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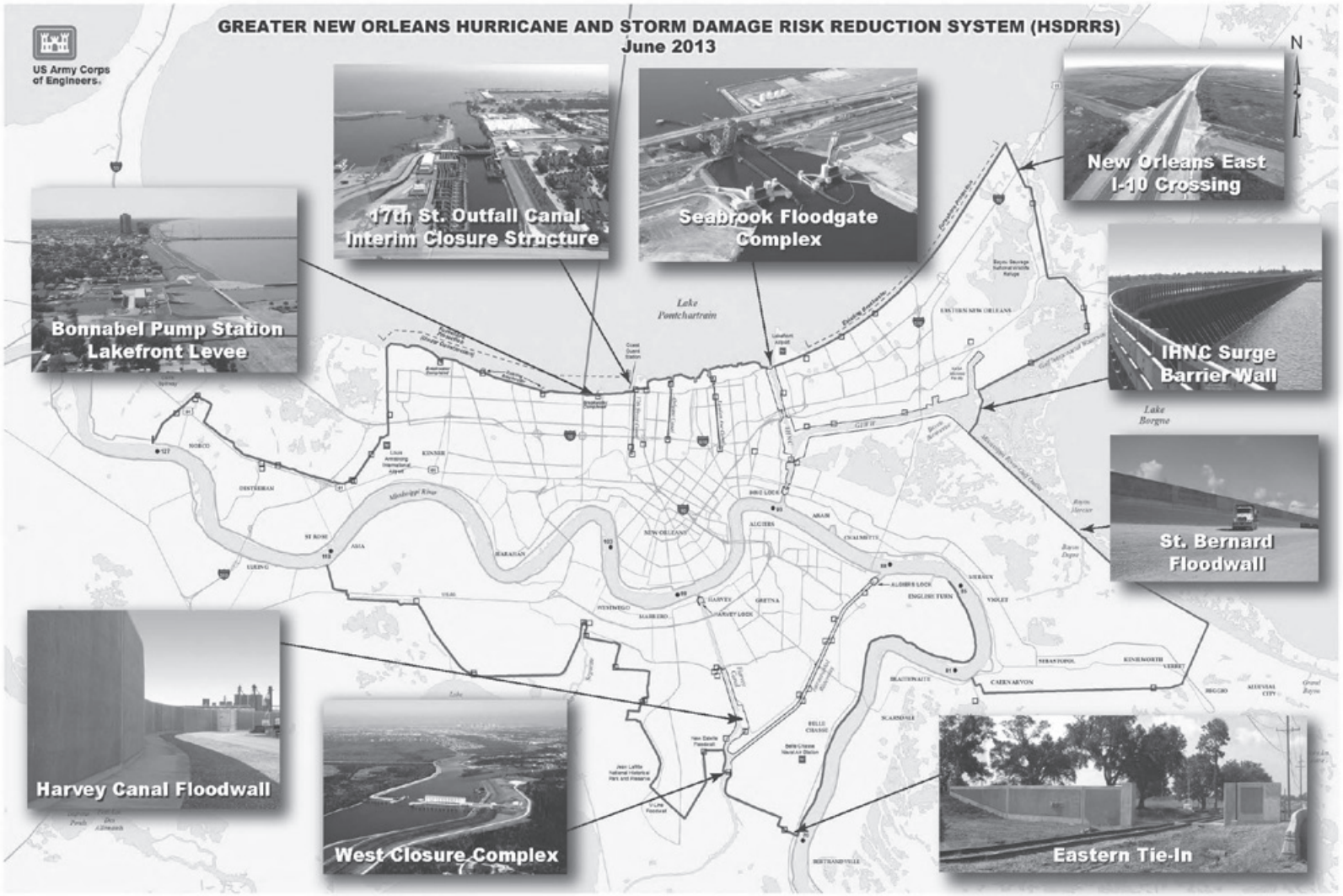

Geotechnical Engineering Systems:

The New Orleans Hurricane Protection System

FEATURE:

Geotechnical Engineering Systems

NEWS:

The 2017 Report Card for Louisiana Infrastructure: Ugly from Any Angle

Annual Louisiana Section Spring Conference a Success!

MAY 2017
VOLUME 25 • NO 3

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TABLE OF CONTENTS

MAY 2017 • Vol. 25 • No. 3

Section Roster 4

President's Message 5

Geotechnical Engineering Systems 6

Region News 13

Section News 14

The 2017 Report Card for Louisiana Infrastructure: Ugly from Any Angle 15

ASCE – COPRI Louisiana Chapter News 17

ASCE – Government Relations Committee News 18

ASCE – T&DI Louisiana Chapter News 19

Branch News 20

ASCE – SEI New Orleans Chapter News 24

Student Chapter News 25

Calendar of Events 28

Professional Listings 28

Service & Suppliers 2,32

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President's Message

By Matthew D. Redmon, PE

Matthew D. Redmon, PE

The flowers are blooming, and I have already mowed my grass five times since February. Spring has arrived in Louisiana! Spring also marks the midpoint of our ASCE calendar year. The Society and the Section have been busy over the last few months, and the rest of the year will be just as busy.

Every spring, ASCE holds its Legislative Fly-In Program in Washington, DC. This year, the Society released its *2017 Infrastructure Report Card* in conjunction with the Fly-In. Unfortunately, the average grade of the nation's infrastructure was a D+, but there is optimism that it can be improved. The members from the Louisiana Section were able to use the *Report Card* to discuss with our elected officials the issues facing our infrastructure and provide solutions for fixing the problem. The keys to restoring our infrastructure include investment, leadership and forethought. We as engineers can inform and guide our lawmakers, as well as the public, about the problems we encounter every day and engineered responses to prepare for the future. More information about the report card can be found at http://www.infrastructurereportcard.org/

The *2017 Louisiana Report Card for Infrastructure* was released in April in conjunction with the State Legislature regular session. Louisiana was one of the first states to release its report card after the Society released the *2017 Infrastructure Report Card*. The Section has developed a brochure that provides the grade summary for the different categories, steps we can take, and how to get involved. This brochure presents easy-to-read information that can be used for public outreach and handouts to lawmakers. In addition, an electronic report provides in-depth details for each category and how grading criteria changed since the *2012 Report Card for Louisiana's Infrastructure*. We will be making presentations to all of the Branches to inform all of our members on the updates to Louisiana's infrastructure and give our members the opportunity to ask questions regarding the grades given. Special thanks go out to the Committee Chairs and Executive Committee who helped assess and organize their respective categories presented in the *Report Card*.

The Acadiana Branch hosted this year's Annual Louisiana Section Spring Conference on April 27-28, 2017 at Parc Lafayette in Lafayette, LA. The technical sessions covered a variety of topics and were well received. We even had a visit from our Society President, Louisiana's own, Ms. Norma Jean Mattei. We had the opportunity to present scholarships to the outstanding students from our local universities as well as honor thirty life members. It is great seeing individuals who have made a lifetime commitment to ASCE and engineering alongside the future of the profession. Special thanks go out to the conference organizers for hosting a great event.

Planning is underway for the ASCE 2017 Convention in New Orleans, LA. ASCE members from around the globe will descend upon the Crescent City October 8-11, 2017. The Society may need assistance from our local branches. If you are interested in helping with the convention, please contact me, and we will try to find a role for you. Registration opens May 31, 2017, and I encourage you to attend. It is quite an experience to interact with engineers from around the globe.

The Louisiana Section continues to be active in its endeavors to serve both its members and the public. The Louisiana Section is always striving to develop new ways to serve our members. If you have comments or suggestions on how the Section Board can better serve you, please feel free to contact any board member.

Geotechnical Engineering Systems

By Reda M. Bakeer, PhD, PE, D.GE, F.ASCE

Reda M. Bakeer, PhD, PE, D.GE, F.ASCE

ABSTRACT

This paper discusses the general principles of engineering systems and their application in geotechnical designs. An engineering system consists of individual components designed to integrally perform together to deliver a desired function or service. Failure of a system develops at its weakest component. Failure of a specific component within a contiguous system is considered a design failure, whereas inability of the system to fulfil its full design function is considered a functional failure regardless of the number of failed components. The main principles of engineering systems are briefly discussed herein using the 2005 New Orleans Flood and Hurricane Protection System (FPS/HPS) and its performance during Hurricane Katrina as an example of a contiguous geotechnical engineering system. Other geotechnical applications that should be viewed as engineering systems include coastal protection and wetland restoration projects, fresh water diversions, ports and harbors, pipeline and highway networks, etc.

INTRODUCTION

An engineering "system" consists of individual components designed to operate in series or in parallel to provide a specific design function (Smith et al., 1983 and Ossenbruggen, 1984). For example, an air conditioning (A/C) "system" consists of individual components (thermostat, compressor, blower, etc.) designed to regulate indoor room temperature ("function"). Failure of one component regardless of its size, such as a fuse, results in full functional failure (inability of the system to control temperature). The inexpensive fuse is designed to be the "weakest link" in a "closed-loop" electric circuit which would fail first to protect the more expensive components, such as the compressor which could also be thought of as a "subsystem" consisting of individual components. Resiliency of a system, or its components, can be verified when exposed to the maximum design or extreme operating conditions, such as high voltage in the case of a fuse. In manufacturing, factory testing is performed during the development and production phases on the A/C system and its individual components (compressor, fuses, etc.). An engineering system may include "redundancies", such as a power generator or a backup pump, to assure performance if a primary component fails. A well-designed and maintained system results in reliable performance and longer service life.

HPS/FPS ANALOGY

The principles of engineering systems apply to the design, maintenance and performance of a contiguous geotechnical engineering system such as a flood or hurricane protection system (FPS/HPS) which consists of individual components (levees, floodwalls, etc.) designed to function as a "closed-loop" to protect a geographical region (polder) against flooding ("function"). A levee reach ("component") having a sufficiently wide base and side slopes, is designed to remain stable under all possible modes of failure (S-Case, Q-Case, global stability, seepage, etc.) and operating water levels (SWL, LWL, etc.) as well as during a storm (FWL). FWL is analogues to the maximum design voltage in the case of an electric circuit. Design FWL for a given reach is selected based on a system approach that models the entire geographical region, ground features, storm characteristics, etc. A secondary interior levee in the FPS/HPS provides "redundancy" in case that a breach develops in the frontal protection system. The term "breach" implies complete failure of a given segment of a flood protection structure causing flooding of the protected side.

Like the A/C fuse, failure under extreme storm conditions, which may exceed the design FWL, develops in the FPS/HPS at its most vulnerable component ("weakest link") such as within a given floodwall reach. In turn, the floodwall ("subsystem") will fail at its most deficient location ("weakest link") say within a low wall top area. Once a component, or a weak segment within the component, is breached the remaining standing segments may not necessarily experience failure, even if they were somewhat deficient, since water entering the protected side through the breach will gradually reach water level on the flood side (hydrostatic pressure equates). Therefore, not experiencing failure along an entire reach does not necessarily verify that it is capable of withstanding future extreme conditions after replacing the failed segment with a more robust structure. This is like replacing a blown 10-amp fuse with a 20-amp fuse as failure will develop during a future power surge at the next weakest element in the circuit and not the 20-amp fuse.

