LOUISIANA CIVIL ENGINEER

Journal of the Louisiana Section **http://www.lasce.org**

ACADIANA • BATON ROUGE • NEW ORLEANS • SHREVEPORT

Joseph N. Suhayda, PhD in 2002 Showing the Potential Depth of Surge Flooding in the French Quarter
(Photograph by William Brangham For American Radio Works & *Now* with Bill Moyers)

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The Louisiana Section of the American Society of Civil Engineers was founded in 1914 and has since been in continuous operation. The Section consists of the entire state of Louisiana and is divided into four branches that directly serve over 2000 members. They are the Acadiana Branch centered in Lafayette, the Baton Rouge Branch, the New Orleans Branch, and the Shreveport Branch.

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President's Message

By Pamela Gonzales Granger, PE

Pamela Gonzales Granger, PE

We are a little past the halfway point of our 2014-2015 year and I am happy to say that the section and the branches have worked hard to meet the challenges and goals of this year by engaging our college students in our local branch lunch meetings, after hour activities, as well as participating in elementary and high school civil engineering outreach activities. One activity, "Engineer It", which is jointly sponsored by the Baton Rouge Branch, warrants recognition as it is a great example of ASCE working with our community and industry partners in outreach to young children about civil engineers. I strongly encourage each of you to volunteer for, attend, promote or provide funding and support for the continuation of such a great program. Contact Joey Coco, Jeff Duplantis, Kirk Lowry or any of the Baton Rouge leadership for more information on the program.

Our 2015 Spring Conference was no exception. I would like to point out that the Baton Rouge Branch incorporated activities for our local civil engineering students and our younger members that coincided with our goals for this year. The luncheon on the Thursday included a panel of our more experienced and veteran civil engineering leaders from across the state who answered questions prepared by the Younger Members about civil engineering and their careers. There was also a career fair offered on the Thursday evening in conjunction with our annual Spring Conference Crawfish Boil. The weather did affect our career fair attendance but for those that were able to make it to the event the students that attended received a lot of attention from perspective firms who are looking for graduates and interns. The conference as a whole was a huge success. It was great to see the large attendance of ASCE members from throughout the state with a large number of sponsors and exhibitors supporting the conference. The technical agenda as well as outreach attracted many members that I had not seen in years. It was great to see our membership engage and support the conference. I want to thank the Baton Rouge Branch and the Conference Committee led by Joey Coco for a job well done in planning an outstanding conference for our membership.

Our Section committees have been hard at work and below are a few of the latest awards and results of their continued commitment to the Section and our members. The Government Relations Committee continues to work hard at bringing awareness of the infrastructure needs by scheduling and attending meetings with our legislature and other governmental officials and by following legislative bills and participating in legislative committee hearings. The Committee also had a strong presence at the ASCE National Legislative Fly-In in Washington DC in March again this year. It is important to point out that we are one of the few sections that have a governmental relations committee and it is an extremely active committee. ASCE national has recognized the effort of our Government Relations committee by presenting an award to the Louisiana Section committee at the National Legislative Fly-In. ASCE national recognizes our committee as a model for what they would like to see in every ASCE Section. This committee success is a direct reflection of the leadership and hard work of Joey Coco, Jeff Duplantis and Nedra Davis. I would like to thank the three of them for all of their government relations efforts on the state and national level.

I am proud to report that our membership committee has received the Section Membership Renewal Award again this year. This award is indicative of our dedicated members renewing their membership and paying the annual dues early along with the committee's efforts in assisting with reminders for renewals. This award results in a $1,000 award to the section that we use for our activities.

Our History and Heritage Committee continues to research and prepare applications for National Historic Landmarks. This year, the Bonnet Carre Spillway has been accepted as a National Historic Landmark by ASCE. The History and Heritage committee is currently planning the ceremony. Stay tuned for the date of the ceremony in upcoming newsletters and emails from the Section and New Orleans Branch.

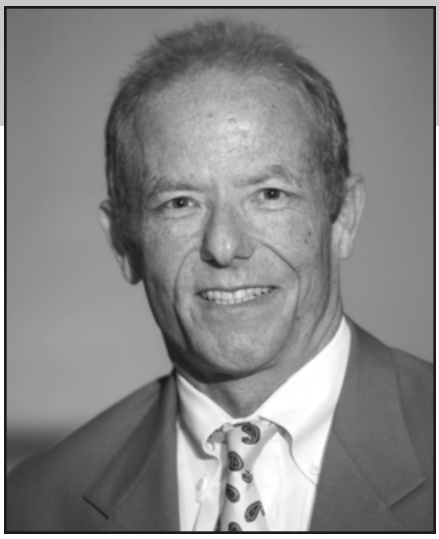
Summer is quickly approaching and I am not sure where the year has gone. Traditionally we have very few ASCE Branch activities scheduled during the summer. The Section does continue to meet and plan activities during the summer in preparation of when students return to school and for the annual fall Conference in New Orleans. As you enjoy the much needed time off of work and time with your families, I encourage you to brainstorm activities or note ideas that you would like for the Section and Branch leadership to explore in the fall and beyond as we continue our goals of connecting with, engaging and mentoring our college students and younger members, reaching out to our elementary and high school students to promote civil engineering as a career and re-engaging our membership to increase our volunteer and leadership pool within our state. Please forward any ideas or activities to your Section or Branch leadership.

I welcome any ideas or comments regarding the Section and how we can better provide for and represent our membership. I can be reached at pamela.gonzales-granger@ch2m.com. I hope everyone has a great summer.

I hope everyone has a great summer. I look forwarding to hearing from you.

Managing Hurricane Surge Risks in the Supercomputing Era, Part I

By Bob Jacobsen PE



Bob Jacobsen, PE

Louisianans have always been aware of hurricane surge hazard, and have wanted to reduce surge risk. Community leaders and their agents have thus faced the task of accurately assessing surge hazard and balancing the desire for reducing surge risk against other public interests. Today, the Supercomputing Era[1] offers impressive tools for quantifying, evaluating, and communicating flood hazards and risks (probabilities of flood heights and their consequences)—facilitating improvements in rational management decisions. However, these decisions must still confront tremendous uncertainties and the challenge of allocating limited public funds among numerous priorities.

This article reviews the history of estimating surge hazard and providing sustainable surge protection for New Orleans, Louisiana and is presented in two parts:

Part I reviews the pre-Katrina evolution, which is worth knowing in order to truly understand past mistakes which led to the City's devastation and issues which continue to threaten its future.

Part II (which will appear in the August issue) provides new details on key Katrina surge events. Part II then describes the post-Katrina progress—as well as limitations—in supercomputer-facilitated surge hazard analysis and risk management, together with important implications for future surge risk reduction.

Appreciating these limitations and acting on the implications is crucial to preventing another surge catastrophe.

Part I: Pre-Katrina Evolution of Surge Hazard Estimation and Risk Management

A. THE RECORD FLOOD

In 1717 Jean-Baptiste Le Moyne de Bienville wrote to his fellow French promoters who were struggling with the decision of where to situate the main settlement of their Louisiana colony. They needed a port location which would optimize their exploitation of local resources and cultivation of cash crops—as well as secure control over the lower Mississippi River and adjacent passages via Lakes Maurepas, Pontchartrain, and Borgne. But they also wanted to minimize exposure to natural disasters that could wipe out their investment. Bienville championed the cusp of a "fine crescent" on the Mississippi River—located strategically at a short portage from the River to Bayou St. John and the south shore of Lake Pontchartrain. Having earlier been granted title to this location, he—not surprisingly—touted it as relatively safe from floods and hurricanes. Thus, from the moment of New Orleans' foudning, flood hazards were underestimated and conflicting interests confounded flood fisk management.

The French Company of the West was engaged in what today would be called a "cost-benefit analysis." The French likely learned much about regional flood hazards from the natives, including the frequency and magnitude of Mississippi River floods and what they termed tidal surges. The region's first human inhabitants undertook a similar tradeoff analysis in choosing locations for their villages. Some tribes —like their European counterparts — may have maintained flood marks spanning generations to supplement their oral history and enhance their chances of staying dry (to say nothing of survival). They may even have recognized how to use the vast, flat, water surface of the swamps during still periods to transfer major flood marks to outlying locations, to enhance their activities in these areas.

Circumstances forced the natives and their European successors to exploit the region's natural resources to the margin of their capabilities—placing a premium on better cost-benefit analyses. Simple reliance on good luck (assuming a run of several easy years would continue) proved an unsustainable risk management practice. Up until the latter half of the 20th Century, keeping track of the historic "record flood" continued to be the State of the Practice (SOP) for defining surge hazard.

Ever since floods have been recorded, the SOP for flood risk management has included placing critical structures—e.g., storage of food reserves, temples, leader dwellings—on the highest available ground, or elevating them. Communities facing frequent floods (dating back to ancient floodplain civilizations in Egypt, China, and Mesopotamia) also adopted the obvious measure of constructing perimeter levees. Within four years of its founding—following the first of many record hurricane surges in 1722—New Orleans leaders required everyone to contribute to building a "back" levee (behind the City, facing Lake Pontchartrain), initially constructed only a few feet above ground. Over the ensuing two hundred years New Orleans experienced many record surges, stimulating the construction of ever higher back levees and improvements in the selection of levee material and construction quality; (the latter particularly during the first half of the 20th Century with advances in geotechnical engineering).

