technical Sessions
11:00 am - 12:00 noon — Section General Membership Meeting
12:00 noon - 1:00 pm — Luncheon and Door Prizes in Ascension Room
1:15 pm - 3:30 pm — Section Board of Directors Meeting

* Check Section website http://www.lasce.org for recent updates on technical session program.

<table>
<tr><th colspan="4">Thursday, March 20, 2003 Technical Sessions</th></tr>
<tr><td></td><td>East Baton Rouge Room</td><td>West Baton Rouge Room</td><td>Iberville Room</td></tr>
<tr><td>9:00 - 9:30</td><td rowspan="2">Underground Enclosures , Tier Loading and Static Ratings, Properties of Polymer Concrete
Jeff Zager, PE</td><td rowspan="2">Membrane Treatment of Industrial Water and Wastewater
John C. McArdle</td><td>Identifying Louisiana Highway Safety Problems with Crash Data Analysis Program
Xiaoduan Sun, PE and Dan Magri, PE</td></tr>
<tr><td>9:30 - 10:00</td><td>Statistical QA/QC Evaluation of Structural and Paving Concrete
John S. Eggers, PE</td></tr>
<tr><td>10:00 - 10:30</td><td colspan="3">Morning Break in Atrium Exhibit Area</td></tr>
<tr><td>10:30 - 11:00</td><td rowspan="2">Perpetual Pavements
Gary Fitts</td><td rowspan="2">Arsenic Removal
Mike Havener</td><td rowspan="2">Design of Rigolets Pass Bridge: Crossing a Navigable Waterway
Ray A. Mumphrey, PE</td></tr>
<tr><td>11:00 - 11:30</td></tr>
<tr><td>12:00 - 1:00</td><td colspan="3">Luncheon</td></tr>
<tr><td>1:15 - 2:15</td><td>Corrosion of Steel in Concrete
Tom Ferguson</td><td>Current Coastal Restoration Efforts in Louisiana
Christopher P. Knotts, PE</td><td>TBA</td></tr>
<tr><td>2:30 - 3:00</td><td rowspan="2">When Walls Fail to Obey - Repair of a Sliding MSE Wall
Kim E. Martindale, PE and Eddie Templeton, PE</td><td rowspan="2">Roundtable Discussion FEMA Letter of Map Amendment, Letter of Map Revision & Elevation Certificates
Gary Zimmer, PE, Joe Martineza, EI, Cindy O'Neal and Ted DeBaene, PE</td><td rowspan="2">TBA</td></tr>
<tr><td>3:00 - 3:30</td></tr>
<tr><td>3:30 - 3:45</td><td colspan="3">Afternoon Break in Atrium Exhibit Area</td></tr>
<tr><td>3:45 - 4:15</td><td>Mold: Not Just Another Four Letter Word
Chris White, EI</td><td>Stormwater No Adverse Impact
Ted DeBaene,PE</td><td>Status of DOTD's Innovative Contracting Process Using Life-Cycle Cost Analysis
Kirk M. Zeringue,EI</td></tr>
<tr><td>6:00 - UNTIL</td><td colspan="3">Ice Breaker and Awards Banquet / Music Entertainment</td></tr>
<tr><td colspan="4">Friday, March 21, 2003 Technical Sessions</td></tr>
<tr><td>8:30 - 9:00</td><td rowspan="2">Trench Safety and the PE's Involvement in OSHA Standards
Bruce Magee</td><td rowspan="2">Landfills: Permitting vs. Design
Todd A. Black, PE</td><td rowspan="4"></td></tr>
<tr><td>9:00 - 9:30</td></tr>
<tr><td>9:30 - 10:00</td><td colspan="2">Morning Break in Atrium Exhibit Area</td></tr>
<tr><td>10:00 - 10:30</td><td rowspan="2">Dewatering Made Simple: Container Filter Technology
Gary Skinner</td><td rowspan="2">Engineering Ethics: Values in Decision-Making
Norma Jean Mattei, PE</td></tr>
<tr><td>10:30 - 11:00</td><td></td></tr>
<tr><td>11:00 - 12:00</td><td colspan="3">Section General Membership Meeting</td></tr>
<tr><td>12:00 - 1:00</td><td colspan="3">Luncheon and Door Prizes</td></tr>
<tr><td>1:15 - 3:30</td><td colspan="3">Section Board of Directors Meeting</td></tr>
</table>

Election of Section officers

The principal item of business during the Annual Spring Meeting of the Section membership will be the election of officers and directors to serve on the 2003-2004 Board of Directors. The official slate of officers proposed by the Section's Nominating Committee and adopted by the Board of Directors is as follows:

- Barbara E. Featherston, PE, President-Elect
- Norma Jean Mattei, PE, Vice President
- Kim E. Martindale, PE, Secretary-Treasurer
- Gustave S. "Gus" Cantrell, PE, Director-at-Large (1 year)
- Patrick J. Landry, PE, Director-at-Large (1 year)
- Joe E. "Butch" Ford, PE, Director-at-Large (2 years), and
- J. Keith Shackelford, PE, Director-at-Large (2 years).