Due to budgetary constraints, the New Orleans FPS/HPS was constructed during the period between the 1960's and 2005. Therefore, each "system" component was subject to different design rationale, parameters and requirements. Some breaches were attributed to inadequate maintenance such as the inoperable floodgate during Hurricane Katrina at the CSX railroad crossing near the IHNC. Resiliency and weak links in the FPS/HPS were challenged by the storm surge like a fuse which was not factory tested or previously exposed to a power surge above its design limit. Regardless of the number of breaches, the contiguous FPS/HPS did not fulfil its design "function" of providing flood protection ("functional failure"). The system approach in design and analysis was recognized and implemented by the U.S. Army Corps of Engineers (USACE) in the Hurricane Storm Damage Risk Reduction System Design Guidelines (HSDRRS-DG, 2006 with the latest revision in 2012) and by the Coastal Protection and Restoration Authority (CPRA) in their Louisiana Flood Protection Design Guidelines (LFPDG, 2015).

Figure 1: The New Orleans Hurricane Protection System (IPET, 2007)

PERFORMANCE OF THE HPS/FPS AND ITS COMPONENTS

The 350-mile long New Orleans HPS consisted mostly of earthen levees and some floodwall segments (I-walls, T-walls and L-walls), floodgates, etc. A floodwall-levee enlargement is used when additional right-of-way (ROW) is not available or cost prohibitive, or if the foundation soils do not permit for enlarging the levee prism. Use of floodwalls and floodgates was necessitated by the urban character of New Orleans, available ROW and budgetary constraints. More I-walls were constructed than T-walls based on their cost-to-benefit-ratio. The HPS/FPS system experienced over 50 breaches during Hurricane Katrina, as shown in Figure 1. More than 170 miles of flood protection structures, or about 49 percent of the FPS/HPS, were overtopped, destroyed or damaged, resulting in major flooding of many areas (ILIT, 2006).

A USACE (2009) Damage Survey Report (DSR) states that: *"The New Orleans East hurricane protection system was designed as part of the Lake Pontchartrain, LA. and Vicinity Project. The New Orleans East portion of the project protects 45,000 acres of urban, industrial, commercial and industrial lands. The levee is constructed with a 10-foot crown width and side slopes of 1 on 3. The height of the levee varies but is in the range of 13 – 19 feet. There are also floodwall segments along the line of protection that consist of sheet pile walls or concrete I-walls constructed on top of sheet-piles. The line of protection was designed to provide protection from the Standard Project Hurricane (approximately fast moving Category 3 Storm).*

The New Orleans East Protection Levee of New Orleans, LA was damaged by Hurricane Katrina in late August 2005. The protected area is located just east of the Inner Harbor Ship Channel. The flood event produced loads at the levee along the Gulf Intracoastal Waterway at approximately EL. 19.0. The height of the existing levees varied but the levee crowns were generally at approximately EL. 17.0. Several breaches, scour and severe erosion occurred along the stretch of levee as the result of overtopping.

Hurricane Protection Features

206,000 ft. of levees and floodwalls
8 Pump Stations
2 Highway Closure Structures
1 Railroad Closure Structure

Damage

Total length of levee w/o cross section	*2,900 ft.*
Total length of levee w/reduced cross section	*3,800 ft.*
Total length of damage floodwall	*24,600 ft.*
Total damage	*31,300 ft*.

As per the DSR, 31,300 linear ft. of levees and floodwalls were damaged in New Orleans East. This implies that about 15.2 percent of the 206,000-linear ft. "system" was damaged with 24,600 linear ft., or 78.6 percent of the total damage, developing in I-walls. Damage to earthen levees (3.3 percent of the total system) was limited to partial or full loss of the levee prism by scour of the more granular soils rather than due to global instability. These statistics yield the conclusion that I-walls experienced more failures. The findings and conclusions of the national investigating teams (ILIT, 2006 and IPET, 2007) indicated that overtopping, erosion and flooding were more dramatic than anticipated during Hurricane Katrina due to the following deficiencies:

1. Inconsistent design elevations where different geodetic reference datum systems were used to design the contiguous "closed-loop" flood protection "system" without applying the appropriate adjustments.

2. Lower or non-uniform design or constructed top elevations within the reaches.

3. Inadequate joints, transitions, or connections, between structures (e.g.; say from an I-wall to an earthen levee).

4. Encroachments on or near flood protection structures (fences, trees, etc.).

5. Use of erodible materials for levee construction and/or lack of armoring, such as along the MRGO.

Deficiencies 1, 2 and 3 enforce the fact that a FPS/HPS should be designed as a contiguous engineering system. Deficiencies 1 through 5 show that failures will develop at the weakest components (links) in the system. Deficiency 4 illustrates that failures could develop because of inadequate inspection and maintenance.

I-WALLS WERE THE WEAKEST LINK IN THE SYSTEM

I-walls, also referred to as cantilever walls, are interconnected steel sheet piles (Z-shaped sections) embedded into an earthen levee and the underlying soils, as shown in Figure 2. The exposed I-wall height (stickup) above the levee crown provides the needed additional flood protection in lieu of raising the levee. In New Orleans, a concrete cap is cast in individual monoliths over the exposed segment to protect the steel sheet piles against corrosion, damage, etc. and to seal any gaps between their interlocks. The cap

adds some rigidity in the longitudinal direction along the floodwall centerline, but it is primarily intended for aesthetics. The stickup in this case is measured from the levee crown to the concrete cap top. Stability of an I-wall depends on the sheet pile section and its tip penetration which are selected based on the "active" and "passive" lateral pressures acting on its opposite faces. Stability is achieved when sufficient "net" passive resistance is mobilized along the I-wall embedment to yield adequate safety factors against overturning under all design loading conditions including the extreme case of FWL. Analytical, experimental and forensic studies of the I-wall breaches throughout the HPS/FPS (ILIT, 2006 and IPET, 2007) indicated that they shared some common failure mechanisms along with site-specific contributing factors. The common failure mechanisms are:

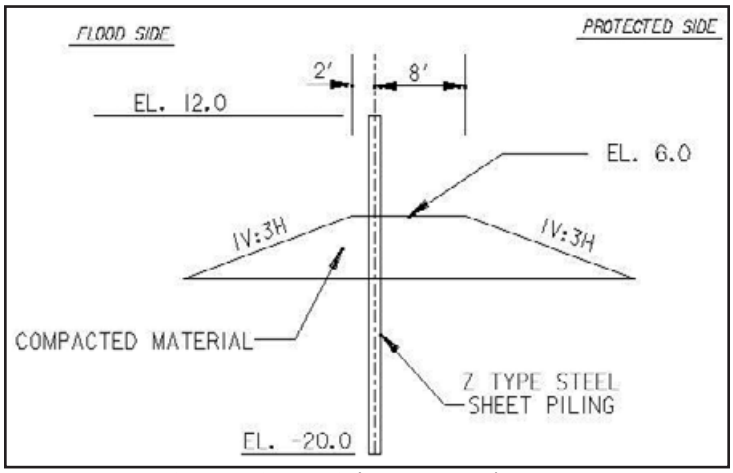

Figure 2: Typical I-wall Floodwall (USACE, 2000)

- I-walls tilted back differentially into the land side (visible lean, partial breach or full breach). Significant tilting and breaches resulted from marginal and inadequate sheet pile section and tip penetration.

- I-wall breaches spread into the land side in a "bow-shaped" pattern under the uniform hydrostatic pressure.

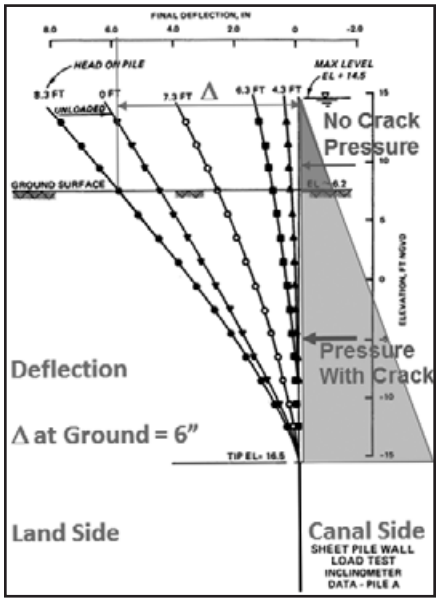

Figure 3: Lateral Deflection of the E-99 Test Sheet Pile A (USACE, 1986)

- Deflection of I-walls caused a tension crack to develop along the flood side causing water pressure to increase (driving force) on the I-wall and reducing seepage path.

- A scour "trench" developed along the land side due to overtopping which expanded deeper with time and farther landward when the I-wall continued to tilt. The scour trench along the land side reduced soil resistance and seepage path.

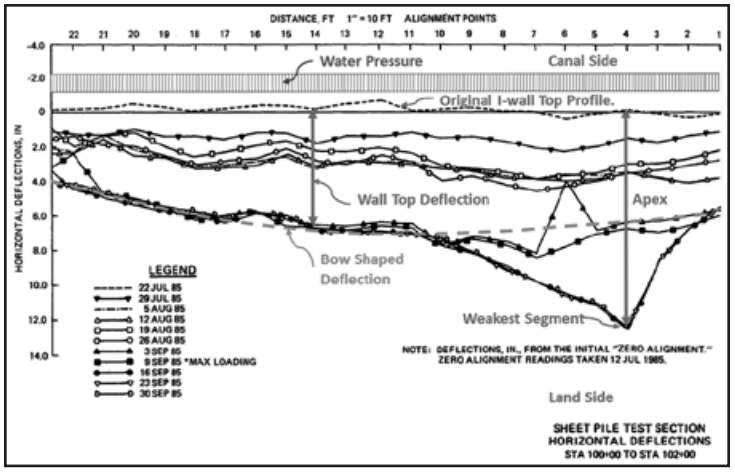

Figure 4: Planar Deflection of the E-99 Test Sheet Pile I-wall Top (USACE, 1986)

The USACE (1985) performed a study (E-99) to simulate flood load on a test section of a typical I-wall constructed within a drainage canal. As expected, maximum deflection occurred at the cantilever wall top and it decreased with depth. Figure 3 shows that sheet pile "A" deflected laterally into the protected side and deflection increased with water level (head). Lateral movement of 6 inches was measured at the levee crown under a water head of 8.3 ft. with a residual value of about 5 inches after pressure release. The large deflection created a triangular gap (tension crack) along the flood side face which extended down to near the sheet pile tips. Figure 4 shows the planar movement profile which indicates that the test section deflected in a "bow-shaped" pattern under hydrostatic pressure. The test section having a uniform cross section and tip penetration experienced maximum deflection (apex) at the location offering the least resistance (Point 4), or at the "weakest link", and not near mid-span (Points 11 or 12) as theoretically anticipated.