By the early 1960s the City had upgraded its Lakefront levees several times, as had other River communities with their "40 Arpent" levees. (French colonial riverfront land grants had a rear limit of 40 Arpents, equivalent to about 1.5 miles.) The U.S. Army Corps of Engineers (USACE) had begun to assist bourgeoning Jefferson Parish with the design and construction of its back levee (USACE 1955). These latest levees largely were a response to vulnerabilities exposed by the surge associated with the September 1947 hurricane (see Figure 1). Of course, relying on a record flood to manage risk also proved unsustainable.

1 Supercomputing

A High Performance Computer (HPC), or supercomputer, distributes parallel steps to solve highly complex algorithms among hundreds to tens of thousands of microprocessors. Accelerating microprocessor improvements over the recent decades have enabled the development and adoption of HPC clusters for a vast number of computing needs. The "SuperMike" and "Queen Bee" Supercomputers at LSU were both examples of high-end HPC clusters at the time of their commissioning.

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STORM BATTERS CITY

The Might Of A Hurricane

Hurricane Damage Is Heavy

Figure 1. Front Page of the New Orleans Item, September 19, 1947 http://www.old-new-orleans.com/1947_hurricane_frontpage

B. THE STANDARD PROJECT HURRICANE

In September 1964 Category 4 Hurricane Betsy produced a new record surge—reaching up to 16 ft NAVD88 in places east of New Orleans. The back levees were not sufficient and there was extensive flooding throughout the New Orleans Lower 9th Ward, St. Bernard Parish, as well as in Gentilly west of the Inner Harbor Navigation Canal (IHNC). The region suffered damages of around $1 billion, making Betsy the most expensive hurricane in the nation at the time. Facing the choice between massive, expensive perimeter protection versus economic stagnation, the City deployed its powerful Senators and Representatives (e.g., Russell Long and Hale Boggs) to persuade a sympathetic President and Congress to fund federal construction (70 percent) of metropolitan New Orleans surge protection.[2]

2 Federal Involvement in Louisiana Flood Protection

The federal involvement on the nation's waterways grew during the 19th century, primarily with demands to enhance navigation in support of interstate commerce. Following a record multi-state Mississippi River flood in 1874, Congress created the Mississippi River Commission to take-over the River levees—in large part to ensure that local flood control priorities did not trump navigation interests. However, due to the importance of its Port, protecting the City of New Orleans quickly became a key part of the Commission's river management. Thus, began the substantial and messy federal entanglement in New Orleans flood protection. Record floods again in 1890 and 1912 precipitated levee upgrades. The Great Flood of 1927 forced the Commission (and its agent, the USACE) to re-examine the balance of its River flood control and navigation priorities and to develop new policies and actions that would better address that balance. This, in turn, led to greatly expanded flood control construction and operations and associated long-term funding. Over the course of the 20th Century the USACE became increasingly authorized to lead regional and even local flood control projects—with state and local sponsors assuming a share of construction costs and the operations and maintenance—including several in Louisiana (USACE 1955). These projects all involved the balancing of flood control with competing interests, such as navigation, irrigation, power generation, recreation, and/or environmental preservation.

To move beyond the record surge, the federal government turned to a concept which had been used in riverine flood control since the 1940s: the Standard Project Flood (SPF). The idea behind the SPF was to determine a "close to worst-case" flood height that could reasonably be expected to occur—given regional hydrologic characteristics (regional rainfall extremes, river basin topography, runoff, time of concentration to various tributaries, etc.). Rapid scientific advances in the first half of the 20th Century, coupled with many decades of rainfall data, suggested that a practical extreme flood height reflecting the various physical factors could be directly calculated. As a "close to worst-case" estimate, the SPF was expected to define a hazard more severe than any in the historical record, and to be appropriate for the design of flood controls intended to prevent BOTH the loss of life and destruction of property.[3] The US Weather Bureau (now the National Weather Service under the National Oceanic and Atmospheric Administration, NOAA) was responsible for the SPF estimates.

For protecting both lives and property from surge, the US Weather Bureau similarly provided regional estimates for a Standard Project Hurricane (SPH). The SPH was defined in terms of the barometric pressure deficit (ΔP) associated with the storm core or eye (peripheral pressure minus central pressure, PP - PC); the core size in terms of radius of maximum winds (RMAX); and the storm forward translational speed (VF). A 1959 Report defined the New Orleans regional offshore SPH as having a ΔP of 2.3 inches of mercury (29.92 - 27.6 inches) or about 80 millibars, an RMAX of 30 nautical miles, and a VF of 11 knots. Offshore, the SPH was estimated to have eyewall winds of about 100 miles per hour (mph), combining with VF for maximum sustained winds (1-minute average) of about 112 mph. The SPH was estimated to decay modestly as it moved overland, with maximum sustained winds over Lakes Borgne and Pontchartrain of about 100 mph. During the

3 Worst-Case Flood

The Weather Bureau also developed estimates for the "worst-case" flood—termed the Probable Maximum Flood—based on likely upper physical limits. The Mississippi River levees in Southeast Louisiana are based on a "Project Design Flood," equivalent to the Probable Maximum Flood, with a combined flow of nearly 3 million cubic feet per second from the Upper Mississippi, Ohio, Missouri, and Arkansas Rivers. The Mississippi River Project Design Flood assumes a significant portion of this combined flow is diverted to the Atchafalaya River at the Old River Control Structure. (The Atchafalaya River must also accommodate inflow from the Red River.) Under the flood management plan additional portions are diverted with weir structures at Bonnet Carré (to Lake Pontchartrain) and Morganza (to a floodway east of the Atchafalaya River). The Bonnet Carré weir is opened in phases as needed, followed by Morganza, to keep the River peak flow at New Orleans below 1,250,000 cfs. The Bonnet Carré and Morganza structures have been opened 10 and 2 times, respectively (see Douglas 2011).

1970s several slight revisions were made to the New Orleans regional SPH, with a 1978 report identifying a ΔP of 84 millibars, an RMAX of 29 nautical miles, a VF of 4 knots, and offshore maximum sustained winds of 90 knots, or 104 mph, (NOAA 1972, 1975, 1978, and 1979). (Estimates of the "worst-case" or Probable Maximum Hurricane were also developed and revised, with ΔP increasing from 100 to 125 millibars.)

To estimate SPH peak surge the USACE utilized a few selected landfall/track scenarios and a late-1960s-era one-dimensional (1D) steady-state empirical formula. The formula used the maximum local perpendicular wind speed derived from one of the SPH scenarios and computed the surge "setup" at the levee. The estimate of setup also factored in the wind fetch distance, open-water depth, a loss coefficient (e.g., for friction), and drop in barometric pressure. The 1D surge analysis addressed the fact that the higher levees would block, and therefore raise, the incoming surge. Timing of tides was ignored. For Lakes Pontchartrain and Borgne the USACE used mean levels of 1.0 and 0.9 ft above mean sea level.[4] Along the south shore of Lake Pontchartrain (the New Orleans Lakefront) the SPH surge was estimated at 11.5 ft MSL and south of Lake Borgne (along the Mississippi River Gulf Outlet, MRGO) at 13.0 ft MSL. The SPH surge setup at the two locations were thus 10.5 and 12.1 ft above the respective mean lake levels (USACE 1966).

For protection features facing open water, SPH peak wave conditions were estimated, along with the wave runup height on levee slopes. To protect against the SPH surge at Lakes Pontchartrain and Borgne the USACE determined that the levee elevation should be set at 16.0 and 17.5 MSL ft, or 4.5 ft above the SPH surge (USACE 1966, 1968, and 1987).

The USACE's recommended SPH surge protection plan for New Orleans is illustrated in Figure 2. As a more cost-effective alternative to a "High-Level Plan" for Lakefront protection (i.e., full exposure to the SPH surge), the USACE incorporated a "Barrier Plan" to reduce surge inflow into Lake Pontchartrain. The Barrier Plan included a levee across what is now known as the New Orleans East Land-Bridge and gates at the Rigolets and Chef Menteur Passes and the IHNC Seabrook entrance. The USACE estimated that the Barrier Plan would reduce the Lakefront levee elevations from 16.0 to 11.0 ft MSL (USACE 1968).

The SPH surge protection project encountered numerous design and construction challenges. Among these were alignment details; adequate buffers; pipeline, utility, and other relocations; availability of suitable levee material; foundation and subsurface variability (affecting levee geometry, soil compaction procedures, and settlement both during and after construction); elevation survey control; and turf establishment. Floodwalls were substituted for levees in reaches with limited rights-of-way, but required extensive subsurface information to specify appropriate sheet pile depth. However, given the USACE's experience with Mississippi River and other flood protection projects these challenges were not that unusual.

4 Vertical Datum

The USACE frequently used references to Mean Sea Level (MSL) and to National Geodetic Vertical (NGVD) interchangeably. The local MSL at Grand Isle is currently estimated at about 0.2 NAVD88, and mean levels in Lakes Borgne and Pontchartrain are about 0.3 and 0.5 ft NAVD88.