As the current President-Elect, Pamela G. Miller, PE, has agreed to succeed to the office of President of the Section. Gus Cantrell and Pat Landry will serve the remaining year of a 2-year term, and there are 2 appointed directors. Roy A. Waggenspack, PE, is appointed by the Baton Rouge Branch and Reda Bakeer, PE, is appointed by the New Orleans Branch.

This meeting will be held during the Section's Annual Spring Meeting and Conference that will be hosted by the Baton Rouge Branch in Baton Rouge. Registration and meeting information for this conference is provided herein. You do not have to be registered for this conference to attend the Section membership meeting.

Summer Institute

Civil Engineering Professor Chukwu Onu acknowledged the support of the Baton Rouge Branch and the Section provided to the 2002 ASCE Summer Institute during the November 2002 membership meeting of the Baton Rouge Branch. The acknowledgment was received from Branch President, J. Keith Shackelford, PE, and Section President, Charles L. Eustis, PE. The ASCE Summer Institute hosted by Southern University, and for which Professor Onu served as the Program Coordinator, is sponsored by the ASCE. The following was extracted from Professor Onu's final report to the ASCE:

There is a concern that today's youth may not be as interested in science and technology as those of a decade ago. This concern is reinforced by declining college graduation rates in science and technology and the failure of high school students to take the courses considered prerequisites to college study in science and technology. Entry into college science and technology curricula is made difficult by the failure to take the prerequisite high school course work.

Industry and government agency interests are acting through the ASCE in an attempt to solve what is perceived as an emerging urgent demand for engineers and technologists resulting from the need to replace retiring employees. The key to solving the problem is believed to be stimulation of increased participation among groups currently under-represented in engineering and technology. The 2002 Southern University ASCE Summer Institute was launched in conjunction with Southern's existing Summer Transportation Institute to address this issue.

The purpose of the Institute is to serve 9th and 10th grade students with varying levels of preparation who are interested in a career in civil engineering by improving their chances of success in future studies. More specifically, it is to provide an experience that motivates the students toward civil engineering as a career choice and encourages college preparatory work prerequisite to the pursuit of a civil engineering curriculum. People and resources from the Louisiana Department of Transportation and Development and the division office of the Federal Highway Administration in Baton Rouge provided substantial technical and educational support for the 21 participating students who mostly reside in a 5-parish area around Baton Rouge.

The program provided opportunities for the students to participate in engineering-related activities including research and computer skills, and to discover opportunities in civil engineering. The students visited

- NASA Space Center - Houston
- Baton Rouge Port Authority
- Baton Rouge Traffic Management
- Bluebonnet Nature Swamp
- ABMB Consulting Engineers and
- DOTD Materials and Testing Lab

The hands-on engineering projects to supplement materials introduced in a classroom setting were planned, including a solar car, balsa wood bridges, computer activities and bridge design and simulation. Activities were pursued to promote thinking and problem-solving skills associated with taking the American College Testing (ACT) examination. Planned recreational activities included bowling, volleyball, basketball, swimming and aerobics.

It was noted that there are over 20 summer programs at Southern University and many others in Louisiana that compete for the same high school students, and the competition is stiff for the top students. It is believed that the ASCE Summer Institute could not have been successful without the support of the FHWA, the Louisiana DOTD, the Southern University Department of Civil Engineering and the Summer Transportation Institute already in place. Keys to its future success are believed to be a program of at least 4 weeks duration, more participation in the program by the professional community and increased financial support from the ASCE and local industry.

- Career Benchmarks -

Albert J. "Al" Dunn, P.E.