IMPACT OF SURROUNDING GRADES

For several reasons, tops of some floodwall segments or reaches were designed and/or constructed lower than the authorized level (ILIT, 2006). Different reference datums were used in the design of the flood protection structures without applying the appropriate adjustments. Geodetic references used included Mean Sea Level (MSL), Cairo Datum (C.D.), National Geodetic Vertical Datum (NGVD29) and North American Vertical Datum (NAVD88). The MSL reference datum assumes global sea water level at Elev. 0.0 ft. MSL and it corresponds to Elev. +23.4 ft. C.D. Adjustments were incorporated in the NGVD29 reference datum in 1985 to consider Local Mean Sea Level (LMSL) within a given geographical region. The NAVD88 reference datum accounts for global and regional subsidence. It was developed in 1988 and adjusted in 2004 (NAVD88 2004.65). IPET (2007) concluded that the model domain for the FPS/HPS was the 1985 epoch of NGVD29. The conversion of NGVD29 1985 to NAVD88 2004.65 varies across the region. For the Lake Pontchartrain and Vicinity and West Bank and Vicinity project areas, the average conversion factor is about -0.5 ft. (NAVD88 2004.65 = NGVD29 1985 - 0.5 ft.). Meanwhile, the NGVD29 elevations are generally lower than MSL values by about 2 ft. (NGVD29 1985 = MSL - 2 ft.). Some elevation changes resulted from subsidence of permanent benchmarks which should also be maintained as a contiguous system.

Top elevations of the FPS/HPS structures and their surroundings changed with time due to local, regional and global settlements; land development; etc. Local settlement develops along a levee reach due to consolidation of the underlying soils under the levee self-weight. Regional settlement is due to lowering of groundwater by pumping which is a common practice in New Orleans since ground surface is typically below sea level. Other factors causing local and regional areal settlements include organic decay, drought, dewatering, fill placement, etc. Per the U.S. Geological Survey (Burkett et al., 2001) subsidence rate in the Gulf Coast region is on the order of 1 to 5 mm per year (0.04 to 0.2 inch/year). Some global settlement is attributed to oil and gas production and rise in sea water level. Overtopping and land side scour developed earlier in lower areas of a reach. Lower grades on the land side or higher grades on the flood side could compromise a floodwall stability depending on the differences from the design values. The foregoing factors were not accounted for in the design and maintenance of the FPS/HPS.

VARIABILITY IN SUBSOIL CONDITIONS

As per the premise of an engineering system, a breach will develop within a reach where the subsoils are much weaker than outside its limits. Otherwise failure should develop along most of an I-wall reach of the same design if subsoil strength and stratification were essentially uniform. During the design phase, soil exploration includes performing sufficient number of borings and laboratory testing to delineate the properties and stratification of the subsoils. Borings are made at some uniform spacing along the relatively long reaches. Some gain will develop with time in soil strength along with settlement due to desiccation of the near surface soils and consolidation of the underlying soils under self-weight of an existing levee. Strength gain does not extend beyond the levee toes where weaker soils would typically exist. Soil conditions on the land side could also differ from the flood side. Therefore, field exploration includes soil borings along the centerline, land side toe and flood side toe of the levee. Soil stratification as well as strength and wet density profiles along the centerline and toes of the levee are then developed using results of the field and laboratory tests.

Appropriate correction factors should be applied to the results of field and laboratory testing to assure their compatibility (SPT, CPT, UCT, VST, DSS, etc.). The selected undrained shear strength profile of mostly cohesive soils should correlate well with the past stress history at the site. The strength profile of Normally Consolidated Clays (NCC) would typically plot near the 0.23 to 0.28s'v line, where s'v is the effective vertical overburden stress or pressure (p') at that location and depth (c/p' = 0.23 to 0.28). This condition exists in undeveloped sites such as along the levee toes and typically on the flood side. The USACE practice has been to assign higher weight to UU tests over UCT tests and to select the undrained shear strength profile such that no more than one-third of the test points plot below the selected strength line. Results of soil tests should be examined, verified and cross-referenced to assess their quality, validity and consistency and to filter out "true outliers." Objective, and occasionally subjective, judgment is used to identify outliers from unreasonably low or high, but true, test values. Ignoring true low values yields unrepresentative design strength that does not identify a weak segment within a reach (say vicinity of a given boring). For example, a soil sample having high natural water content should be cohesive or organic with high LL and probably low strength. Similarly, a soil sample having stiff consistency should exhibit higher wet density and lower water content than a weak sample of similar organic content and composition.

In view of the above, wet density and undrained shear strength profiles for a given reach may overestimate the strength at the "weakest link" locations where less favorable soil conditions exist. Using a simple mathematical average from borings made at uniform spacing of say 500 ft. along say a 10,000-ft. long reach may not be fully representative. Results of laboratory tests performed on samples obtained from widely spaced borings possibly made at different times should not be represented by a simple mathematical average or even plotted on the same diagram without applying scientific reasoning and adjustments considering ground elevation at the time of drilling, boring location, field or laboratory test type, etc. This reasoning is the premise of risk-based designs where different weights are assigned to test data based on soil type, test type, lab quality, etc.

CONTRIBUTING FACTORS WITHIN A REACH (SUBSYSTEM)

Relatively long, or plain strain structures, such as levees or floodwalls, settle differentially due to variations in subsoil conditions where higher settlement occurs in segments underlain by weaker and more compressible soils or where more fill has been placed. This causes some levee or floodwall segments to have lower top elevations making them subject to earlier splashing and overtopping by storm surge. Overtopping played a role in many I-wall failures because some wall tops were lower than the storm surge due to settlement or design or construction inconsistencies. Even when the mean storm surge level is lower than the floodwall top, intermittent and localized "splashing" occurs when storm water begins to flow over low areas of the floodwall due to wave overtopping and wind. Continuous overtopping creates a concentrated "waterfall" over the I-wall top causing soil erosion along the land side and creation of a scour trench. The scour trench grows wider with time under the rising storm surge and expands farther into the land side as the I-wall tilts landward. The width and depth of the scour trench depend on the specific conditions within each I-wall segment (top elevation, soil type, degree and rate of tilting, and overtopping period). The increase in active pressure (driving force) due to the development of a tension crack along the flood side and reduction in the passive resistance due to the scour trench expansion along the land side lowers the factors of safety against local and global instability. This also shortens seepage path around the sheet pile tips. This explains why a breach developed within a given I-wall segment while most of the reach remained standing or leaning despite of the uniform sheet pile section and tip penetration as well as the presence of a tension crack and scour trench.

The more catastrophic failures occurred in the I-wall reaches along the 17th Street Canal (one breach), London Avenue Canal (two breaches) and the IHNC (three breaches) due to their proximity to populated areas. In addition to the common failure mechanisms discussed earlier, IPET and ILIT attributed the I-wall breach on the 17th Street Canal to the presence of an extremely soft organic (weak peat) stratum within its limits which was not considered in

the design. In this regard, no soil borings or field tests were performed along the toes of the existing levee during the enlargement project due to limited access. Therefore, the parameters used in the design of the 17th Street Canal I-wall enlargement overestimated soil strength beyond the levee toes. Similarly, IPET and ILIT concluded that seepage around the relatively shallow sheet pile tips caused the two breaches along the London Avenue Canal as evident by the sand boils found on the land side. Four breaches developed along the IHNC as shown on Figure 5 (IPET, 2007). Two breaches (1 and 2) developed on the west bank and two (3 and 4) on the east bank. Breaches 1, 3 and 4 occurred in I-walls and Breach 2 occurred in an earthen levee on the west bank near the Port of New Orleans facilities. Some of the remaining floodwall segments along the IHNC experienced various degrees of tilt, but did not develop into full breaches. Breaches 3 and 4 developed in the east bank between the Florida Avenue Bridge and the Claiborne Avenue Bridge and will be used to illustrate the concept of weakest link. The east bank I-wall separated the Lower Ninth Ward (protected side) from what is referred to as the East Bank Industrial Area (EBIA) on the flood side. Breaches 3 and 4 resulted from insufficient lateral soil and structural support needed to sustain the rising hydrostatic pressure due to storm surge entering the IHNC from the north (Lake Pontchrtrain and GIWW). The common failure mechanisms for Breaches 3 and 4 are:

Figure 5: Breaches along the IHNC HPS (IPET, 2007)

A. The presence of weaker and more compressible soils within their limits resulted in lower grades and additional fill being placed over the existing earthen levee and its vicinity during the floodwall construction in the 1960's. Therefore,

   a. More settlement occurred with time in both areas resulting in significantly lower wall top elevations in 2005.

   b. Lower grades on the land side of the I-wall within the limits of the breaches, where elevations of the levee top and ground surface beyond the toes were much lower than the original design grades.

B. Formation of a tension crack along the flood side face of the I-wall allowed water to flow into the gap and increased the hydrostatic water pressure.

C. Storm surge caused early splashing, wave overtopping and full overtopping to develop over the low I-wall segments to create a wider and deeper scour trench on the land side.

The specific local contributing factors at Breach 3 (weakest link) include a structural deficiency at its northern limit (initiation point) situated precisely at the transition joint between a deteriorated 1960's I-wall segment and a more robust I-wall segment to the north constructed in the 1980's. The structural deficiency consisted of:

1. The 1960's segment had the lowest wall top along the east bank reach. A 1999 geodetic survey indicated that, top of the I-wall settled about 2.25 ft. (27 inches) since its construction in the1960's near the interface joint with the 1980's I-wall. Additional settlement has likely developed between 1999 and 2005.

2. The two adjoining I-wall segments did not form a contiguous system. Top of the 1980's I-wall was about 2.5 ft. higher than the adjoining 1960's I-wall since the two segments were designed based on the NGVD29 and MSL reference datums, respectively. Earlier splashing and overtopping developed over the low segment.

3. The 1980's I-wall segment to the north had more structural rigidity since it consisted of steel sheet piles 14 ft. longer than the adjoining 1960's sheets to the south. The 1980's segment was followed to the north by a series of interconnected new I-walls and T-walls which added more rigidity.

4. The 1960's sheet piles experienced significant deterioration. IPET tested a sample taken from one of the failed sheet piles which indicated about 14 percent loss in web thickness due to corrosion. The first 1960's sheet pile at the interface joint had an 18-inch long tear repaired with a crude field weld. The weld failed under the storm surge and the tear propagated down about 12 ft. into the sheet pile.

5. Significant localized scour occurred landward of the I-wall due to flow of water through the triangular gap that developed along the 12-ft. long tear when the 1960's sheets deflected landward along the standing 1980's segment to the north under the rising storm surge.

6. A full breach developed when a deteriorated interlock between the next two 1960's sheet piles separated under the rising water pressure.

A deviation from straight-line alignment and multiple abandoned pipeline penetrations through the 1960's sheet piles created "weaker" structural end points in the 1960's I-wall that coincided with the precise limits of Breach 4. In addition, this segment had the second lowest top along the I-wall reach where the 1999 survey indicated 17 inches of settlement near the apex of Breach 4 (second weakest link). Meanwhile, the 1999 survey indicated that the remaining standing segments of the 1960's I-wall reach experienced settlement as low as 0.25 ft. (3 inches).

Breaches 3 and 4 were about 200 and 800 linear ft. long representing 3 and 13 percent, respectively, of the entire length of the 1960's east bank I-wall reach of more than 6,500 linear ft. The original 1960's exploration included five general borings (G-type 1, 3, 4, 5 and 7) and two undisturbed borings (U-type 2-U and 6-U). Meanwhile, the subsoil conditions along the toes of the existing levee were established from two general borings (3-T and 4-T) and two undisturbed borings (2-UT and 6-UT) made on the land side. Only two general type soil borings (4 and 4-T) were made near the southern limit of Breach 4 away from its apex and no borings were made within the limits of Breach 3. Therefore, the design wet density and undrained shear strength profiles may not have been representative of the weaker soil conditions within the limits of the two breaches.