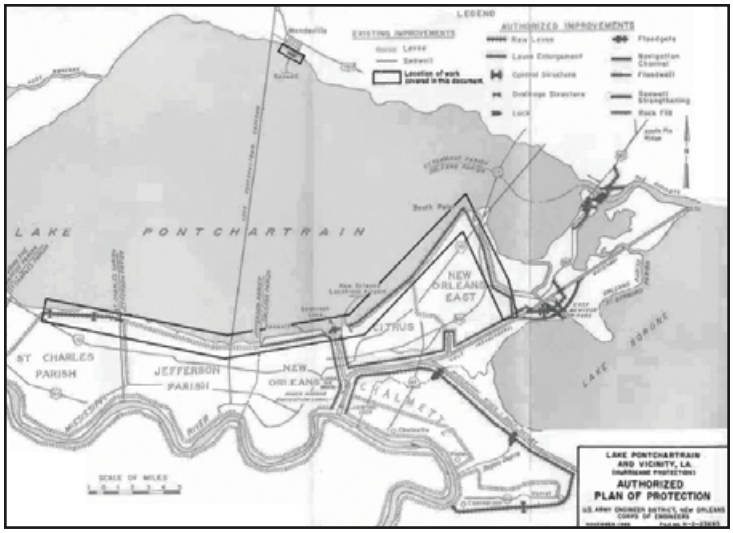

Figure 2. Barrier Plan for Protecting the New Orleans East-Bank, USACE 1968

Despite a reinforced sense of urgency resulting from the "near miss" of Hurricane Camille in 1969—which produced a surge of over 20 ft in nearby Waveland Mississippi—the New Orleans SPH Barrier Plan began to confront competing interests and new programmatic hurdles that were not quickly resolved. The Barrier Plan was opposed over concerns that it was likely to alter Lake water quality and fisheries. Environmental interests also opposed the location of a St. Charles Parish levee along the Lakefront, preferring to move it further south and impound much less of the LaBranche Wetlands. Addressing these challenges involved new and evolving—and time consuming—requirements for environmental impact assessments and economic cost-benefit analysis. A final resolution in favor of the High-Level Plan was not reached until the mid-1980s and the St. Charles south alignment was not adopted until the 1990s.

Delays forced by these concerns and processes were then compounded by budget issues (see Government Accountability Office, GAO, 1976):

- Steep inflation of construction costs during the 1970s and 80s meant that annual appropriations covered less and less work, exacerbating delays.
- Annual appropriations for SPH surge protection projects were restricted—as Congress spread USACE funds across many competing demands from across the nation—forcing construction schedules to be greatly extended. New Orleans officials often placed navigation priorities—such as replacement of the IHNC Lock—above surge protection for annual funding.
- The official estimated cost (millions) and completion date of the New Orleans East-Bank SPH surge project (including St. Charles Parish) mushroomed:
  - In 1965 at authorization, $85/1978, (revised in 1968 to $98).
  - In 1976 according to a review by GAO, $352/1992.

- In 1982 for the re-evaluation and adoption of the High-Level Plan, $760/2008.

Through the 1970s and 80s the region entered an extended period of low hurricane activity, which began to undermine the urgency to complete the SPH surge protection project. As the project dragged on there was an inevitable increasing emphasis on cost control and construction speed-up. This in turn contributed to engineering concessions—e.g., floodwall support conditions, levee materials, elevation control—and to deferring supplemental lifts for levee segments which had undergone significant post-construction settlement.

C. THE SURGE HAZARD CURVE

In addition to the SPF, by the mid-20th Century flood protection projects had begun to routinely apply statistical techniques for estimating the probability of extreme events. Flood hazard was quantified in terms of the annual probability of a particular flood stage being exceeded. (Each stage has its own discrete mass probability so the probability of exceedance is a cumulative probability encompassing the mass probabilities of all higher stages.) Quantified flood hazard offered a way (at least in theory) to apply objective, uniform criteria for similar projects across the nation and to gauge the cost-effectiveness of incremental protection alternatives—avoiding suboptimal over- and under-designs. (Subsequent planning developments would incorporate the probability for flood consequences—damages, loss of life, etc.—and seek to compare projects on the basis of quantified flood risk.)

Quantified flood hazard is depicted with a location-specific curve—graphed with flood stage on one axis and cumulative annual probability, also referred to as annual return frequency, on the other. The annual return frequency has a finite range—from 0 to 1.0 (0 to 100 percent). Instead of annual return frequency the average annual return period is often used—the latter is simply the inverse of the former—e.g., an annual return frequency of 0.01 equals an average return period of 100 years.

In the 1960s, the SOP for developing a flood return frequency curve for a location was to plot the series of maximum stages from a local river gauge (or a tide gauge in the case of surge data) versus each observed stage's rank in the record (sometimes slightly adjusted). If river gauge information was limited, additional stage-frequency "data" could be synthesized by estimating the stages associated with regional rainfall events (using the probability of the rainfall event together with hydrologic and hydraulic modeling). Connecting all the plotted points yielded a ragged line. Often a smooth curve was preferred and one would be hand drawn—reflecting what the author thought visually best fit the data. In both cases neither the ragged line nor the hand-drawn curve represented a parametric equation. Given very limited data sets, extrapolation of the hazard curve by hand was very subjective—e.g., to return periods of 100- and 500 years.

In 1966, less than one year after Hurricane Betsy, the USACE developed hand-drawn surge hazard curves to supplement their estimation of SPH surge. Figure 3 depicts a regional hurricane intensity[5] return frequency curve prepared with simple visual fitting to a record of central Gulf of Mexico storm PC observations. The curve—graphed as a nearly straight line on log-linear paper—incudes hand extrapolations. (USACE 1966; an earlier version of this curve appeared in U.S. Weather Bureau Report 1959.) The USACE used the hand-drawn hurricane intensity return curve—together with a few basic track scenarios and the simple 1D steady-state empirical wind setup formula described above to synthesize some limited surge-return data for three main portions of the project: Lake Pontchartrain Lakefront of Jefferson and Metro New Orleans; New Orleans East and the IHNC; and St. Bernard Parish (referred to as Chalmette Loop). The synthesized surge return events supplemented the regional surge return data for nine storms (1893, 1901, 1909, 1915, 1926, 1947, 1956, 1964, and 1965). Figure 4 presents the three 1966 hand-drawn surge hazard curves, prepared on log-linear paper.

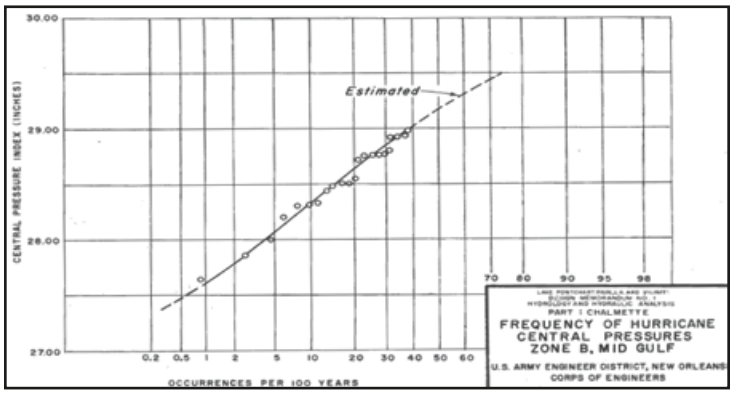

Figure 3. Central Gulf of Mexico Return Frequency for Hurricane Central Pressure, USACE 1966

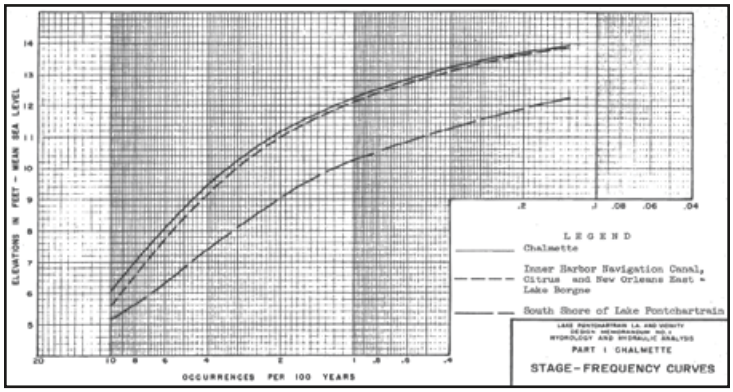

Figure 4. SPH Project Surge Hazard Curves for East Bank New Orleans, USACE 1966

5 Hurricane Intensity

Given more than a century of coastal extreme barometric pressure observations, including from ships, ΔP (or simply PC, assuming a value for PP) has long been used to represent hurricane intensity. Given that PC usually correlates reasonably (though not always) with expected eyewall winds, and surge depends largely on the wind-speed, many hurricane observers came to treat PC as a short-hand predictor of surge severity for a storm on a given track. In the 1970s, with routine aircraft reconnaissance of hurricane eyewalls and the measurement of maximum sustained winds, the Saffir-Simpson Scale categorizing hurricane intensity from 1 to 5 (based on wind speed) was popularized. For the next three decades, track and Saffir-Simpson category became ingrained in the minds of officials and the public as the overriding factors in surge hazard. Interestingly, the New Orleans regional offshore SPH with maximum sustained winds of 112 mph is a minimal Category 3 storm; however the SPH ΔP of over 80 millibars can be more indicative of a Category 4 storm.