Louisiana native and lifelong resident, and a civil engineer, **Albert J. "Al" Dunn,** PE, was inducted into the Louisiana Highways and Transportation Hall of Honor December 11, 2002 in the presence of his many friends and colleagues. Sponsored by the Louisiana Good Roads and Transportation Association, the Hall of Honor recognizes those people who have significantly contributed to the development of highways and transportation in Louisiana. Dunn, who is retired from the Louisiana Department of Transportation and Development, was recognized principally for his work with that agency in developing its highway bridge maintenance inspection processes and inventory systems. This enabled the Louisiana DOTD to objectively identify and address bridge maintenance and safety problems on a priority basis. Dunn earned his baccalaureate degree from Louisiana Tech University, worked most of his career with the Louisiana DOTD and served a term as a member of the Louisiana Professional Engineering and Land Surveying Board.

Section members, **Jeffrey M. Reder,** PE, **Aziz A. Sabri,** PE, **Amy K. Weaver,** PE, recently earned their civil and/or environmental engineering license in Louisiana. If you are in contact with any of these engineers, please offer them your congratulations on their accomplishment.

Louisiana resident, **Louis B. Porterie, Jr.,** PE, recently earned his civil and/or environmental engineering license in Louisiana and is not a member of the ASCE. A copy of this issue of the journal is sent to him as an informal introduction to the Section. If he wishes to join and/or find out more about the ASCE, he is hereby encouraged to visit the ASCE national website, http://www.asce.org. If you are in contact with Louis, please formally introduce him to the Section by inviting him to attend a branch meeting as your guest.

Is a separately managed account right for you?

By Blaise J. Ernst

You may have heard or read about separately managed accounts and wondered what they are and whether they may be appropriate for you. Here are answers to some of the questions you may have about professionally managed accounts:

Q: ***What is a separately managed account?***
A: A separately managed account is an account managed by a professional investment manager who, for one all-inclusive annual fee, creates a portfolio of stocks, bonds and cash designed to meet your personal investment objectives. Several consulting and investment services are provided for the all-inclusive annual fee. Rather than charge commissions on individual transactions, and charge separate fees for other services, a fee-based separately managed account lets you know up-front what your fee will be. This annual fee is based on the value of the assets in your portfolio.

Q: ***What services are provided for the fee?***
A: Separate account programs differ somewhat from firm to firm, but typically the all-inclusive annual fee includes:

- aid in identifying investment goals
- aid in creating and reviewing a personalized investment policy statement in writing that identifies your investment goals and objectives
- assistance in selecting a pre-screened professional investment manager whose investment style and philosophy match your goals
- professional management of your account as a separate portfolio to best address your specific goals
- execution of transactions without a surcharge for commissions
- review of your quarterly investment performance reports
- ongoing consulting services provided by your financial advisor.

If these services were purchased individually, the cost would likely exceed the all-inclusive, annual fee. However, for an actively traded equity account, the annual trading costs alone would generally add up to more than the annual fee.

Q: ***Can I hire an investment manager on my own?***
A: You can hire an investment manager on your own from the more than 30,000 registered investment managers to choose from in the US. Financial professionals at major brokerage firms narrow this large universe down to several hundred professional investment managers, then further screen a smaller group and make these managers available to you. A brokerage firm also monitors its pool of money managers on an ongoing basis and usually removes from the pool those who fail to meet criteria pre-set by the firm.

Q: ***How large does my account have to be?***
A: Professional investment managers typically handle very large institutional accounts of a minimum of $1 million that places them out of the reach of many individual investors. Through separate account management programs, you can benefit from the same knowledge and service as the largest pension funds for an initial minimum investment of about $100,000.

Q: ***What happens if my financial situation changes, or if I am no longer satisfied with my investment manager?***
A: Generally, if your financial situation changes or if the investment manager you select is no longer satisfactory, simply contact your financial advisor who will reevaluate your situation and help you choose an investment manager who is better suited to your needs, at no extra charge. You may also liquidate your account at any time, generally without charge.

Q: ***How can I find out more about professionally managed fee-based programs?***
A: Your financial advisor can advise you as to whether placing your assets in a separately managed fee-based account is appropriate for your individual situation. If you would like more information about establishing a professionally managed, fee-based account, please feel free to contact the author.

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(Continued from Page 11)

master of ceremonies during the presentation of the certificates.