Global stability analysis of Breaches 3 and 4 indicated a failure surface passing between Elev. -15 and -20 ft. NAVD88. Figure 6 shows the undrained shear strength profiles for the east bank I-wall reach (IPET, 2007). The centerline and toe profiles were developed using the 1960's design borings 2-UT and 6-UT made outside the breaches and CPT, VST and borings made after Katrina within their limits. As expected, the figure illustrates the effect of desiccation on the near surface soil and the higher undrained shear strength values under the levee centerline. Figure 6 shows weak marsh soils under the toe within the failure surface depth interval. Much weaker soils were detected in the post-Katrina explorations (filled triangles) in the interval between Elev. -10 and -20 ft. NAVD88. The much lower strength difference within the interval demonstrates the contrast between pre-Katrina borings 2-UT and 6-UT made outside the limits of Breaches 3 and 4 and the post-Katrina explorations made within their limits. Therefore, using a simple mathematical average of test data may not represent the conditions where failure is likely to develop (weakest links), which is extremely critical in design and forensic analyses.

NEW SYSTEM APPROACH

Following Hurricane Katrina, the USACE recognized the potential for developing a tension crack on the flood side and mandated that it be considered in local stability, global stability and seepage analyses of I-walls (HSDRRS-DG, 2012). In addition, the USACE Headquarters issued a Technical Letter (ETL 110-2-575, 2001) entitled "Engineering and Design – Evaluation of I-walls" for implementation by all USACE commands having civil work responsibilities nationwide. The USACE new guidelines include:

- No new I-walls are being constructed except at transitions.
- All I-walls constructed nationwide as part of a flood or hurricane protection system were reviewed, evaluated, retrofitted or replaced, as needed.
- The present HSDRRS-DG requires that the flood protection structures be designed for the SWL condition as well as the case of water at wall top (not FWL).

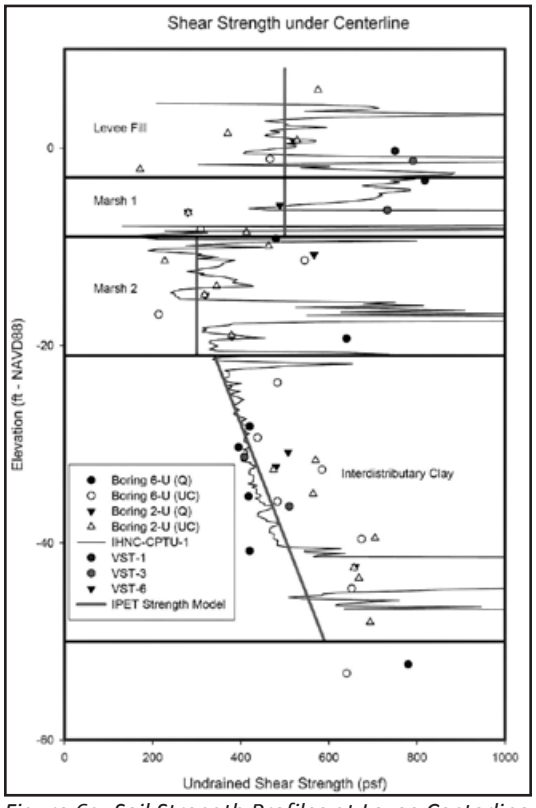

Figure 6a: Soil Strength Profiles at Levee Centerline (IPET, 2007)

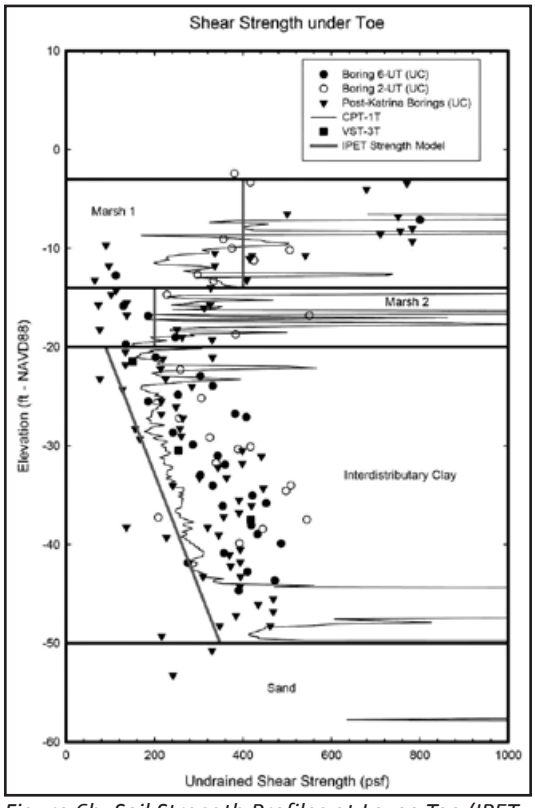

Figure 6b: Soil Strength Profiles at Levee Toe (IPET, 2007)

- Stricter design criteria and limitations were applied in evaluation of existing I-walls. These include limiting the exposed wall height, higher required safety factors, assuming a tension crack along the flood side, seepage control provisions, land side protection against scour and tighter deflection limits.
- Some breached segments were repaired with deeper penetrating steel sheet piles and some were replaced with more rigid T-walls.
- Slope paving was used along the remaining I-wall reaches to provide scour protection.

The exposed height of I-walls was limited to 4 ft. on both sides as per the present HSDRRS-DG (USACE, 2012). All designs are presently based on the NAVD88 2004.65 reference datum. The necessary

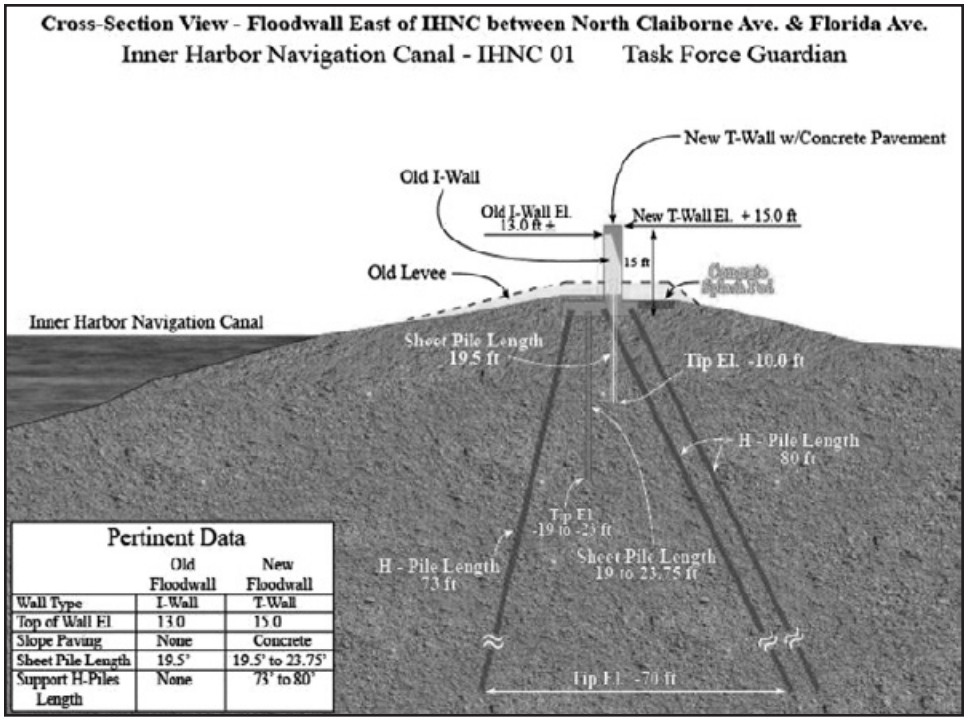

Figure 7: IHNC Old I-wall and Replacement T-wall (USACE, 2006)

parameters needed for design of a levee or floodwall (water levels, storm surge, wave loads, surcharge, etc.) are identified based on system modeling of the "design" storm (i.e.; model whose parameters define the design criteria). The present HSDRRS-DG (USACE, 2012) states that "the 100-year return period, 90% assurance, is authorized as the current design hurricane loading condition."

Figure 7 compares the dimensions and configurations of the breached 1960's I-wall along the east bank of the IHNC and the replacement T-wall constructed in 2006. In addition to the contribution or the 70+ ft. long steel H-piles used to support the new T-wall, its concrete base provides protection against scour by surge water, waves and overtopping on both sides. The cutoff sheet piles of the replacement T-wall have equal or deeper tip penetration than those of the breached 1960's I-wall. Limiting the stickup and slope paving along the remaining I-wall reaches on the IHNC were verified to be effective to withstand storm surge and overtopping during Hurricane Gustav in 2008.

CONCLUSIONS

The general principles of engineering systems and their geotechnical design applications were discussed briefly in this paper using the New Orleans FPS/HPS and its performance during Hurricane Katrina as a practical example. It was illustrated that some of the failures during Katrina in 2005 resulted from the fact that the FPS/HPS was not analyzed and maintained as a contiguous geotechnical engineering system. The system approach in design and analysis was recognized and implemented by the USACE and CPRA in their present HSDRRS-DG (2012) and LFPDG (2015).

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Gas Tax Increase: Is 2017 the Year?

Louisiana's roads and bridges are in need of investment. You know this not only as a resident of the state who has a daily commute and shuttles your kids to and from school and other activities but, as a civil engineer. The general public knows the same, and their willingness to make the investment has grown.

This fact is also apparent to your elected officials. They have been flirting with the idea for the past few years, and now the "D" roads grade and "D+" bridge grade given by the 2017 Louisiana Report Card have the potential to be the evidence they need to put a bill on the Governor's desk. If the legislature acts, Louisiana would be in good company. In the last four years, 21 states have raised the gas tax. In 18 of these states ASCE Sections have released a State Report Card in the years leading up to this legislative action.

Over the last several sessions various transportation proposals have been introduced, looking for the right mix of what will be palatable to bipartisan action, acceptable to constituents, and raise enough revenue. Ideas like tolling and gas tax increases have been debated off and on. During the 2015 Legislative Session the 10-cent per gallon increase proposed in 2015 by State Representative Karen St. Germain came close to passing. While a gas tax increase may seem like a tough vote, elected officials are generally rewarded with reelection. In the 2016 election, 91% of legislators who supported legislation to increase their state gas tax were reelected.

Governor Bel Edwards made infrastructure one component of his campaign in 2015. The Governor's Task Force on Transportation Infrastructure Investment was convened to make recommendations for getting Louisiana's infrastructure back on track. The task force recognized the need for additional revenue to support multimodal transportation in Louisiana. Its recommendations include many of the usual solutions like indexing the gas tax, implementing tolling, exploring public-private partnerships, and other user fees.

Even the voters, like you, have been given an opportunity to weigh in with recent ballot measures like 2015's unsuccessful Constitutional Amendment 1, which would have allowed for a portion of mineral tax revenues to be allocated for transportation projects. Arguments put forward by the opposition included the potential or reducing the state's "rainy day fund", the primary destination for these dollars. Despite the ballot measure's defeat, 47.5% of voters turned out in favor. In retrospect, this was a sign that voter sentiment was shifting. Over the last two years there has been a change in heart among Louisiana's drivers. LSU's annual Louisiana Survey 2017 shows that a majority of residents support a gas tax increase up to an additional 15 cents per gallon. Perhaps an indication that drivers recognize that this upfront investment can cut down on the costs of driving on poor and congested roads, which can cost a driver up to $2,466 a year in urban areas.