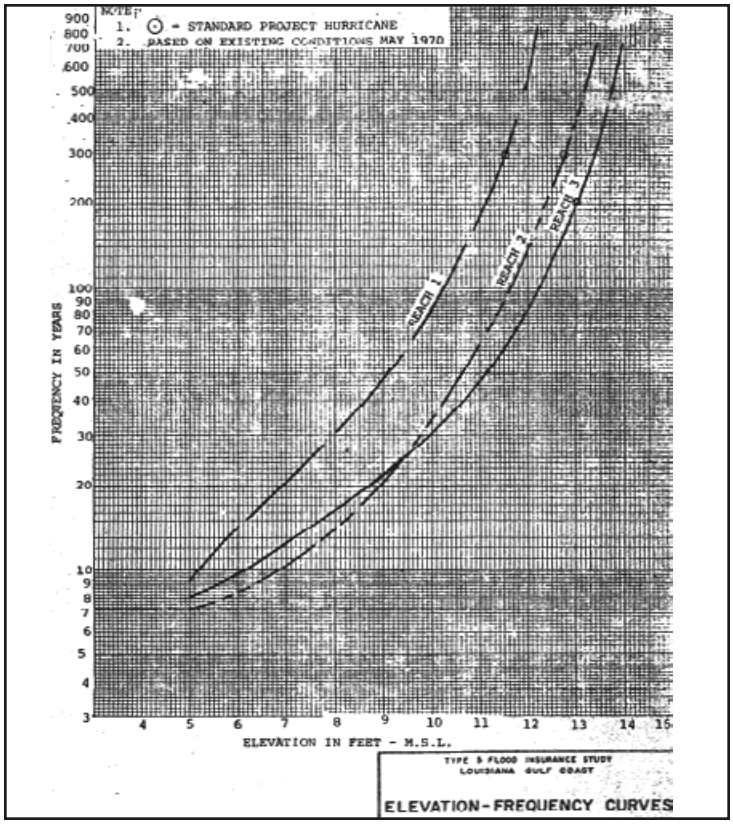

Figure 5. FEMA FIS Surge Hazard Curves for East Bank New Orleans, USACE 1970

During the 1970s the newly established National Flood Insurance Program (NFIP)—which provided insurance coverages and premium costs based on exposure to a one percent annual return frequency, or 100-year (yr) flood—triggered an explosion in hazard analyses for Flood Insurance Studies (FISs) across the country. For coastal Louisiana the predecessor to what is now the Federal Emergency Management Administration (FEMA) turned to the USACE to provide the first FIS surge hazard analysis. The USACE followed a similar procedure to the one described above to create Figure 5, with three hand-drawn[6] surge hazard curves for the New Orleans area: Reach 1, South Shore of Lake Pontchartrain (St. Charles Parish to eastward to South Point); Reach 2, North Shore of Lake Pontchartrain (eastward to the Rigolets Pass); and Reach 3, Lake Borgne (St. Bernard Parish).

The surge hazard curves in Figures 4 and 5 are identical at return periods above 50 years. (The SPH protection project and FIS surge hazard analyses apparently used slightly different input information affecting the lower return period values.) Circles on the curves in Figure 5 note that the SPHs for the New Orleans Lakefront and Lake Borgne locations were estimated to be 300-yr and 200-yr events. For the New Orleans Lakefront the 100- and 500-yr surge elevations were 10.3 and 11.9 ft, and for Lake Borgne they were 12.5, and 13.7 ft. Notably, the USACE's hand-drawn curves indicated that the respective increases in surge hazard from 100- to 500-yr return were only a modest 1.6 and 1.2 feet. Both surge hazard curves excluded the Barrier Plan.

At the same time that surge hazards curves were being evaluated for the SPH project and the NFIP, metropolitan New Orleans interior FISs were also defining large areas subject to 100-yr rainfall inundation. These FISs took into account the federally authorized (but incomplete) SPH projects. Thus, for NFIP purposes flood hazard inside the protection was only based on rainfall events. Home mortgagors inside the protection not subject to interior drainage issues were not required to purchase flood insurance—and optional flood insurance was very affordable. Property values in better drained interior areas were greatly enhanced, while those in designated 100-yr flood hazard zones declined, placing a significant economic hardship on whole neighborhoods. Officials in New Orleans (as well as other flood-prone cities across the nation) naturally wanted to accelerate projects that might remove larger, populated, and/or potentially more valuable areas from the 100-yr flood zone. In the 1990s New Orleans area leaders sought and obtained a federal interior drainage construction project under the USACE: the Southeast Louisiana Drainage Project, (SELA). Thus, the NFIP ironically had the inevitable and perverse effect of spurring many local officials to prioritize USACE funding for SELA projects over SPH surge protection. (The NFIP, particularly the arbitrary 100-yr threshold, continues to influence decisions by communities and individuals throughout the nation.)

D. JOINT PROBABILITY ANALYSIS AND TWO-DIMENSIONAL MODELING

The significance of other storm characteristics in addition to PC to local wind and surge exposure had long been known and in the 1980s these characteristics—variations in RMAX and VF, as well as track, including both landfall location (X) and storm approach direction (θ)—began to be more closely re-examined by leading hurricane climatologists (see NOAA 1979 and 1987). Decay in storm intensity with landfall was also studied. Hurricane climatologists determined that a reasonable surge hazard analysis required a larger array of synthetic storms representing the combined joint probabilities of PC with

6 Extreme Value Functions

When sufficient data were available, the 1970s-era SOP called for the use of parametric equations—termed Extreme Value Functions (EVFs)—in place of hand-drawn hazard curves, eliminating subjectivity in the extrapolation to higher return periods. Five common EVF types were the basic Log-Normal equation, the Log-Pearson Type III equation, and three variants of the Generalized Extreme Value (GEV) equation—the Gumbel, Weibull, and Frechet equations. The plot of cumulative probability data were compared to graphs of several EVF types, with several versions of each EVF type prepared by adjusting equation coefficients. The EVF providing the best general agreement in shape (asymmetry/skew) and suitable tailing properties (especially at the upper return period) was selected. The early SOP relied on special plotting paper customized for each EVF type, which allowed the EVF coefficients to be easily evaluated. Agencies tended to use a particular EVF type for rivers with particular flow characteristics based upon research which suggested a good match—e.g., better fit according to a root mean square error. For example, the Log-Pearson Type III (and corresponding plotting paper) became widely applied for general riverine flood hazard curves. By the 1980s, computers were facilitating the calculation of EVF coefficients and comparison of EVF fits. While the use of an EVF eliminated subjectivity in extrapolating the hazard curve to extreme return periods, some subjectivity still remained in the choice of one EVF type over another. Research efforts on the use of EVFs, particularly the Weibull distribution, to represent hurricane wind and surge hazard were initiated in the mid-1980s but were not applied to New Orleans surge protection prior to Katrina (see Georgiou 1985, USACE 1986, and NOAA 1987.)

RMAX, VF, θ, X, and decay—a so-called joint probability analysis (JPA).[7]

During this same period surge scientists started applying two-dimensional (2D) hydrodynamic modeling to estimate peak surge for each storm (see Massey et al 2007). 1980s-era 2D hydrodynamic modeling began to capture some of the complex time-varying physical interactions between three phenomena:

1. The shoreward-driven forerunner and main surge.
2. The rapidly shifting local setup driven by the passing wind-field.
3. The impacts on surge caused by coastal landscape features—such as bathymetric conveyances (channels and large, shallow interior bays and lakes) and topographic barriers (levees, roads, dunes, ridges, etc.).

1980s-era 2D transient surge simulation—e.g., FEMA's in-house Coastal Flooding Storm Surge Model—was still coarse in resolving localized interactions. Some important physical processes were not yet represented, such as the setup contribution from wave radiation stress gradients. Often there were debates over whether the 2D model or the earlier 1D steady-state equations (which were simpler, quicker to complete, and less expensive) was more accurate, or more conservative, or more suitable for FISs. One of the first applications of JPA and 2D modeling in coastal Louisiana was performed in 1989 by Joseph N. Suhayda, PhD for a Cameron Parish, Louisiana FIS. Suhayda's JPM set used 685 storms.

By the 1990s, continued advances in computer capabilities had made JPM and 2D modeling the SOP in surge hazard analysis. The cumulative probability curve was typically left as a non-parametric function covering the wide range of return periods generated by the analysis (perhaps smoothed using an algorithm) and there was no need for extrapolation.

7 Techniques for Joint Probability Analysis

There are several approaches to developing a synthetic set of storms. Empirical methods emphasize expanding on historical observations to create an artificial record much longer (e.g., an order of magnitude) than the longest return period of interest. The empirical approach produces an artificial record with variability in the combination of hurricane attributes that is consistent with the generally observed joint probabilities in the regional climatology. Coastal wind hazard analysts would later develop an artificial 100,000-yr hurricane record—with tens of thousands of storms—using an empirical approach (Vickery et al 2009).

Surge simulation of an entire empirically-derived artificial record has not been practical. An alternative approach to the storm set, termed the joint probability method (JPM), is to select storms that represent a reasonable sample of the joint-probabilities. Early efforts used a few values for each characteristic—e.g., three values each for five characteristics yields a set of 243 storms.