Other items discussed were:

- Proposed revisions to the national governance of the ASCE with the intention to reduce the number of representatives and move away from the one man-one vote concept by allowing membership of the institutes to be represented on the Board of Direction.
- Specialty certification of civil engineers outside of the licensure process and by professional engineering societies such as the ASCE was considered a better solution than splintering the civil engineering profession by specialty registration.
- The Tulane ASCE Student Chapter requested funds to aid it in hosting the Deep South Conference of student chapters. The Section has a line item in its budget of $1400 to support this activity when the Conference is hosted in Louisiana.
- The Section's journal, *The Louisiana Civil Engineer,* won the 2002 National Outstanding Newsletter Award for Large Sections. It is the second time in a row for the Section to win this award.
- The Louisiana Tech ASCE Student Chapter will have its annual awards banquet January 30, 2003. Patricia Galloway, President-Elect of the ASCE, will be the guest speaker.
- The evolution and continuing development of the ASCE Policy Statement 465 - First Professional Degree and how the Section should respond to it was discussed at some length.
- The Top Ten civil engineering projects in Louisiana program that was schedule to conclude as part of the ASCE 150th anniversary celebration in the Section has been delayed but it is not dead. It is expected to be revived and hopefully completed this year.

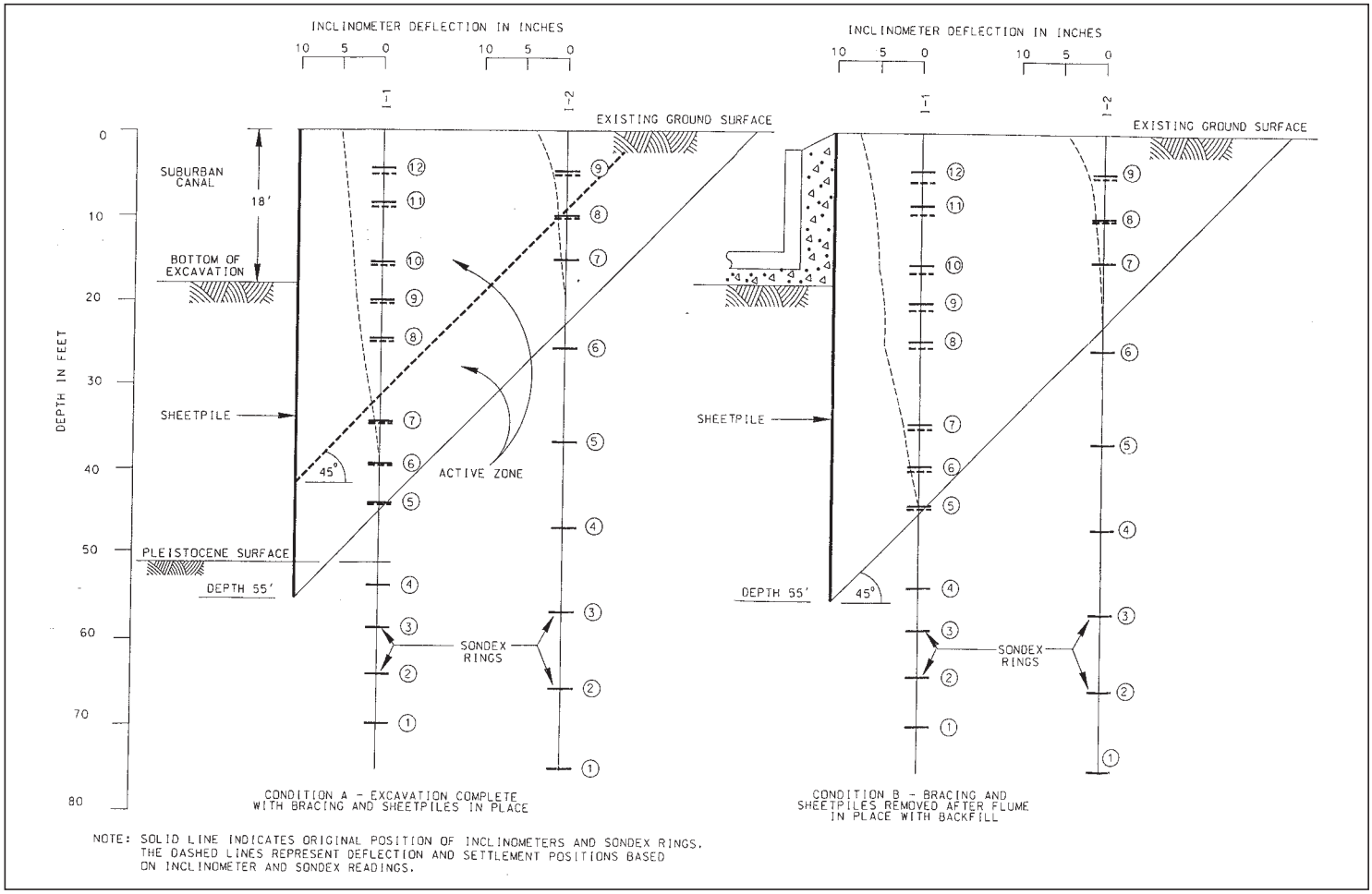

Figure 5. Lateral movement adjacent to the TRS at Suburban Canal is shown to be contained within the (classical theory) active zone bounded by a plane intersecting the plane of the sheet pile wall at a 45 degree angle and projecting up from the bottom of the wall.