There are nearly 10 unique legislative proposals on the table this legislative session. Among them are bills that will raise the gas tax by anywhere from a half-cent to 10-cents per gallon. Other legislative proposals dictate how existing (and potentially future) funds will be allocated to roads – like implementing a transportation "lockbox".

ASCE's transportation funding policy statement recommends that adequate funding for operating, maintaining, and improving the nation's transportation system be provided by a comprehensive program with sustainable dedicated revenue sources at the federal, state, and local levels. While this "all options on the table" approach makes any number of proposals attractive, legislators need prompting from infrastructure experts like you to get the job done.

They need civil engineers like you to put the 2017 Infrastructure Report Card in their hands and provide first hand information about the current conditions of Louisiana's infrastructure. Take time to reach out to your state officials and let them know why they should take the first step toward raising the grades. A lift as simple as a quick e-mail urging them to continue their dialogue on transportation funding and ultimately prompting them to cast a vote in favor of raising the grades for Louisiana's roads and bridges. Be sure to visit ASCE Legislative Tracking page at http://cqrcengage.com/asce/state/louisiana for the latest information on legislative and regulatory action items.

SAVE AMERICA'S INFRASTRUCTURE

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America's aging infrastructure received a "D+" from the American Society of Civil Engineers. Help save America's roads, water pipes, airports, and more. Learn about the 16 infrastructure categories, the economic implications of poor roads and broken water pipes, and how your state stacks up. Then tell your lawmakers to do something about it in the action center. Push notifications will let you know when it's most important for Congress to hear from you and a news section keeps you updated on current trends.

2017 Multi-Region Leadership Conference for Regions 1, 2, 4, & 5 Workshop for Section, Branch and Institute Leaders January 20th -21st 2017, Newark, New Jersey

By Brant B. Richard, PE

As a representative of the Louisiana Section of ASCE, I attended the 2017 Multi-Region Leadership Conference (MRCL), which was held this past January 20-21, at the Newark Liberty International Airport Marriott in Newark, New Jersey.

The conference began bright and early Friday morning 1/20th with a full day of workshops and leadership training. After introductions and discussing the agenda for the 2 day conference, a session was held to learn the ins and outs of ASCE including the organization, structure, and internal workings. Nancy Berson, Director of Geographic Services was the moderator and a multiple choice quiz game format was poised to a selected panel of ASCE governors. When called upon with their selected persuasive answers, the general assembly was to guess the correct answer. The format was a good icebreaker as it generated good discussions with each workshop participant.

Following this session, a Region 5 breakout was held with students, young members, as well as branch and section leaders. It was moderated by Melissa Wheeler, M.ASCE, Region 5 Director and the intent was to discuss ongoing activities within our leadership for information purposes.

The first day ended with a social and the "Dream Big" Premier along with the Eastern Regional Younger Members Conference (ERYMC) Awards Dinner.

Day 2, Saturday, January 21, was filled with a networking breakfast with an open discussion with the 2018 President-Elect Nominees. Subsequent sessions included, Best Practices, brain teasers, and focus groups on various topics, which included Dream Big, the ASCE Report Card, Website Successes, Student Gala's, and Student Outreach.

It was a full 2 days of pertinent information about ASCE and the importance of our organization as it relates to regulatory, funding, and political entities for the betterment of the society.

But I must say, the two most important issues or topics that seem to carry the theme of the workshop were the following:

- Dream Big
- Raising the Bar Concerns

A lot of discussions on how the movie, Dream Big, will be released in what markets and how and when other areas will have access to the film. The intent is to have a limited debut in certain areas and then follow with subsequent releases to not saturate the market. The entire budget for this project was $15 Million with ASCE donating $1.5 Million.

The next topic that seemed to come up during any question-answer session or during any open microphone opportunity was the Raising the Bar Initiative. In particular, the students were concerned about additional schooling which means additional student loan burdens and time. In contrast, the ASCE leadership were trying to emphasize that this will become the new normal as there continues to be a push to increase the body of knowledge needed for our profession.

The 2017 Report Card for Louisiana Infrastructure: Ugly from Any Angle

By Mark Lambert

Mark Lambert

On April 26, the Louisiana Section of the American Society of Civil Engineers issued the 2017 Report Card for Louisiana Infrastructure in a news conference at the state capitol. As expected, it wasn't a pretty sight.

Former DOTD Secretary and Report Card Executive Director Kam Movassaghi, PhD, PE, said Louisiana's overall grade of D+ means "the system does not provide the intended service and is at a risk of failure. Louisiana's infrastructure needs immediate attention. It is poorly maintained, inadequately funded and will not meet tomorrow's demands."

Before we dive too deep into the grades, let's review the specs on this report. In all, 11 infrastructure categories were analyzed and graded on several criteria, including capacity, condition, funding, resiliency, future need, operations and maintenance, public safety and innovation. Each infrastructure category had its own team, and its work was reviewed by a state ASCE executive committee and by a team of national experts at ASCE in Washington, D.C.

The 11 categories and their grades are:

Aviation, C
Bridges, D+
Coastal, D+
Dams, C+
Drinking Water, D-
Inland Waterways, D-
Levees, C
Port, C-
Roads, D
Solid Waste, C+
Waste Water, C-

You can review the full report at www.infrastructurereportcard.org/louisiana.

These grades probably come as no surprise to those involved in planning, designing, building and maintaining public works systems. And yet, the narrow range of grades, from a C+ to a D-, for 11 categories suggests there are common deficiencies across the systems that collectively comprise our infrastructure. Our coastal systems are roughly on par with the condition of our bridges, which are slightly worse than our solid waste systems but slightly better than the drinking water systems across the state.

What else do these infrastructures have in common? Ten of the 11 categories were cited for a lack of money to build and maintain systems. Only coastal protection, which is sufficiently funded for now because of the BP oil spill settlement, did not list funding as a major problem.

Each category includes a section in the report entitled "Let's Raise the Grade," a collection of bullet points on how to improve the infrastructure. Here's a sampling:

- Aviation - With $1.105 billion in unfunded projects on backlog, current funding levels are not sufficient to maintain existing facilities throughout the state while continuing to address capital improvement projects.

- Bridges - Significant increase in transportation and bridge funding is needed.

- Dams - Increase annual investment levels for publicly-owned dam repair, reconstruction, and renovation.

- Drinking Water - Increase investment from all levels of government and the private sector, to repair, improve, and expand the state's water infrastructure. The persistent theme of water infrastructure shortcomings in the state is a lack of funding needed for improvements.

- Inland Waterways - Increase the USACE budget for operation and maintenance of the navigable waterways for dredging, locks, dams, and control structures on these waterways.

- Levees - Congress must fully appropriate authorized funding for adequate O&M for the new HSDRRS for the gates and pump stations, as well as future levee lifts to maintain the 100-year elevation as levees subside and sea level rises.

- Ports - Increase the Louisiana Port Construction and Development Priority Program's annual funding from $39.4 million to $50 million.

- Roads - Significantly reduce the $10.1 Billion of Roadway Backlog funding for the State…Secure funding for Priority A and Priority B Megaprojects identified in the Louisiana Statewide Transportation Plan.

- Solid Waste - Parishes and municipalities should provide funds for the closure and post- closure care of all public landfills.

- Wastewater - Increased investment from all levels of government and the private sector, to replace older treatment, and collection systems including additional federal funding for the State Revolving Fund Loan program.

It bears repeating that the April 26 news conference wasn't a pretty sight, but it's hard to say which was worse - the grades or the uniform lack of interest among members of the Louisiana Legislature, none of whom took ASCE up on its invitation to hear a presentation about the condition of our state's basic building blocks for which the legislators are primarily, fiscally responsible. The news conference was held at the state capitol, during the legislative session. It could not have been more convenient for legislators to attend.

So, the question becomes, why aren't legislators more engaged on the issue of infrastructure? Perhaps it is more illuminating to ask, why should they be engaged? Everyone needs more funding from the legislature - teachers, hospital administrators, mental patients, environmentalists, prison guards, police - and the only way to give everyone what they need is to raise taxes. Better schools, health care systems, prisons, roads, etc., require money the legislators don't have, and they don't want to ask the public for it.

It's also naïve to think that politics isn't at play. Louisiana's legislative process traditionally has been orchestrated by the governor, regardless of party affiliation. But the Republican-dominated legislature has broken with that practice and does not want to give the Democratic governor a "win," even for something as universally agreed-upon as a gas tax increase to improve roads and bridges. In other words, legislators are protecting what they perceive to be their own self-interests. They believe it is safer to avoid a vote, or even a discussion, on raising taxes for infrastructure than to tempt the wrath of voters, many of whom are quite willing to pay a little more to live a little better.

Perhaps the legislators could take a lesson in courage and accountability from DOTD Secretary Dr. Shawn Wilson, whose department certainly was under scrutiny via two poor grades for bridges and roads. Dr. Wilson not only attended the news conference but gave candid remarks about how his department deserved the grades it received.

"The first thing that comes to mind is that we earned these grades," he said. "We've earned these grades because we've not invested in infrastructure the way we should." If Louisiana doesn't invest more money in its infrastructure, "these grades will continue to drop down and give us more D-minuses, eventually causing us to have a failing system, and that's unacceptable for businesses, it's unacceptable for families, and it's unacceptable for us as a department. But, it's the deal we have, and it's the deck of cards we've been dealt."

The only way legislators will embrace infrastructure is if they believe their constituents want them to do so. That means the engineering community in Louisiana must let its voice be heard. That means we must call and email our legislators and tell them to look at Louisiana's grades. That means we must do our jobs, which is to tell the legislators to do their jobs and protect the public.

Like a piece of public infrastructure, the 2017 Report Card for Louisiana Infrastructure was designed and built by engineers, to be used for the public good. But it's also up to engineers to maintain it, which means not letting the report sit on a shelf. It was designed to be used as a persuasive tool, a method to convince those in power that we must invest money in our communities if we are to remain a safe, healthy and mobile society.

Mark Lambert is a public relations professional who specializes in transportation and engineering issues. He is a former DOTD Communications Director and has worked extensively with ASCE, the American Council of Engineering Companies of Louisiana, the Louisiana Good Roads and Transportation Association and private firms. He handles communications for the 2017 Report Card for Louisiana Infrastructure, but his views are his own. You can reach Mark at mark@lambert-media.com.

ASCE-COPRI Louisiana Chapter News

By Venu Tammineni, PE, Director - Communications

COPRI
COAST, OCEANS, PORTS AND RIVERS INSTITUTE
Louisiana Chapter

The Louisiana Chapter of the American Society of Civil Engineers (ASCE) Coasts, Oceans, Ports, and Rivers Institute (L. COPRI) is continuing to promote membership and visibility throughout the State of Louisiana.

Spring Seminar

L.COPRI organized a spring seminar on March 9, 2017 at the Tulane University Bywater Institute. Mr. Benjamin G. Foley, General Manager of Keystone Engineering's Offshore Renewables Group, presented a case study of the Block Island Wind Farm. The seminar was well attended by students, professors and consultants.