Figure 6a illustrates a set of 76 storms with their respective *mass probabilities*. In this set several hypothetical storms share the same mass probability (they have common attributes, but different landfall locations). Figure 6b shows a histogram of the combined mass probability by 1-ft bins. The cumulative hazard curve, Figure 6c, is developed by numerically integrating the mass probabilities through each bin.

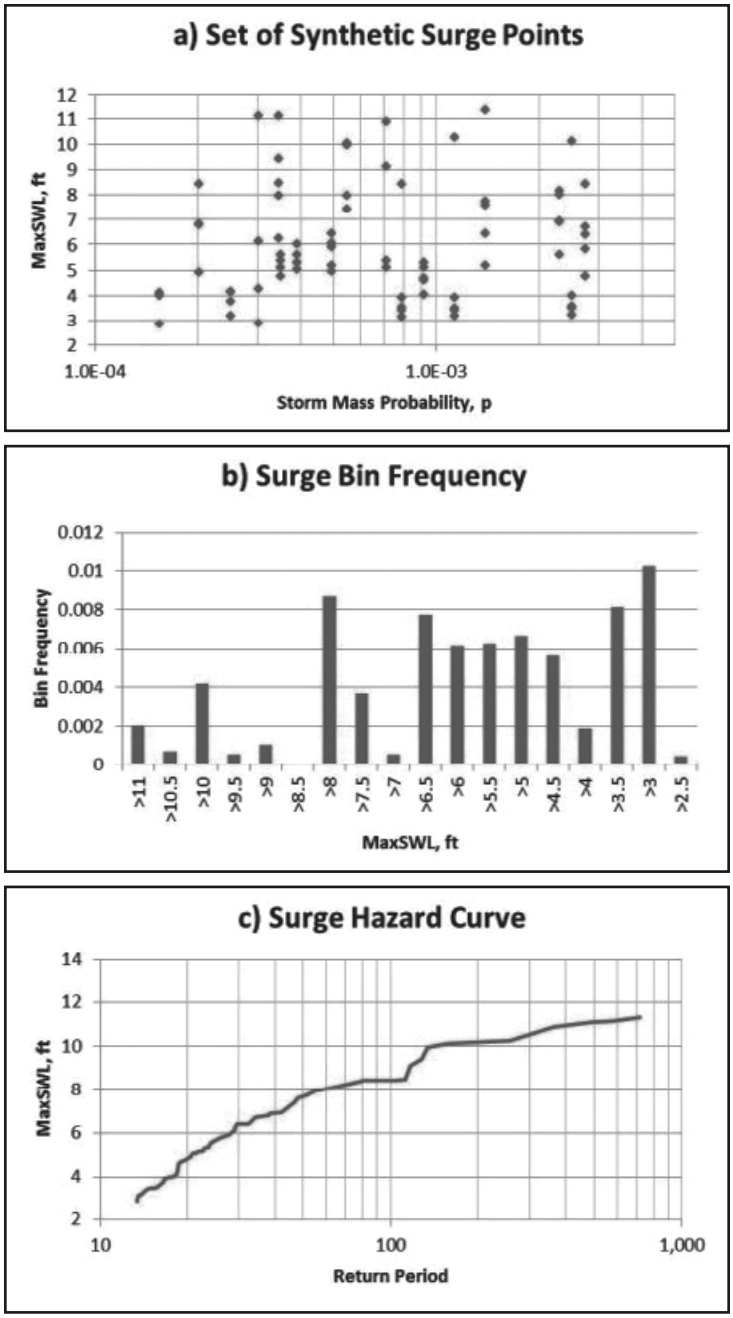

Figure 6 Construction of a Surge Hazard Curve from JPM Results

Despite advances in JPA and 2D modeling, the USACE continued to rely on the original estimated SPH surge and hand-drawn surge hazard curves; (even as the High-Level Plan was only then being finalized and a new surge protection project was being added for the metropolitan West-Bank, USACE 1994). Some of the factors which no doubt influenced the USACE included:

- The New Orleans regional SPH did not change appreciably between 1959 and 1979, and NOAA never revisited the estimate of the regional SPH after that. For new flood control projects the hazard community increasingly preferred estimates of extreme return periods (e.g., 500-yr) over SPFs.
- FEMA had not required a new regional surge hazard analysis for NFIP purposes. If FEMA had, perhaps it might have indicated higher surges at the 200- to 300-yr return period. However,

FEMA had a long nationwide backlog for FISs and funded new analyses according to their own priorities.

- The 1966 SPH surge estimates and surge hazard analysis were still thought to be reasonable in light of the relative newness of the JPM/2D approach; some considered the 1966 1D steady-state SPH surge estimates conservative.
- Engineering designs had long been committed the 1966 SPH surge heights. Project momentum using the original 1966 SPH surge analysis was reaching 30 years.
- There was a natural reluctance to re-open the specification of design surge height and a desire to expedite completion of regional SPH protection. At the time of the final selection of the High-Level Plan in the mid-80s an expert review team could have been consulted to determine the reasonableness of continuing to use the 1966 SPH surge as the design surge. However, any change in the design surge likely would have delayed the High Level Plan adoption by many more years.

With prolonged lower hurricane activity and other competing funding priorities—e.g., navigation and drainage—the post-Betsy/Camille urgency was being supplanted in many quarters by complacency. Unfortunately, just like counting on a string of good luck or the record flood, relying on the 1966 SPH surge estimates would also prove to be unsustainable.

E. EXTREME SURGE SCENARIOS

Hurricane Andrew came ashore near Homestead, Florida in August 1992 with devastating 150 mph winds, causing $25 billion dollars of damage in Dade County alone. Andrew then crossed into the Gulf of Mexico, re-energized to Category 4, and made landfall with 138 mph winds southeast of Morgan City, Louisiana. Andrew renewed interest in the true nature and impact of extreme hurricanes among both hurricane climatologists and regional wind and surge hazard planners.

By the mid-1990s, state and local emergency operations officials and their federal counterparts (including storm forecasters and disaster planners and responders) had become concerned that the available analyses did not provide sufficient information about potential severe surge events. For the New Orleans area the 1966 estimates of surge hazard were all that was available and these now appeared very rudimentary. If (or when) a major hurricane approached Southeast Louisiana, these officials needed information about surge scenarios associated with that hurricane. They also wanted extreme hurricane scenarios to enhance their annual preparedness drills and "table-top exercises." Information coming from hurricane climatologists made these officials increasingly aware that surge scenarios based on track and Saffir-Simpson category alone were not sufficient. They were also increasingly aware of the effect of the coastal landscape on surge—such as the impact of extended, raised topographic features on blocking and raising surge—and they wanted these better accounted for in the scenarios.

In response to these needs FEMA and the USACE prepared a *Southeast Louisiana Hurricane Preparedness Study* in 1994. The USACE used NOAA's 2D Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computer model to simulate 328 variations for each of the five Saffir-Simpson intensity categories—including 9 variations in θ, each with two different values for VF and at 15 to 20 landfall locations. A single RMAX of 25 miles was utilized. While the SLOSH model was much coarser than the FEMA's model, simulations were more efficient—allowing more storm variations to be considered. The peak surge results from the various simulations for each combination of Category and θ (e.g., Category 3 on due north heading) were compared, and maximum surge values everywhere throughout the model domain were determined. A composite map showing the maximum envelope of water (MEOW) was thus created, illustrating the maximum surge exposure for a hurricane of given category and general heading many hours before landfall. Five Maximum of Maximums (MOM) maps were then generated further compositing the MEOWs for each category. The MEOWs and MOMs thus provided critical maximum surge exposure throughout the region under extreme hurricane scenarios. (MEOWs and MOMs are not peak surges for a single storm). Figure 7 is a combined MOM for slow-moving Category 4 and all Category 5 hurricanes for Southeast Louisiana prepared by the USACE.

In August 1998 Category 3 Hurricane Georges took direct aim at New Orleans but turned to the east as it approached the Mississippi River Delta. The near-miss of Georges amplified interest in extreme surge scenarios. NOAA subsequently undertook minor refinements of the SLOSH model and updates to the MEOWs and MOMs with additional variations for tide. During this same period the Louisiana Office of Emergency Preparedness tasked Joseph N. Suhayda, PhD with using the higher resolution FEMA model to examine some hurricane scenarios, including Category 5 storms.

The surge estimates developed from these efforts—as illustrated in Figure 7—warned of conditions far in excess of those experienced during the record Hurricane Betsy, and more disquieting, the SPH or even the current (1966) 500-yr surge. Moreover, hurricane climatologists were considering these extreme conditions to have a return frequency estimate of less than 500 years. By the early 2000s national and local news media were increasingly attentive to stories on extreme surge hazard, (New York Times 2002; Times-Picayune 2002; see this issue's Cover), and there was broad dissemination of the extreme surge scenarios among state and local officials and the public.