(Continued from Page 7)

were installed at distances of 10', 30', and 104' from the sheet pile wall, respectively. Each inclinometer was installed to a depth of 75' below the ground surface. Sondex tubing was placed over Inclinometers I-1 and I-2 to their full depth.

Inclinometer readings began 27 July 2000 and the Sondex tubing readings began 24 May 2000 prior to the installation of the TRS wall. The readings of both ended on 16 February 2001 after the extraction of the sheet piles. Important dates of the construction schedule include the installation of the TRS wall adjacent to the instrumentation on 31 August 2000, excavation work between 9-11 October 2000, and the extraction of the sheet piles on 3 February 2001.

A summary of the lateral and vertical ground movements near the surface is shown in Table 1 and details of the cross section through half the

Figure 6. The connection of the struts at the wale prior to the wood shims being placed to support the steel sheet pile wall on the Napoleon Avenue project. The piles are acting in cantilever after the excavation in completed.

Figure 8. Timbers are placed on the Hollygrove project adjacent to the excavation to provide a working and access area. Note the steel sheet pile wall is braced by struts and wales.

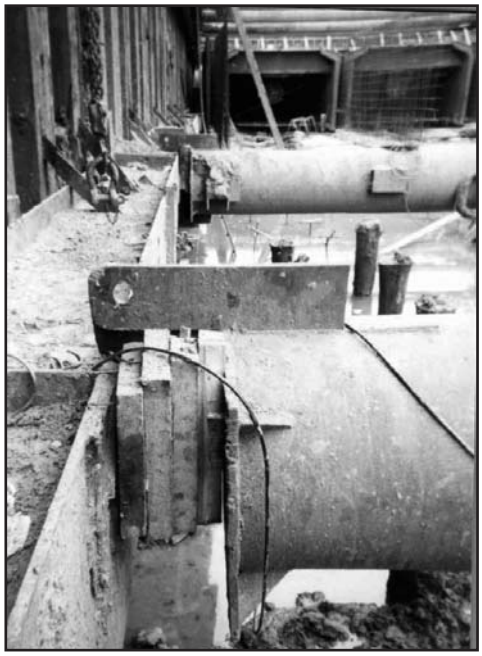

Figure 7. The connection of the struts at the wale made with the wood shims inserted to brace the steel sheet pile wall on the Napoleon Avenue project. Notice the cast in place box culvert forms in the background.

Figure 9. Because of the limited work area adjacent to the excavation on the Hollygrove project, crane mats are supported on the top edge of the steel sheet pile wall (upper right) and span over the excavation for the access for the heavy equipment to the working area.

excavation, the active zone and the location of the inclinometers and Sondex tubing are shown in Figure 5.

According to this data, Inclinometer I-1 (10' from the TRS wall) experienced 5.0" of lateral-movement during the excavation and construction processes and half of that after extraction of the sheet piles for a total of 7.5" of lateral movement. The settlement at I-1 during construction was 8.5" due to Loveland Street being the major thoroughfare for the construction equipment. This resulted in the consolidation of the shallow compressible strata in the zone of influence caused by overburden stresses induced by loads from fill material, crane mats and construction equipment. Comparing the readings taken at I-1 the day before the sheet piles were removed and the day after and subsequent readings, it was found that there was additional settlement of 3.5" for a total settlement of 14.5".

At Inclinometer I-2 (30' from the TRS wall), there was 3.5" of lateral movement during the excavation and construction processes and almost half of that after the extraction of the sheet piles for a total of 5.0" of lateral movement. Once again, the settlement during construction was 3.0" because of the heavy traffic. However, there was no settlement 30' from the TRS wall attributed to the extraction of the sheet piles. At Inclinometer I-3 (104' from the TRS wall), no significant horizontal movement was experienced throughout the entire construction process.