Offshore Wind Farm Case Study Presentation by Benjamin G. Foley, PE, PEng, PMP

L.COPRI Scholarship

L.COPRI initiated an annual scholarship program in 2015 in which a graduate or undergraduate student studying Civil, Coastal or Environmental Engineering in Louisiana is awarded $1,000 for their accomplishments and interest in protecting or improving the nation's coasts, oceans, ports or rivers. In 2016, we received many qualified applications from students and upon much deliberation, the L.COPRI committee decided to award scholarships to two qualified candidates with each receiving $750. The awards were presented to Mr. Francisco Avelar (UNO) and Mr. Charlie Wildman (UNO) at the spring seminar.

New Board Members

L.COPRI conducted the installation of new board members during the spring seminar.

Incoming board members are:
Chair – Paul Tschirky
Vice-Chair – Dennis Lambert
Secretary – Tyler Ortego
Treasurer – Erin Rooney
Director of Programs– Andrew Woodroof
Director of Communications – Venu Tammineni
Director of Education – Ashly Adams-Tschirky
YPG Chair – Myriam Bou-Mekhayel
Past-Chair – Rudy Simoneaux

Academic and Practitioner Advisory Committee:
Ehab Meselhe
Nancy Powell
Clint Willson
Fred Tharp

Save the Date for ICCE 2018

The 36th International Conference on Coastal Engineering (ICCE) 2018 will be held in the US (www.icce2018.com) and provides an opportunity to learn from and network with coastal engineers, researchers, academics, and scientists from around the world. Join us at the premier coastal engineering conference July 30 - August 3, 2018 in Baltimore, MD. The Call for Abstracts opens March 2017 and abstracts are due August 1.

Other Information

For more information on all COPRI conferences, please visit http://www.asce.org/coasts-oceans-ports-and-rivers-engineering/coastal-engineering-conferences-and-events/.

The activities of L.COPRI will include seminars, workshops and other activities to benefit all ASCE and COPRI members. One does not have to be an engineer to join COPRI. These Institutes are formed for the benefit of ASCE and non-ASCE members to participate and interact with other professionals interested in coastal, oceans, ports, and riverine efforts in Louisiana. If you have any questions or to add your name to our mailing list, please contact Venu Tammineni, at LCOPRI@yahoo.com.

Offshore Wind Farm Case Study Presentation by Benjamin G. Foley, PE, PEng, PMP

Francisco Avelar (right) Receiving Scholarship Award from Rudy Simoneaux, PE (left)

Charlie Wildman (right) Receiving Scholarship Award from Rudy Simoneaux, PE (left)

Paul Tschirky, PhD, PEng (left), Current Chair Presenting a Memento to Rudy Simoneaux, PE (right), Past-Chair

ASCE National Legislative Washington D.C. Fly-In

ASCE | GOVERNMENT RELATIONS

The Government Relations Committee (GRC) has been extremely busy over the past year with the roll out of the 2017 Report Card for Louisiana Infrastructure and the national legislative fly-in held in Washington DC. ASCE members Dr. Kam Movassaghi, Kahli Cohran, Kirk Lowery, Nedra Hains, and ASCE President Dr. Norma Jean Mattei, met with members of our Louisiana Congressional Delegation to introduce the ASCE's 2017 Infrastructure Report Card and to ask for support of several critical infrastructure issues. On March 15th, our delegation met with the staff of Senators Bill Cassidy and John Kennedy and personally with Representatives Steve Scalise, Garrett Graves and Clay Higgins as well as their staff.

As with any plan to better address infrastructure issues, the main question is how to fund the various infrastructure programs. This similar question, today being addressed by Louisiana's own Legislature, is not an easy one to answer. ASCE's 2017 Infrastructure Report Card http://www.infrastructurereportcard.org/, rates the overall condition of the nation's infrastructure a "D+," with an investment gap of $2 trillion. An economic study released last year found that the U.S. is on track to invest only half of what is needed in infrastructure over the next decade. This underinvestment will cause our infrastructure to further degrade, resulting in a loss of 2.5 million jobs and $3.9 trillion in GDP by 2025. And it will cost American families $3,400 a year – $9 a day.

ASCE admittedly has no "silver bullet" to make our infrastructure whole; however, during the meetings with our representatives the National Report Card was referenced. Some of the key talking points that were discussed follow.

Congress passed the five-year surface transportation authorization (FAST) Act in December 2015 which included an increase in funding to help improve the nation's highways, bridges, and transit systems. Continuing Resolutions have kept funding at pre-FAST levels, and ASCE advocates passing FY 17 and FY 18 spending bills and not Continuing Resolutions.

According to the U.S. Environmental Protection Agency's (EPA) more than $655 billion is needed to repair and replace drinking water and wastewater infrastructure nationwide over the next 20 years. With current appropriations as they are today, the message to our representatives is that instances like in St. Joseph, Louisiana or Flint, Michigan will continue. ASCE advocates tripling the current State Revolving Funds from $2.25 billion to $6.75 billion.

Congress reauthorized the National Dam Safety Program (NDSP) and established a new high Hazard Dam Rehabilitation Program. The High Hazard Dam Rehabilitation Program will provide grants to high hazard non-federal dam rehabilitation repair or removal. Congress also established a new levee program in the to promote consistent safety standards, create levee safety guidelines and provide funding assistance to states for establishing participating levee safety programs. The NDSP program is authorized at $13.9 million a year until 2019, the federal dam rehab program is authorized at $45 million over 10 years, and the levee program is authorized at $395 over 5 years. However, no funding for these programs has been authorized and ASCE advocates funding $23.5 million in FY 17 and FY 18 for the dam program and $79 million annually for the levee program.

A final issue that was discussed with Louisiana's representatives was fiscal reform and the proposed taxing of municipal bonds. ASCE's stance is tax-exempt municipal bonds are a key tool for state and local governments to finance infrastructure projects. If these investment funds are taxed, the amount of money to pay an investor would have to be increased to accommodate the taxes paid. This additional revenue would have to be generated locally to pay the bonds off thus reducing the working capital in the municipality for where the bond was generated.

In the end, our ASCE delegation reminded the representatives that they were elected to find the answers and to reach out to our members to help find solutions. Ultimately, they will and should be held accountable for their action/inaction. If you would like to help or join the Louisiana Government Relations Committee, please contact the editor, our president or the government relations chairman. We need volunteers and could use assistance from engineers all over the state.

Left to right: Jeff Duplaintis, Nedra Hains, Kahli Cohran, Rep. Garret Graves, Dr. Norma Jean Mattei, Dr. Kam Movassaghi, and Kirk Lowery

Representative Majority Whip Steve Scalise and Kirk Lowery

ASCE-T&DI Louisiana Chapter News

By Joffrey Easley, PE - Newsletter Editor

TRANSPORTATION & DEVELOPMENT INSTITUTE
LOUISIANA CHAPTER

Louisiana State Science and Engineering Fair

The LSU Student Union Royal Cotillion Ballroom once again hosted the Louisiana State Science and Engineering Fair. The event was held in Baton Rouge on March 21st and 22nd. Several members of the T&DI Executive Committee judged transportation-related projects in both the Junior and Senior Divisions. The first and second place projects were presented a $200 and $100 award, respectively. In the Junior Division, the First Place Award went to Joseph Clary for his project entitled "Warning: Baby on Board". Second place went Landon Pace for his project "Stirling Engine vs. Gasoline Engine". The Senior Division First Place Award went to Meridith Guidry and Madison Hasenkampt for their project "On the Glow: Assessing the Luminosity, Reflectivity, and Durability of Strontium Aluminate Applied to Road Striping". The Second Place Award went to Robert Alexander for "The Battle for Air Supremacy". Congratulations to the winners!

Junior Division Science Fair Winners – Joseph Clary and Landon Pace

Senior Division Science Fair Winners – Madison Hasenkampt, Meridith Guidry, and Robert Alexander

Upcoming Seminars

The Alternative Concrete Bridge and Deck Systems seminar that was scheduled to be held at the TTEC Auditorium on the campus of LSU in Baton Rouge in March had to be rescheduled. Check your in-box for an announcement once the revised date is finalized.

Looking Ahead

The intent of T&DI is to promote transportation and development as a career path, and to provide training and networking opportunities for all professionals involved in transportation projects. If you are interested in co-sponsoring a seminar at your branch, the T&DI Louisiana Chapter has prepared a Seminar Coordinator's Check List to assist you in your preparation Contact Louay Mohammad, PhD, PE at louaym@lsu.edu for a copy of the checklist. Our seminars are two hours in length and are typically presented from 5:30-7:30 pm in either the New Orleans or Baton Rouge area. We have also presented out-reach seminars with the ASCE Acadiana Branch and Shreveport Branch. We are open to co-hosting seminars in additional Louisiana cities if requested. In keeping with the intent of the Institute to provide training and networking opportunities for all professionals involved in transportation projects, the Chapter is planning the following future seminars:

- Mitigation Banking – NEPA Method
- Complete Streets from the Users Point of View
- Pavement Engineering (Part 3 of 3)
  Application of Earthwork and Embankment Materials

ACADIANA BRANCH

By Sasan Daneshvar, PE, Branch President

The Acadiana Branch hosted the 2017 ASCE Louisiana Section Spring Conference on Thursday, April 27th and Friday 28th at the luxurious Le Pavillon in Parc Lafayette. The conference was a great success, and the Acadiana Branch would like to say thanks to all the attendees, speakers, sponsors, exhibitors, students, faculty members, and all those who donated their time to make this conference possible.

The conference featured a presentation by Kam Movassaghi, PhD, PE, the executive director of the Louisiana Infrastructure Report Card, who discussed the 2017 Louisiana Report Card just a day after its unveiling. The panelists: Dr. Shawn Wilson, Secretary of Louisiana DOTD, Tom Carroll, Director of Lafayette Public Works, Melanie Bordelon, MPO Manager of Acadiana Planning Commission, and Chris Humphreys, Louisiana ASCE Past President discussed the reasons behind Louisiana's infrastructure grades and solutions at the local, state, and legislative levels that could improve them. The conference and especially this presentation was widely covered by the media, and several local news outlets broadcasted the report card grades, what experts say we should do, and public opinion about these solutions.

Following this presentation ASCE President, Norma Jean Mattei, PhD, PE, delivered a State of the Union Address speech, and updated the audience with what ASCE does globally and throughout the nation.

The conference consisted of 16 PDH sessions in two tracks, and a variety of topics including in Hydraulics, Geotechnical Engineering, Structural Engineering, Transportation, Survey, Construction, Water & Wastewater, Alternative Delivery, and Ethics.

Thursday's lineup also included a crawfish boil for everybody to enjoy and relax after a full day of workshops and events. Friday's luncheon featured the 2017 Life Member Awards Ceremony, presented by Matthew Redmon, President of the ASCE Louisiana Section; and, recognition of the Distinguished Civil Engineering Senior Students Award, presented by Jerry Klier, PE.

The 2017 Annual Louisiana ASCE General Membership Meeting followed the awards ceremony, and the sign-up sheet and meeting minutes can be obtained by contacting the Louisiana Section Secretary.