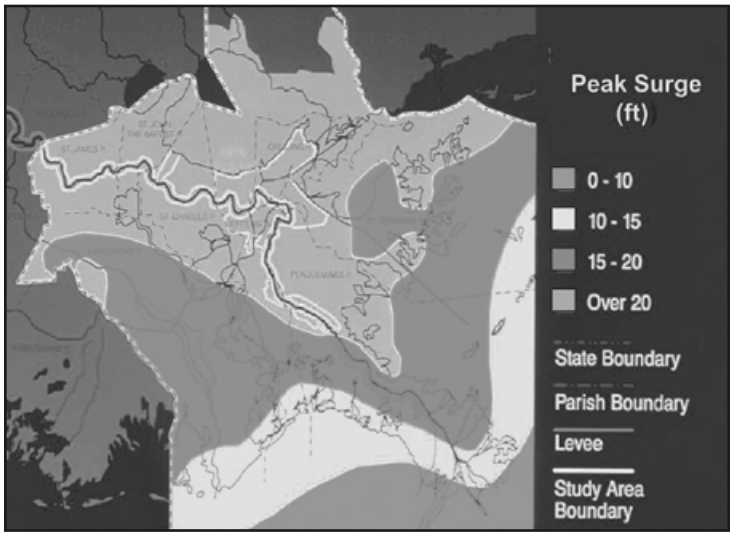

Figure 7. MOM for Slow Category 4 and All Category 5 Storms, Southeast Louisiana, USACE 1998

The new information on extreme surge scenarios precipitated three critical risk management reactions:

1. The directors of SPH surge protection undertook a serious but limited response. Within their authorization and budget constraints the USACE initiated: development of an advanced supercomputer-based regional 2D surge model (Westerink and Luettich 2003); preparations with FEMA for a new FIS surge hazard analysis; evaluation of vertical control and settlement issues using modernized GPS-enhanced surveying techniques; and preliminary studies for higher protection. The USACE also prepared an interior "unwatering plan" in the event of catastrophic surge inundation. However, a comprehensive review of structural vulnerabilities throughout the region—given that reaching or exceeding the SPH surge could be more likely than previously thought—was not initiated. USACE and local levee board representatives routinely underscored the need for funding to complete, maintain, and enhance SPH surge protection.

2. New Orleans community leaders emphasized the critical importance of evacuation.[8] Hurricane and local television meteorologists—in conjunction with state and local emergency response officials—significantly improved the quality and communication of hurricane warnings and recommendations for evacuation of low-lying areas over the course of the 70s, 80s, and 90s. Completion of the regional interstate and the explosive growth in travel and accommodations made evacuation more practical to increasing numbers of residents in potentially affected areas. During 1998's Hurricane Georges a large number of New Orleans residents evacuated. In 2004, Category 5 Hurricane Ivan entered the Gulf of Mexico appearing to head for Southeast Louisiana (it also later curved to the east). Authorities urged those capable of leaving New Orleans to do so. A mass evacuation of the City ensued, utilizing the first implementation of a "ContraFlow Plan" that converted some incoming segments of the surrounding interstate to outgoing traffic. (The limitations of the 2004 ContraFlow were subsequently identified and an enhanced plan adopted for the 2005 hurricane season, see Wolshon 2006.)

3. Interest increased in coastal protection and restoration to reduce inland surge hazard and risk. Coastal scientists had long been studying the impacts of hurricane surge on coastal wetlands, forests, barrier islands, dunes, cheniers, channels, bays, and other features. With mounting appreciation for Louisiana's rapid loss of coastal wetlands in the 1990s, Hurricanes Andrew and Georges spurred more investigations of these impacts (for example, see Gunenspergen and Vairin 1996). But, with increasing attention on extreme surge scenarios and associated inland risks, coastal scientists were also encouraged to consider the effect of the various features on surge hazard. Prior to 2000 there was a reliance on overly simplistic explanations: such as the oft-quoted "rule of thumb" that 2.7 miles of wetlands reduce surge by 1 ft. After 2000 the effects of coastal landscapes on surge became a subject for more rigorous inquiries (e.g., Stone et al 2003). While the nuanced influences of various landscape features on surges of various magnitudes had yet to be well-defined, coastal advocates stressed what seemed an obvious link between more coastal wetlands and less surge hazard. State, local and private coastal landowners, resource managers, and supporting scientists began lobbying for federally sponsored coastal protection and restoration not only for ecosystem benefits, but to reduce inland surge risk (see the 1998 Coast 2050 Plan).

As of 2004 most East-Bank protection segments were still incomplete or had inadequate heights (due either to settlement or vertical control issues). However, the USACE's proposed FY2005 budget included less than $4 million for work on the SPH surge protection—substantially less than previous years and a small fraction of the $70 million needed for completion. By comparison, the FY2005 budget was $30 million for SELA and over $200 million for regional navigation and other civil works. In the summer of 2004 (awaiting the FY2005 appropriation) the USACE was forced for the first time in 40 years to temporarily halt work on the SPH surge project.

By the mid-2000s hurricane climatologists noted that the Western Atlantic seemed to be returning to a period of high hurricane activity. At the same time they began urging surge hazard planners to be mindful of the effects of storm size—and not just RMAX but also the extent and strength of the full wind-field. The latter was characterized with a shape parameter (termed "Holland B") and/or the radial span of tropical storm and hurricane force winds. Investigators of extreme surge scenarios took note. In July 2004 researchers at the Louisiana State University (LSU) Hurricane Center—working with the authors of the Advanced Circulation model (ADCIRC, the supercomputer-based model being evaluated by the USACE for updating regional surge hazard analysis)—simulated a large Category 3 storm passing on a critical path just west of New Orleans, which they dubbed "Hurricane Pam." The simulation was prepared for an eight day response exercise attended by over 300 representatives of various federal, state, and local agencies. Figure 8 illustrates the surge just after landfall—in some areas approaching the MOM shown in Figure 7. After the near-miss of Hurricane Ivan a month later, the Hurricane Pam simulation received greater attention during three follow-up workshops, two of which were held in New Orleans. One was conducted in the fall of 2004 and the other, ironically, in late July 2005, one month before Hurricane Katrina struck New Orleans.

Part II (in the August issue of *Louisiana Civil Engineer*) will present:

- A summary of the August 2005 Hurricane Katrina surge event, including new inundation simulations for the various protection failures.
- A review of new developments in—and remaining limitations of—supercomputer-facilitated quantitative hurricane surge hazard analysis and risk management.
- Crucial lessons for providing sustainable surge protection.

8 **Evacuation and Levees**

For communities with flood levees, an increasing emphasis on evacuation reduces the priority of levees as a life-saving measure. This in turn fuels greater commitment on the part of leaders to evacuation and leads to levees designed and maintained strictly for mitigating property damage risk (e.g., NFIP purposes). This is especially reasonable if higher levees are not technically or economically feasible. However, when evacuation becomes essential communities must provide for those who have medical, logistical, or financial problems with self-evacuating.

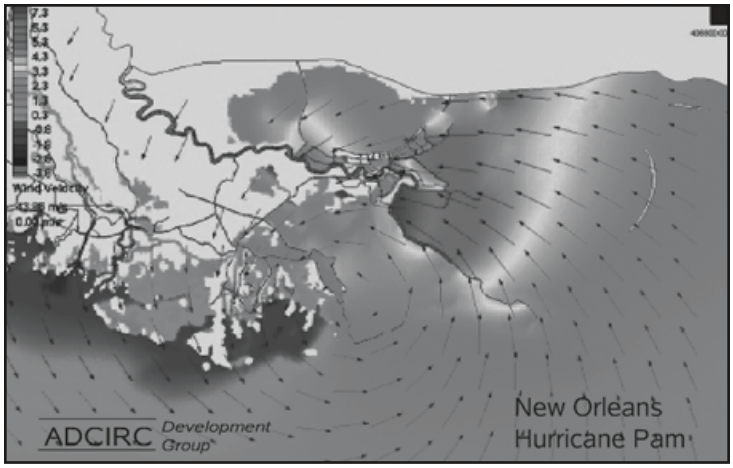

Figure 8. Snapshot of Surge for Large, Category 3 Hurricane Pam http://www3.nd.edu/~adcirc/pam.htm

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This article is dedicated to the 1,400 Louisianans who lost their lives during Hurricane Katrina ten years ago.

Some of the information presented in this article resulted from recent work sponsored by the Southeast Louisiana Flood Protection Authority-East and the Louisiana Coastal Protection and Restoration Authority. However, this article does not represent the opinion of either agency, or of the Louisiana Section of the American Society of Civil Engineers.

Bob Jacobsen, PE *grew up in Metairie and earned undergraduate and graduate degrees at LSU, including an MS in Civil (Environmental) Engineering. His 35-year career has focused on state-of-the-art environmental and water resource planning studies and conceptual designs for South Louisiana. Since 2001 he has been at the forefront of applying HPC/high-resolution hydrodynamic modeling to coastal restoration and hurricane storm surge protection. Bob served as the 2013-14 President of the American Society of Civil Engineers Louisiana Section.*

ASCE Region 5 Director's Letter

By Melissa Wheeler, M. ASCE

Melissa Wheeler, M. ASCE

Dear Region 5 Members,

2015 has been off to an exciting start for ASCE and Region 5. Most recently, I was able to participate in the Legislative Fly-In. Are you an ASCE member interested in walking the halls of Capitol Hill and learning firsthand how policy is crafted? Every spring, ASCE holds its Legislative Fly-In Program in Washington, DC. This intensive two-day program that provides participants with an inside look at the political process. ASCE arranges visits with your Senators and Representatives so you can discuss issues important to Civil Engineers like the Water Resources and Surface Transportation. If you've never done anything like this, I'd encourage you to step out of your comfort zone and apply to attend next year.