Napoleon Avenue

This test section is located in an urban area on the east bank of Orleans Parish at the intersection of Napoleon Avenue and South Galvez Street. The purpose of this test section is to quantify lateral and vertical movement of the ground adjacent to the project site. To accomplish this, 4 inclinometers were installed varying distances from the sheet pile wall to characterize and measure the lateral movement and 2 of them were equipped with Sondex tubing to measure the vertical movement (settlement). Monitoring of the instrumentation began prior to construction and ended after the extraction of the sheet piles.

(Continued on Page 18)

Figure 10. Temporary steel sheet piles are driven in close proximity to residences on the Hollygrove project. Note that crane mats are placed over the excavation for construction equipment access because of minimal working area available.

Figure 11. Extracting the steel sheet piles after completion of the concrete U-frame channel at Suburban Canal. Note the series of large extraction holes left behind in the operation.

Figure 12. This is a completed portion of the concrete U-frame at Suburban Canal with the temporary steel sheet piles being extracted while the wales and struts remain in place.

Figure 13. A soil veneer approximately 1" to 2" thick adheres to the surface of the extracted steel sheet piles on the Suburban Canal site. This leaves a remnant extraction hole substantially much larger than the area of the steel sheet pile cross section.

(Continued from Page 17)

Inclinometers and Sondex tubing were installed during the period of 7-16 November 2001. The inclinometers I-1, I-2, I-3, and I-4, were installed at distances of 11', 21', 32', and 85' from the sheet pile wall, respectively. All inclinometers were installed to a depth of 90' below the ground surface. Inclinometers I-1 and I-2 were equipped with Sondex tubing to their full depth.

Instrumentation readings took place from mid-November 2001 prior to the installation of the temporary sheet pile wall through 3 April 2002 after the extraction of the sheet piles. Important dates of the construction schedule include the installation of the TRS wall adjacent to the instrumentation on 20 December 2001, excavation work between 18 January 2002 and 2 February 2002, removal of lower struts on 12 February 2002, removal of upper struts on 22 March 2002, and the extraction of the sheet piles on 2 April 2002.

A summary of the lateral and vertical ground movements near the surface is shown in Table 2. This data indicates that a total 1.5" of lateral movement was recorded at Inclinometer I-1 (11' from the TRS wall); whereas, approximately 4.0" of lateral movement was recorded at Inclinometer I-2 (21' from the TRS wall). Typically, greater movements are observed closer to the excavation. The majority of the movement at I-2 was attributed to the excavation and-construction processes. The Sondex readings at I-1 measured approximately 3.0" of settlement after excavation and prior to the steel sheet pile extraction. After the extraction, there was an additional 2.5" of settlement for a total of 5.5".

At Inclinometer I-3 (32' from the TRS wall), a total of 1.2" of lateral movement was recorded and Inclinometer I-4 (85' from the TRS wall) experienced no significant lateral movement throughout the construction process.

The fact that Inclinometer I-2 measured more lateral movement than I-1 contradicts the assumption that the larger horizontal and vertical movements are found closer to the excavation. This may be explained as a possible error in the measurements. An error in reading the instruments could have occurred or the heavy construction equipment operating on top of the instruments could have been affected them. The actual reason for this unexpected data is not known at this time.

Hollygrove

This test section is located in an urban area on the east bank of Orleans Parish south of the intersection of Mistletoe Street and Colapissa Street. The purpose of this test section is to quantify lateral and vertical movement of the ground adjacent to the project site. To accomplish this, 4 inclinometers were installed varying distances from the TRS wall to characterize and measure the lateral movement and 2 of them were equipped with Sondex tubing to measure the vertical movement (settlement). Monitoring of the instrumentation began prior to construction and ended after the extraction of the sheet piles.

Inclinometers and Sondex tubing were installed at this project site during the period of 7-16 November 2001. The inclinometers, I-1, I-2, I-3, and I-4, were installed at distances of 5', 20', 80' and 40' from the sheet pile wall, respectively. The inclinometers were installed to a depth of 90' except Inclinometer I-4 that was installed to a depth of 100'. All of the inclinometers including I-4 were seated in thin sand strata. Inclinometers I-1 and I-3 were equipped with Sondex tubing to their full depth.

Instrumentation readings took place from mid-November 2001 prior to the installation of the temporary sheet piles through 22 April 2002 after the extraction of the sheet piles. Important dates of the construction schedule include the installation of the TRS wall adjacent to the instrumentation on 15 January 2002, excavation work between 9 January 2002 and 9 February 2002, removal of lower struts between 29 March and 20 April 2002, and the extraction of the steel sheet piles on 20 April 2002.