2017 Life Members - Acadiana Branch
Joseph Delahoussaye, Jr.
Wayne J Hebert
Thomas R Carroll, III
Dale W Leblanc
Rodney T Thibodeaux
Allen L Martin
Lonnie G Harper
Eric Steven Duck
Michael Joseph Debaillon
Michael Boudreaux

2017 Life Members - Baton Rouge Branch
Patrick J Wilson
Glen R Landry
Wilfred Bennett Barry
Daniel J Broussard
John C Arbuthnot
Ronald Joseph Rodi
Carl Douglas
Stephen D Field
Hunter Christian Thom
Eileen Taylor

2017 Life Members - New Orleans Branch
William Douglas Beakley
Frank M Stuart
Alan George Moody
William Benjamin Haensel, Jr.
Paul M Legrand, II
Alan Hunter
Luis F Sosa
Alan Daniel Schulz, Sr
Bruce Joseph Bivona
Richard Christian Lambert

The Distinguished Civil Engineering Senior Students Awardees:
Enrique McDonald, University of New Orleans
Harry Franklin Pieterson, Southern University
Mary Justine Voisin, Louisiana Tech University
Drewe Burns, McNeese State University
Jeremy Vezina, Louisiana State University
Jacob Alex Neu, University of Louisiana at Lafayette

Spring Conference well attended

ASCE National President Norma Jean Mattei, PhD, PE and Acadian Branch President Sasan Daneshvar, PE

Dr. Kam Movassaghi presents Report Card Chair Jan Evans, PE with signed poster thanking her for her hard work

President Matthew Redmon kicks off the luncheon. Pictured left to right: Matthew Redmon, Malay Ghose Hajra, Jerry Kleir, Beau Tate, Sasan Daneshvar, and Ronald Schumann, Jr.

The Distinguished Civil Engineering Senior Students Awardees: Harry Franklin Pieterson, Jacob Alex Neu, Mary Justine Voisin, Jerry Klier (presenter), Jeremy Vezina, Drewe Burns, and Enrique McDonald,

The panelists: Dr. Shawn Wilson, Tom Carroll, Melanie Bordelon, and Chris Humphreys

Jerry Kleir presents Student Awards

Ali Mustapha, Mary Voisin, Norma Jean Mattei, Stetson Keen, and John "Jake" Kraft

Ali Mustapha and Chris Humphreys enjoying the crawfish boil

Dr. Norma Jean Mattei and Patrick Furlong of Shreveport

Tonja Koob, PhD, PE - President of the New Orleans Branch gives the Ethics Presentation

Patrick J Wilson, PE Life Member

Eric Steven Duck, PE Life Member

Paul M Legrand, II, PE Life Member

Dael W Leblanc, PE Life Member

Thomas R Carroll, III, PE Life Member

Daniel J Broussard, PE Life Member

BATON ROUGE BRANCH

By Khali Cohran, PE, Branch President

2017 is shaping up to be a full year for the Baton Rouge chapter. Major initiatives such as the release of the state report card on infrastructure and key infrastructure funding legislation being considered this session have added to the local discussion, while our expanded chapter programming has had very good turnout so far this year. In February in association with LES the branch celebrated engineers Week, which culminated with a banquet at Juban's on February 22nd. The Branch was pleased to honor to well deserving civil engineering students with scholarships. The ASCE Baton Rouge Branch Annual Scholarship is awarded to a Junior or Senior in Civil or Environmental Engineering in good standing with the College of Engineering with an overall GPA above 2.5 and a core GPA above 3.0. The 2017 Baton Rouge Branch Scholarship Recipient was Denzel Flores Cubillas, for dedication to his education, his leadership potential, and his involvement in the student chapter of the American Society of Civil Engineers. The Melissa Young Doucet Scholarship is awarded to a young woman who shows excellence in scholastics, leadership, and fellowship as exemplified by the namesake of the scholarship. The 2017 Melissa Young Doucet, PE Memorial Scholarship Recipient was Gabrielle Dubroc, for dedication to her education, her strong leadership skills, and her continuous involvement in the student chapter of the American Society of Civil Engineers.

In an effort to broaden our base, the Baton Rouge Branch is excited to begin rolling out our new "ASCE: Bridging the Gap" series where ASCE members will be taking a break from the technical side of our industry to informally collaborate and share ideas of both business and personal development around a brief cocktail hour. The first event of this quarterly series was well attended and indeed attracted a diverse crowd. Our panelists, Sherri LeBas Firnberg, PE, Brant Richard, PE, and Miles Williams, PE discussed their tactics on employee development and long-term retention. Tyson Ducote, Director of Enforcement at LAPELS joined us at the March luncheon to present an overview of recent rules changes, use of electronic seals, decoupling the PE exam from experience, annual renewal cycles, and the most common recent rules violations. Attendance reached capacity in April for out Coastal Master Plan topic luncheon. Our speaker was Charles Sutcliffe on behalf of Johnny Bradberry, Director of Policy and Programs, Louisiana's Governor's Office: Coastal Activities.

Quarterly series at Sullivans: (left to right): Facilitator Danielle Welborn, PE, Brant Richard, PE, Sheri LeBas Firnberg, PE, and Miles Williams, PE

Great turn out at the Quarterly Series at Sullivans!

NEW ORLEANS BRANCH

By Tonja Koob, PhD, PE, Branch President

The New Orleans Branch hosted Jared Genova, a Senior Advisor for the City of New Orleans Office of Resilience and Sustainability, for our March luncheon. He discussed the city's resilience and sustainability program and forthcoming projects. Sharon Bradshaw of Hilti North America presented Anchoring Principles and Design for our April luncheon. Hilti was also our major sponsor for the annual May Social held at Second Line Brewery. Each May the Branch hosts an evening social for members to interact in a more casual atmosphere than our monthly luncheons.

Our annual Branch Awards banquet will be held at the Southern Yacht Club in July, date to be announced.

We are actively seeking abstracts for our annual Fall Conference September 27th and 28th jointly held with ACI. We are also actively accepting UNO student scholarship applications for our annual awards. We will award up to three $500 scholarships to UNO students.

Branch president Tonja Koob Marking was appointed a member of the Environmental and Water Resources Institute (EWRI) History and Heritage Committee. She will attend the World Congress in Sacramento, CA on May 21st.

If you are interested in volunteering at the national ASCE conference in New Orleans in October, please contact Tonja Koob Marking tonja.k.marking@gaeaconsultants.com who will get you in contact with the local committee organizing volunteers.

Sharon Bradshaw of Hilti North America presented Anchoring Principles and Design for our April luncheon

SHREVEPORT BRANCH

By Jared Boogaerts, PE, Branch President

It is always at the end of April that I admit to myself the reality that North Louisiana does in fact have more than one week of nice weather every year. I am sure in a month I will revert to my usual opinion that it is always uncomfortably hot and humid here and puzzle over how mankind survived in the past without air conditioning. So here's to beautiful weather while it lasts!

Spring time has arrived and with it the Annual ASCE Spring Classic Golf Tournament. The tournament took place Friday May 12, 2017. We had over 12 different sponsors for the event and multiple teams. I want to thank everyone sponsoring and attending this event on behalf of not only ASCE Shreveport Branch but of our Louisiana Tech Student Chapter as well. The proceeds of this fundraiser always go towards scholarships for Outstanding Engineering Students at Tech.

At our most recent monthly meeting we were given a presentation by Patti Parker of Southern Geo Supply where she raised the following question: How can we better promote and maintain awareness of changing construction products in a constantly advancing industry? There is something to be said about the tried and true products; however, sometimes the products in this category are no longer available or have changed manufacturers entirely. We discussed how construction specifications don't always change as new products become available and old ones are retired.

We had our monthly meeting Thursday May 18, 2017 at the Petroleum Club in Downtown Shreveport. Patrick Wilson, PE gave us a presentation on "Shreveport's Historic A-Truss Bridge over Cross Bayou: Past, Present and Future". This was our last meeting before we break for the summer. We will resume regular monthly meetings in September.

Annual ASCE Spring Classic Golf Tournament

ASCE-SEI New Orleans Chapter News

By Om Dixit, PE, FASCE, F-SEI

STRUCTURAL ENGINEERING INSTITUTE
New Orleans Chapter

The ASCE SEI New Orleans Chapter has gotten off to a good start in 2017, hosting and planning seminars and workshops and volunteer efforts. All seminars are held from 5:30 PM to 8 PM.

The David Hunter Lecture for 2017 will be presented by Victor Shneur, PE (Chief Engineer, LeJeune Steel Company, Minneapolis, MN) on May 16, 2017 at University of New Orleans**.** Shneur has over 30 years of experience in structural design and construction, working last 25 years for steel fabricators. Shneur has designed connections and supervised connection design of a wide range of structures including numerous high-rise office buildings, large industrial facilities and stadiums with long span trusses.

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ASCE SEI New Orleans Chapter sponsored Coaches Lounge at the LES Regional MathCounts competition held at University of New Orleans in February 2017 and provided a few volunteers for managing the competition.

The ASCE SEI New Orleans Chapter sponsored awards at Greater New Orleans Science and Engineering Fair (GNOSEF) held in February 2017. SEI NO Chapter provides judges to pick the best projects related to structural engineering. In recent years the number of projects related to structural engineering have grown due to these awards. The award winners were:

Junior Division

The First Place ($100) award was given to Aelia Aladwan of Islamic School of Greater New Orleans for her project "Bridges & Gravity"**.** The Second Place ($75) award was given to Matthew Pelias of Christian Brothers for his project "Which Popsicle Bridge is Sturdiest".

Senior Division

The First Place ($100) award was given to Ellen Sedlacek of Benjamin Franklin for her project "The Effect of Roof Type on Stability". The Second Place ($75) award was given to Jasmine King of Haynes Academy for advanced Studies for her project "Bridge Design and Weight Capacity"

The awards of $50 were also given to the Teachers of the winning project's school for encouraging their students to do a Structural Engineering project. These teachers were Fatima Babu (Islamic School of Greater New Orleans); Thomas Constant (Christian Brothers); Grant Gussman (Benjamin Franklin), David Prentice (Haynes Academy for Advanced Studies). The teachers of the winning projects are also awarded to encourage more students to structural engineering projects in future Science Fairs.

ASCE New Orleans Branch has a new web page (http://www.asceneworleans.org), which went live in January 2017. It has all the information and news about ASCE New Orleans Branch and its committees. SEI NO has a corner for its news and activities. The members could go and join our email list for the future event announcements. There is an events calendar listing all the future seminars and luncheons. Members will be directed to registration page for preregistration to the event. Members could also follow the activities and news of SEI-NO on Facebook @ SEINOCHAPTER.

The committee is looking for good topics and speakers for future presentations. Members with expertise in the field of structural engineering would be welcome to join the Executive Committee. For any suggestion and information on joining the Executive Committee, contact Chairman Mark Castay, PE at MCastay@trcsolutions.com.

Victor Shneur, PE (Chief Engineer, LeJeune Steel Company, Minneapolis, MN) gave the 2017 DHL on May 16 2017 at University of New Orleans

Student Chapter News

LOUISIANA TECH UNIVERSITY

By Beverly Case

Louisiana Tech's chapter of the American Society of Civil Engineers has been extremely busy this year! We have increased our efforts to be involved with the students on campus and the entire community, while maintaining our two competition teams Concrete Canoe and Steel Bridge.