I participated in the Board of Direction meeting in DC held on March 27th and 28th. One of the items discussed was a list of values that your BOD has adopted and will use to conduct ourselves. This list of values includes: Integrity, Honesty, Respect, Service, Excellence, Teamwork, Accountability, Commitment to ASCE's vision, mission, goals, and Code of Ethics. An interesting presentation was given by the Continuing Education Blue Sky Task Committee looking at the future of learning in ASCE. The Society is looking at options of how our learning process is changing and how ASCE will fit into the big picture. As we look ahead to our July BOD meeting, the Board will be focused on Strategic Planning and the Budget.

Are there exciting programs and events going on in your local Section, Branch, Student Chapter, YM Group, or Institute Chapter? I would like for everyone to know how much success and fun we have in Region 5! Please consider submitting an item for the Region 5 News. This is the place for photos from tours, shout outs to award winners, news of successful programs and events, and all the great things happening around Region 5. It's easy to submit news items with this link: https://asceforms.wufoo.com/forms/x1ygbyn217de85a/.

Your Region 5 Board of Governors is always open to hearing about what's important to you. If you have something you want to share, please feel free to contact me at any time. I will be happy to address any issues or concerns at our spring BOG meeting. Your Director and Governors are here to help you and make your group successful. Please let us know how we can help!

Melissa Wheeler, M. ASCE
Director, Region 5
mswheele@southernco.com

* Remember, the R5BoG is made up of seven Governors who are willing and able to help:

Quincy Alexander (MS): Quincy.G.Alexander@erdc.dren.mil

Eric Czerniejewski (FL): eczerniejewski@gmail.com

Brett Goodman (FL): bgoodman@jonesedmunds.com

Peter Moore (FL): pmoore@chenmoore.com

Stu Moring (GA): smoring@aol.com

Ali Mustapha (LS): alimm@bellsouth.net

Tony Palmer (AL): tpmailbx@aol.com

Spring Conference 2015

The Baton Rouge Branch recently held the 2015 Louisiana Section Spring Conference on April 16th and 17th in Baton Rouge, LA at the Downtown Hilton Conference Center. The conference was a wonderful success and we had a great lineup of speakers and presenters. The Baton Rouge Branch would like to say thanks to all who attended especially our conference sponsors and exhibitors. Your support is greatly appreciated and makes events like the conference possible. This year's conference included 24 total sessions for attendees to obtain up to 13 PDH's. Thursday's luncheon included a presentation by LAPELS about Recent changes to the PE Exam, Younger Member Forum about Issues Facing Young Civil Engineers (Special thanks to the Panelists, Ann Trappey, Rhaoul Guillaume and Richard Savoie), Recent Changes to Public Bid Law, by Mike Vallan at the Attorney General's Office. Thursday's lineup also included a crawfish boil that everyone enjoyed. Friday's luncheon featured a presentation by General Membership Meeting and also featured the 2015 Life Member Awards, presented by Pamela Granger, PE, President of the Louisiana Section; and, recognition of the Distinguished Civil Engineering Senior Students Award, present by Jerry Klier, PE, of which Graham Hogsett of Louisiana Tech; Michael Daigle of University of Louisiana at Lafayette; Jessica Trahan of McNeese; Kelsey Martin of University of New Orleans; Laura Iverson of Louisiana State University; and, Kylan Douglas of Southern University were present to accept their awards. The branch would like to thank the Region 5 Governor, Ali Mustapha and all the others that made this event a success and the students for their hard work throughout their studies.

2015 LIFE MEMBERS

New Orleans Branch

A. Kevin Fry, PE
Ashton Avegno, PE
Dale Hunn, PE
John Leary, PE
Albert Olivier, PE
Robert Grubb, PE

Acadiana Branch

Robert Hughes

Baton Rouge Branch

Gasper Chifici
Jesse Arnold
Robert Overall
George Web

Shreveport Branch

Ramiro Bernal

The Distinguished Civil Engineering Senior Students Awardees:

Graham Hogsett, Louisiana Tech
Michael Daigle, University of Louisiana at Lafayette
Jessica Trahan, McNeese
Kelsey Martin, University of New Orleans
Laura Iverson, Louisiana State University
Kylan Douglas, Southern University

The 2015 Annual L.ASCE Membership Meeting was held Friday after the Spring Conference and the sign up sheet and minutes can be obtained by contacting Kirk Lowery at kirk.lowery@arcadis-us.com.

continued on next page

Spring Conference Distinguished Civil Engineering Senior Students Awardees presented by Louisiana Section President Pamela Granger, PE (Left to Right): Graham Hogsett (Louisiana Tech); Michael Daigle (University of Louisiana at Lafayette); Jessica Trahan (McNeese); Pam Granger, PE, Louisiana Section President; Kelsey Martin (University of New Orleans); Laura Iverson (Louisiana State University); and, Kylan Douglas (Southern University)

(Left to Right): Jarret Bauer, Thomas Montz, Jennifer Shortess, Joey Coco, Kirk Lowery, Sarah Laakso, Ben McArdle, Blake Roussel (not pictured: Danielle Welborn, Kahli Cohran)

Jerry Klier, PE presents the student awards

Crawfish boil gets kicked off

Left to right: Ann Trappey, Joey Coco, Marie Schexnaydre at their vendor booth, Forte & Tablada

Chris Siverd, PhD Candidate for LSU and Erin Rooney, HDR enjoying the crawfish boil

Marie Schexnaydre, Lisa Crookmeyer, and Joey Coco enjoying the crawfish boil

Crawfish boil gets kicked off

GRC Seeking Members

By the Louisiana Section ASCE (L.ASCE) Government Relations Committee

ASCE | GOVERNMENT RELATIONS

The Government Relations Committee (GRC) had a very active first quarter of 2015 which was centered around the national legislative fly-in held in Washington DC. ASCE members Dr. Kam Movassaghi, Matthew Redmon, Joey Coco, and Nedra Davis met with members of our Louisiana Congressional Delegation to encourage them to support infrastructure funding. We had the opportunity to meet personally with Representative Garrett Graves and with Senator David Vitter, along with their support staff.

(Left to Right): National President Bob Stevens, Nedra Davis, Joey Coco, Jeff Duplantis, and Dr. Kam Movassaghi accepting the National Infrastructure Advocacy Award 2015

The tenor appears to be changing in Washington and around the country regarding our infrastructure needs. While there, we learned of a bill being introduced in the U.S. House of Representatives to raise the federal gasoline tax by 15 cents total over a 3 year period, although there wasn't a comparable bill in Senate. We also learned of several revenue side solutions to infrastructure funding that have passed within the last year in several other states where it was once deemed impossible. The positive side of the fly-in was the sense that everyone at the highest levels of government is becoming aware of a national infrastructure problem, and the momentum seems to be shifting towards fixing it.

Separately, the Louisiana GRC was honored with a national infrastructure advocacy award for the grassroots effort in Louisiana which has consisting of The 2012 Louisiana Infrastructure Report Card, Infrastructure Day, and participation in infrastructure advocacy with our state and local government. Our state GRC has become a model for what other sections and branches of ASCE are trying to accomplish for infrastructure advocacy.

ASCE National Legislative Washington D.C. Fly-In

By Matt Redmon, PE

Matt Redmon, PE

On March 24, 2015, I along with four other members of the Louisiana Section, Joey Coco, Nedra Davis, Dr. Kam Movassaghi, and Dr. Norma Jean Mattei, traveled to Washington D.C. for the 2015 Legislative Fly-In. We learned about issues affecting the civil engineering profession with the main focus on improving our nation's deteriorating infrastructure. After discussing the issues with engineers from across the country, we shared the information we gathered with our elected representatives on Capitol Hill.

The Fly-In started with a younger member program designed to introduce the younger members of our organization to advocacy and the issues ASCE is supporting at this year's fly-in. Mr. Scott Asher of Colorado presented on the Colorado Springs report card and lessons he learned as he prepared the report card. Furthermore, Mr. Asher explained how he used the report card to inform the public and advocate for legislation. As a younger member myself, it was encouraging see how passionate and involved the other younger members were in their respective branches and sections. It was great interacting with the future of our profession.

The fly-in continued Tuesday afternoon with more training sessions followed by a dinner and awards presentation. Mr. Peter Rogoff, acting under secretary of transportation for policy at the U.S. Department of Transportation, and Rep. Earl Blumenauer were guest speakers. The main focus of the fly-in this year was fixing the nation's infrastructure and finding viable, sustainable funding solutions. Mr. Rogoff warned that short-term extensions have caused local and state leaders to "lose their vision" to plan long-term projects, which are what America needs most to be ready for future population growth and demographic trends. Rep. Blumenauer proposed a sustainable, long-term funding solution for the Highway Trust Fund, the UPDATE Act. The UPDATE Act would raise the federal motor fuels tax rate over the next three years and index the future rate for inflation.

Now prepared and well informed of the issues, civil engineers invaded Capitol Hill to visit their United States senators and representatives. As a group, the Louisiana Section representatives visited Senators Vitter and Cassidy. We then visited our respective representatives, Scalise, Graves, Boustany, and Fleming. Armed with the Louisiana Infrastructure Report Card prepared in 2012 and national data, we urged our representatives to come up with a solution to fund infrastructure projects. The current funding mechanism is outdated and cannot keep up with the demands of our growing nation. For the most part, the elected officials agreed that the state of our current infrastructure needs improvement. Now, they need to agree upon a mechanism to fund the necessary improvements.