A summary of the lateral and vertical ground movements near the surface is shown in Table 3. According to this data, there was 4.6" of horizontal movement at Inclinometer I-1 (5' from the TRS wall) during excavation and the extraction of the sheet piles resulted in an additional 3" of lateral movement for a total of 7.6". Prior to the sheet pile extraction, I-1 settled 5.2", and after the extraction, there was an additional settlement of 0.7" for a total of 5.9".

At I-2 (20' from the TRS wall), lateral movements totaled 1.7" prior to the extraction of the sheet piles and after extraction an additional 1.5" of lateral movement occurred for a total of 3.2". Inclinometer I-4 (40' from the TRS wall) experienced 0.3" of lateral movement prior to and 0.6" of movement after—sheet pile extraction. No significant lateral deformation or settlement was recorded at Inclinometer I-3 (80' from the TRS wall) throughout the construction period.

Summary and conclusions

Soniat Canal

Soniat Canal was deepened and widened resulting in an increase in its cross-section at the test section. It was assumed that the groundwater table would be lowered as a result. However, this did not happen according to the test data.

The lower pre-construction piezometer readings that occurred resulted from the severe-drought conditions experienced through 2000 and are not associated with the construction of the concrete U-frame canal. During construction, the readings were not as low as the pre-construction data because of the end of the drought. A return to normal rainfall caused numerous localized flood events at the test site that recharged the adjacent soil formation. Recharging also was supplied by seepage of water from the flooded excavation through the interlocks of the temporary sheet piles. To date, the post-construction

Ground Movement	I-1 Lateral (inches)	I-1 Vertical (inches)	I-2 Lateral (inches)	I-2 Vertical (inches)	I-3 Lateral (inches)
Completion of excavation	3.0	2.5	2.0	0.5	0.0
Construction of U-frame	2.0	8.5	1.5	3.0	0.0
Extraction of sheet piles	2.5	3.5	1.5	N/A	0.0
TOTAL	7.5	14.5	5.0	3.5	0.0

Ground movement	I-1 Lateral (inches)	I-1 Vertical (inches)	I-2 Lateral (inches)	I-2 Vertical (inches)	I-3 Lateral (inches)	I-4 Lateral (inches)
Completion of excavation	1.0	3.0	1.7	3.0	N/A	0.0
Construction of box culvert	0.5	–	1.5	–	0.8	0.0
Extraction of sheet piles	N/A	2.5	0.8	0.5	0.4	0.0
TOTAL	1.5	5.5	4.0	3.5	1.2	0.0

Ground movement	I-1 Lateral (inches)	I-1 Vertical (inches)	I-2 Lateral (inches)	I-4 Lateral (inches)	I-3 Lateral (inches)	I-3 Vertical (inches)
Completion of excavation	4.6	5.2	1.2	N/A	0.0	0.0
Construction of box culvert	1.0	–	0.5	0.3	0.0	0.0
Extraction of sheet piles	3.0	0.7	1.5	0.6	0.0	0.0
TOTAL	8.6	5.9	3.2	0.9	0.0	0.0

Table 1. (Above left) Lateral and vertical ground movement measured near the surface at the Suburban Canal test section at 3 stages of construction.

Table 2. (Above right) Lateral and vertical ground movement measured near the surface at the Napoleon Avenue test section at 3 stages of construction.

Table 3. (Left) Lateral and vertical ground movement measured near the surface at the Hollygrove test section at 3 stages of construction.

piezometer readings are still higher than the pre-construction readings, which is attributable to the return of normal rainfall in the area.

To date, the data indicates that canal construction and operation has had little impact on the groundwater table; however, three other test reaches still have to be monitored. Based on the construction and post-construction data at this test section, which occurred during relatively normal hydrological cycles, it is anticipated that the other three test sections under similar conditions will produce similar results. However, the pre-construction piezometer data of the other reaches should initially be higher than the current Soniat Canal test section and will more than likely show the effect of groundwater drawdown due to construction.

Also, to date the long-term magnitude of groundwater drawdown from the canal widening is not known nor can it be predicted. Therefore, monitoring of all piezometers will continue through all phases of the construction and operation so that any effects on the groundwater table can be determined.

Braced excavation test sections

The data from the 3 test sections with the purpose to investigate the magnitude of near surface ground movements associated with construction of a braced excavation, indicates that the lateral and vertical ground movements associated with braced excavation construction can be divided into those movements resulting from the driving of sheet piles, the excavation of the soilmass, and extracting the sheet piles. These component movements are considered significant in areas close to the excavation. Figures 6 through 13 show and explain to some degree the effects the construction of braced excavations has on adjacent ground movement.