This year, we started a Transportation Leadership Council to promote transportation engineering to our students and encourage them to explore the field. We also participated in campus wide events to promote our chapter and get students involved with ASCE including SGA homecoming events, community service events like clothing drives and volunteered at the Boys and Girls Club, welcomed industry speakers in all areas of civil engineering, and put on our annual Winter Banquet with Chi Epsilon and the Association of General Contractors (AGC). We also hosted some fun competitions of our own including a gingerbread house building contest, and a cake baking contest themed around concrete aggregates.

We also recently competed at the ASCE Deep South Conference where our Concrete Canoe team won first in every race and second overall, our Steel Bridge team won first in three of the 6 subcategories and first overall. We also won second place for the Professional Paper Event. Our chapter will not let these victories blind us from the hard work that's still needed though. We will continue to ensure our chapter maintains it's high levels of involvement.

National Student Steel Bridge Competition Team

National Student Concrete Canoe Competition Team

LOUISIANA STATE UNIVERSITY

By Summer Flowers, Student Chapter President

ASCE at LSU participated in the 2017 Deep South Conference at the Univsersity of Memphis in Memphis, Tennessee this past March. Our competing teams included Steel Bridge and Concrete Canoe, and both worked diligently to completed the respective designs. With the goal of getting more of our ASCE members involved, Josh Olivier and Gabriella Dubroc (the captains of Steel Bridge) as well as Daniel Gutierrez and Amanda Jackson (captions of the Concrete Canoe Team), made a great effort to guarantee that each participant played an active role in the design and construction processes. For many of our members it was the first time being involved on either team; as expected this turned out to be a wonderful team building and learning experience. Concrete Canoe members Vincent Orlando and Mason Bonano placed 3rd in the Men's Sprint, and Amanda Jackson and Gabrielle Dubroc placed 3rd in Women's Endurance. Team members Jack Cadigan, Josh Olivier, and Ronald Smith placed 2nd in Water Filtration. In the Mystery Event, team members Mason Bonano, Kimmy Phan, Vincent Orlando, and Manuel Calderon placed 3rd. Of course, we are all very proud of our Tigers for both the effort and the outcomes of this year's south conference; as always we look forward to building an even stronger team next year. We would like to thank our sponsors: Chevron, The Albemarle Foundation, Louisiana Transportation Research Center, Terracon, Ardaman & Associates Inc, Waskey, BASF, Providence, and Robert & Mary Dank. This would not have been possible without the continued support of these organizations.

In addition to the conference we are proud to announce that our members also participated in the Geaux Big Baton Rouge community service event for the fifth year in a row. As the end of the semester approaches, ASCE at LSU ended on a strong note.

The ASCE at LSU career fair, held March 22nd, was a great success. Many companies as well as students came out and participated in the event. We'd like to thank our president Joshua Olivier and career fair planner Denzel Flores for helping to keep this event going. This smaller scale career fair provides civil and environmental engineering students with a more personal experience than those on a larger scale would.

The meetings, featuring guest speakers from Jacobs, the Department of Transportation, and the international ASCE chapter itself, have been extremely insightful. We kicked off our final general body meeting on April 19th at Mellow Mushrooms. As always, we are looking for speakers who are eager to share their experiences to our members here at LSU. Not only does this provide our young engineers with an invaluable networking experience but it also gives a much-needed insight into the professional world we will soon be diving into.

MCNEESE STATE UNIVERSITY

By Jessica Trahan, Student Chapter President

The ASCE student chapter at McNeese State University has numerous events and volunteer opportunities that will be very productive and beneficial to the student chapter, the public as well as McNeese State University. The students will be participating in E-week at McNeese, volunteering at Chenier Plain Coastal Restoration, and working at the Chennault Air Show. During E-Week at McNeese groups of ASCE members performed demonstrations for high school students that represented different aspects of civil engineering. Some of these demonstrations included watershed analysis display, soil stability, concrete cylinder testing, along with many others. The Chenier Plain Coastal Restoration planting is an event McNeese ASCE attends annually, groups of volunteers plant smooth cord grass and California bulrush near Pecan Island, Louisiana to help prevent coastal erosion.

The student chapter looks forward to traveling to Memphis, Tennessee to compete in the annual Deep South Regional Conference. This conference includes different competitions such as concrete canoe, steel bridge, water filtration, and surveying. This is an annual event that the McNeese ASCE chapter looks forward to every year and is a great opportunity to take their knowledge obtained in the class room and apply to real world, hands on design projects.

Also, the chapter will be sending a select few students to attend the ASCE State Conference held in Lafayette, Louisiana this year. Last year two of our students traveled to Shreveport for this event. The Chapter looks forward to sending more students this year in hopes of a beneficial learning experience.

This year McNeese's ASCE chapter will graduate approximately 60% of the total ASCE chapter. With this large of a senior class leaving we have found it extremely important to recruit younger members into the chapter this semester and have them get involved in as much activities as possible.

Finally, our organization would like to mention how important of a role ASCE has been to the graduating seniors of 2017. Over the last year, these students have grown into a family that was founded through ASCE. The students have formed many study groups to support one another through challenging semesters, as well as supporting one another outside of the classroom. These students come from many walks of life, some from other countries, some athletes, some more quiet and shy than others, but together they form the McNeese ASCE Student Chapter and all bleed Blue and Gold. Without the fellowship that ASCE provides, our seniors could have never formed valuable friendships that will last a lifetime.

"Over the course of our lives many friends come and go, but some friends stay and become family. Over the past year and a half, I have learned that these people will forever be a part of my family, and I owe that to ASCE! Geaux Pokes!"

-Drewe Burns (McNeese ASCE student President/Senior)

UNIVERSITY OF LOUISIANA AT LAFAYETTE

By Sarah Pippen, Student Chapter President

The ASCE student members at the University of Louisiana at Lafayette excitedly began their spring 2017 semester with high ambitions. One main goal for the students was to participate in another volunteer opportunity in conjunction with the ULL student chapters of ACI, Chi Epsilon and ITE to help clean up Louisiana's coastline. As a result, a volunteer event was scheduled for April 8 in Cameron Parish to clean up trash from the valued wildlife sanctuary, Rockefeller Refuge. A picture from a similar event which was coordinated in the fall of 2016 can be seen below. Students also plan to work with the Coalition to Restore Coastal Louisiana (CRCL)

UNIVERSITY OF LOUISIANA AT LAFAYETTE, continued

to participate in improving the various marshes and dunes located along Louisiana's cherished coastline. These events are ideal in providing civil engineering students with an opportunity to serve their community while also getting to know their fellow classmates.

As the spring semester progresses the student members of ASCE are working diligently to prepare for the annual ASCE Deep South Conference, which is to be held on March 29-31 at the University of Memphis in Tennessee. This year's conference encompasses exciting events such as a water filtration event, concrete canoe and steel bridge. This annual conference is something the students look forward to every year, as it is a great learning opportunity to see what civil engineering is like at other universities in their region.

Students plan to wrap up their busy semester by attending the annual ASCE/Chi Epsilon Banquet. This banquet is a celebration that students, faculty and involved professionals from the local community look forward to at the end of each school year. This banquet celebrates the accomplishments of students, professors and organizations within the civil engineering department. This year the banquet was held at the Petroleum Club in the Oil Center in Lafayette, on May 5, 2017. We appreciate the strong attendance from the community supporting our accomplishments. There is no better way to wrap up the demanding school year by enjoying good food and even better company. Geaux Cajuns!

UNIVERSITY OF NEW ORLEANS

By Enrique McDonald, UNO ASCE President

At the end of March, twenty-five students from The University of New Orleans' Student Chapter attended the annual ASCE Deep South Conference, which was hosted by the University of Memphis. Since last August, the students have been designing and building their steel bridge and concrete canoe to compete with thirteen other schools from Louisiana, Mississippi, Arkansas, and Tennessee. This regional conference serves as a qualifier for the national concrete canoe and structural steel bridge competitions, which this year, are hosted in Golden, Colorado, and Corvallis, Oregon, respectively. There were 5 main competitions: Steel Bridge, Concrete Canoe, Surveying, Environmental, and a Mystery event.

Schools that participated listed by state:

Louisiana: *UNO, LA Tech, ULL, LSU, McNeese, Southern*
Mississippi: *MS State, Ole Miss, Jackson State*
Arkansas: *AK State, Univ. of AK Little Rock*
Tennessee: *Christian Brother's Univ., UT Martin*
Guest School: *Southeast China*

The University of New Orleans placed 2nd overall in the Steel Bridge Competition, 4th overall in the Concrete Canoe Competition, 4th overall in the Environmental Competition, and 4th overall in the mystery event. Additionally, in the subcategories for the Steel Bridge competition, UNO scored 1st place in Construction Speed, 1st place in Economy, and 2nd place in Display. Since UNO placed 2nd overall in the steel bridge competition, the UNO Steel Bridge Team will be moving on to compete in the National Student Steel Bridge Competition! The University has not attended the national competition in seven years, and the students are thrilled to see that their hard work has paid off. "We have actually been preparing for this since last March! A few of us involved decided that we would take initiative, begin researching successful steel bridge designs of the past, and review the specifications early on so that we won't be pressed for time during fabrication. We have invested so much of our free time between August and March perfecting our design, fabricating, and practicing putting the bridge together so that there would be as few hiccups as possible during the real competition. We have persevered for so long and we are proud to see our bridge succeed!" Says Rachel Lindley, a junior on the UNO Steel Bridge Team. The team is currently preparing to attend the National Student Steel Bridge Competition at Oregon State University between May 26-27. They are fine-tuning their bridge by checking their connections and practicing the construction process to further reduce their construction time.

Events such as this serve as a great opportunity for students to apply what they learn in their engineering courses, and it develops their understanding of how to manage multi-faceted projects similar to what they would encounter in their engineering careers. Additionally, the opportunity to interact with students from other schools in different states by seeing and discussing their approaches to the same challenges proved a valuable learning experience for all. The University of New Orleans attended with tremendous school spirit and they are proud to walk away with their many successes. Their victories would not have been possible without their close-knit team, their sponsors, and especially their faculty advisors and staff. The University of New Orleans' ASCE Student Chapter would like to give a special thank you to Gianna Cothren, Byron Landry, Ghose Malay, Chris O'Brien, and Guillermo Rincon for all of your support and guidance during this journey.

National Student Steel Bridge Competition Team

NOTICE FOR POTENTIAL CANDIDATES TO APPLY FOR VACANCIES ON THE SOUTHEAST LOUISIANA FLOOD PROTECTION AUTHORITY EAST AND WEST LEVEE BOARDS

The State contact person is Ms. Stephanie Aymond at Stephanie.Aymond@LA.GOV . Applicants need to complete the official application, which can be found at the following link: http://www.coastal.louisiana.gov/wp-content/uploads/2013/09/SLFPAApplication1.pdf. Applicants are needed to fill the following Board vacancies:

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— CALENDAR OF EVENTS —

JUNE 2017	
June 14	**T&DI UNO SEMINAR - Geotechnical Topics in Pavement Engineering – New Orleans, LA**
SEPTEMBER 2017	
September 27-28	**Louisiana Civil Engineering Conference and Trade Show – New Orleans, LA**

For more events visit the ASCE Events Calendar: **http://www.lasce.org/calendar.html**

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