Despite the discrepancy in the data obtained in Inclinometer I-1 for Napoleon Avenue, overall, the data gathered is consistent with what was expected. A large percentage of the total lateral movement occurred after excavation. The large amount of settlement that occurred during the construction of Suburban Canal was likely due to consolidation of the shallow compressible strata caused by overburden stresses induced by loads from fill material, crane mats and cranes. The lateral and vertical ground movements after extraction of the sheet piles are due primarily to the void left in the ground as a result of soil adhesion to the steel sheet pile surfaces as shown in Figures 11, 12 and 13. However, the magnitudes of these movements were greater at Suburban Canal than they were at Napoleon Avenue and Hollygrove.

For these three test sections, as expected, the lateral and vertical ground movements were confined to the active soil wedge behind the sheet pile wall. These movements appear to agree with classical earth pressure theories as shown in Figure 5. Because of this, adjacent areas in close proximity to the TRS are affected more significantly than areas further from the TRS. This means that movements within the zone of influence extend a distance from the excavation defined by the horizontal projection of the vertical depth of the sheet pile or a 45º angle from the sheet pile tip.

Mitigation techniques

There are potential alternative methods of minimizing near surface movements experienced with braced excavation construction. Even if alternative mitigation techniques are implemented, there will still be horizontal and vertical ground movements expected but of a smaller magnitude. The ways to control groundwater drawdown include recharge, seepage cut-off, and reduction of construction period or reducing dewatering time.

Groundwater drawdown

Well recharging is practical where limited construction dewatering space is available, such as the urban area where the test sections are located. The purpose of a recharge well system would be to inject water into the adjacent ground at the same rate that water is pumped out of the excavation. The effect would be to create an increase in head and stop further development of the cone of depression. This ultimately results in a constant piezometric head and little or no groundwater drawdown. This is considered an expensive process and the benefits of well recharging need to be weighed carefully against the costs.

There are alternative methods to cut-off or minimize the seepage of groundwater into the excavation. Other than steel sheet piles, slurry walls and cement or chemical grout curtains are feasible methods of cut-off used in southeast Louisiana. A slurry wall is backfilled with an impervious soil such as a bentonite mud slurry. It provides a support stiffness greater than that of steel sheet piles. Slurry walls, like sheet piles walls, are not impermeable. Therefore, they may also be used as a temporary structure in conjunction with the construction a permanent structure. Grout curtains are very expensive and difficult to implement in all types of soil, but they are useful in preventing seepage, and strengthening the soil adjacent to the excavation. Though expensive, the necessity of having an ongoing pumping system for the duration of construction may be minimized due to the reduced permeability.

Reducing the time period that a section is dewatered and reducing the area that is affected by the construction dewatering can control groundwater drawdown.

Ground movement

Ground movement adjacent to the excavation and construction activities is almost impossible to avoid entirely. However, there are some methods to minimize the movement. The use of a hydraulic hammer instead of a vibratory hammer to install the sheet piles can minimize the effects of dynamic compaction on the dessicated clays near the surface. The installation of the top row of struts prior to excavating would eliminate the initial cantilever condition of the sheet pile wall allowed in these projects as explained in Figures 6 and 7. This would eliminate the poten-

(Continued on Page 20)

PROFESSIONAL LISTINGS

(Continued from Page 19)

tial movement of the adjacent soil. The excavation could utilize more struts at closer vertical spacings to increase the overall support stiffness of the sheet pile wall. The struts can be preloaded against the wales to ensure a full engagement of the sheet piles against the adjacent soil formation. The excavation depth below the lowest bracing level could be limited to minimize movement of the steel sheet piles. The canal can be flooded prior to extracting the sheet piles to saturate the granular backfill so that when the sheet piles are extracted, the vibrations will liquefy the backfill so that it flows into the void left behind by the sheet piles. The movement of the liquefied backfill results in its settlement as opposed to the collapse of an unsaturated granular backfill, which also moves laterally. The sheet pile wall could be left in the ground. This is expensive and should be implemented only when extensive structural damage is expected from extracting the sheet piles.

Zone of influence

The zone of influence established through the described test methods and results provides the boundaries where possible damages can occur from the installation and removal of sheet piles. Residents within the limits of the zone of influence are limited in number and can be easily identified and compensated based on expected damages from the adjacent construction limiting the legal liability of the Corps.

Acknowledgments

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