The Legislative Fly-In concluded with a reception and a preview of ASCE's new IMAX film "Dream Big: Engineering Wonders of the World." The OPAL Awards followed the Fly-In Thursday night, which Dr. Norma Jean Mattei and Nedra Davis attended.

(Left to Right): Nedra Davis, Joey Coco, Senator Vitter, Dr. Kam Movassaghi, Matt Redmon

(Left to Right): Dr. Norma Jean Mattei and Nedra Davis at the OPAL Awards

ASCE-COPRI Louisiana Chapter News

By Erin Rooney, 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 by conducting joint seminars with local Branches and State Sections of ASCE.

The chapter held a spring seminar at the Port of New Orleans on April 29, 2015 regarding Mississippi River navigation and maintenance. The event featured Steve Jones, Chief of Navigation for the Mississippi Valley Division, discussing the Mississippi River system from a programmatic perspective including dredging activities and an overview of inland navigation in the US. The event also featured Don Rawson with the USACE New Orleans District discussing the lower Mississippi River bank stabilization program, including challenges and data collection. The event was well attended and informative.

National COPRI will be holding the PORTS '16 Conference in New Orleans June 12-15, 2016 at the New Orleans Marriott. The theme of the conference will be "PORTS: Gateways to a World of Opportunities". Share your valuable experience with the global ports and harbors development community by attending the conference. Sponsorship and Exhibitor opportunities are currently available; please contact Sean Scully (sscully@asce.org) with any questions about available options. Reserve your spot in the exhibit hall soon and don't miss out on this exciting opportunity to network with the ports and harbors community. The PORTS Conference series is internationally recognized as an outstanding opportunity to network with hundreds of practitioners, researchers, and specialists at the leading edge of the port engineering profession. For the most up-to-date information, please visit http://www.portsconference.org/.

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 L.COPRI Young Professionals Group (YPG) participated in the Lake Pontchartrain Basin Foundation Spring Sweep on March 21. The entire event included 530 volunteers collecting approximately 3,530 pounds of trash and 36 bags of recyclables. The Spring Sweep was part of Keep America Beautiful's Great American Clean-Up. The YPG also participated in the ASCE student meeting at the University of New Orleans on April 15 by presenting information on the field of coastal engineering.

A P3 For Waterways Infrastructure Subcommittee of the Waterways national committee has been established. The purpose of the committee is to assess the USACE's implementation of Section 5014 and evaluate whether ASCE should make changes to its existing policy on public-private partnerships, Policy Statement 526, among other possible subcommittee activities. The subcommittee will also coordinate with the COPRI Ports & Harbors Committee, and the ASCE Policy Committee. Early coordination with the P3 team at the USACE Institute of Water Resources and USACE Headquarters has begun. The subcommittee is currently seeking volunteers. If you want to join, please contact Dennis Lambert (delm@cowi.com).

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 Erin Rooney, at LCOPRI@yahoo.com.

ASCE-T&DI Louisiana Chapter News

By Joffrey Easley, PE - Newsletter Editor

New Member Announcement

T&DI would like to welcome Chad Turner to the Executive Committee. Chad was nominated by Monica Herrera, who is no longer able to serve on the committee due to her recent relocation to Texas. Chad has worked as an Environmental Scientist with Providence since June 2013. His areas of focus are environmental permitting and compliance. He is actively involved in all phases of the Section 10/404 and Coastal Use permitting processes for clients in a variety of sectors in Louisiana and the surrounding states. Prior to joining Providence, Mr. Turner worked in the Louisiana Department of Transportation and Development (LADOTD) Environmental Section for four years as an Environmental Impact Specialist. He obtained a BS degree in Biological Sciences from Louisiana State University in 2008.

LADOTD BDEM and Revised Concrete Specification Seminar

On February 26th, the T&DI Louisiana Chapter hosted a seminar on the recently published LADOTD Bridge Design and Evaluation Manual (BDEM) and the soon to be updated Concrete Materials Specification. The seminar was held at the LSU TTEC auditorium in Baton Rouge. The speakers were Zhengzheng "Jenny" Fu, PE, who acts as the Assistant Bridge Design Administrator for LADOTD and John Eggers, PE, with the LADOTD Construction Division. Ms. Fu presented on the organizational changes and major provisions of the BDEM and Mr. Eggers discussed the upcoming changes to the concrete specifications. This seminar was very well attended and the speakers did a great job of presenting not only the changes to the new documents, but also the reasons behind the changes. Thanks you everyone who attended!

Blueprint for Louisiana Growth Management and Transportation Seminar

The Chapter also held a seminar on May 5th at the UNO Engineering Auditorium to highlight the work the Merritt C. Becker, Jr. UNO Transportation Institute (UNOTI) recently completed related to the establishment of a growth management policy for the state of Louisiana. The speakers for this seminar were Eric Kalivoda, PhD, PE and John Renne, PhD, AICP. Dr. Kalivoda presently serves as the Deputy Secretary for LADOTD and Dr. Renne is an Associate Professor of Planning and Urban Studies at UNO and he also serves as the Director of the Merritt C. Becker, Jr. UNO Transportation Institute.

Louisiana State Science and Engineering Fair

T&DI again participated in the Louisiana State Science and Engineering Fair. The event took place March 24th and 25th at the LSU Student Union Royal Cotillion Ballroom in Baton Rouge. T&DI members served as judges for both the Junior and Senior Divisions and presented awards for the top two transportation-related projects in each division. In the Junior Division, the First Place Award went to Neelambar Mondal for his project entitled "Winglets: One Small Wing Extension, One Giant Change in Flight Distance." Second place went to Jude Thibodeaux and Zachary LeBoeuf for their project "Wing It". The Senior Division First Place Award went to Marygrace Duggar and Olivia Guidry for their project "A Greener Shade of Grey: The Effects of a Novel Water-Reducing Geopolymer on SO3 in Non-Standard Coal Combustion Residues". The Second Place Award went to Chancey Cothren for "Safety in Bridge Design". Congratulations to all winners!

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 in your preparation. Contact Michael Paul, PE, at MPAUL@trcsolutions.com for a copy of the checklist. Seminars are two hours in length and are typically presented from 5:30-7:30 pm in either the New Orleans or Baton Rouge areas. 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. The Louisiana Chapter is planning the following future seminars:

- I-49 South Corridor
- Louisiana ITS
- Toll Road Feasibility for I-10/LA 1 connector in Baton Rouge
- Pavement Engineering (Part 3 of 3) Application of Earthwork and Embankment Materials
- New Pavement Design / Empirical Methods
- Mitigation Banking

Junior Division Science Fair Winners – from left to right; Neelambar Mondal, Zachary LeBoeuf, and Jude Thibodeaux

Senior Division Science Fair Winners – from left to right; Marygrace Duggar, Olivia Guidry, and Chancey Cothren

THESE ARE CHANGING TIMES

By Deborah Ducote Keller, PE

Deborah Ducote Keller, PE

"What's Changed in the Practice of Engineering Consulting in the New Millennium?"

"Progress is impossible without change, and those who cannot change their minds cannot change anything."

---George Bernard Shaw

As many of my peers know by now, after nearly 27 years of service I have retired as chief engineer at the Port of New Orleans to start Deborah D. Keller and Partners, LLC. Returning to the private sector brings me full-circle to where my engineering career began 36 years ago.

In between packing and unpacking an enormous number of boxes during the transition, I had plenty of time to think about the changes that have evolved in the practice of engineering. My reflections come from wearing many "hard hats" that gave me several perspectives, including project engineer, project manager, owner's representative, chief engineer, and now, owner and CEO of the consulting engineering firm.

HOW WE WORK

It used to be that a consultant engineer was basically an 8-hour a day job, weekdays only position mainly in an office environment. The exception being emergencies or firms engaged in operations for their clients.

Outside of normal working hours, when the office was closed, the business was closed. Rarely was work brought home. It was nearly impossible to do work (the verb), if not at work (the place). Computers, modems, drafting equipment, paper documents, and co-workers were available only at work (the place).

Today, there is only work (the verb) because we are expected to conduct work anywhere, at any time, in order to provide exceptional service to the clients, who are may also be working 24/7. Engineers with a laptop and cell phone are not confined to work (the place).

Where do we work? Everywhere.
When do we work? As needed.
How do we work? On remote access into the firm's main computer or that of data storage companies, such as Apple's iCloud, and with communication systems described below.

HOW WE COMMUNICATE

Being highly mobile and accessible means we communicate via a quick text or voice message using a cellular phone, or a more detailed email message with digital files attached via a desktop computer or mobile device, or posting on social media, or using websites and file sharing apps, such as Dropbox. Formal memos and letters are reserved for the most official correspondence. Typing, is now call keyboarding, and hunting and pecking to find the keys is now a handicap. Fortunately for me, I took typing class in high school thinking I was headed to a career in journalism.

HOW WE COMPETE

In the past, engineering firms didn't consider branding and marketing as necessary to attract and retain clients. Today, the older, well-established firms with a strong brand may not be as concerned as a new firm is about branding. Less established firms face the challenge of evaluating their existing brand, as well as their business development/marketing department that may have been cutting-edge when the firm started, but have now fell behind the times. It used to be that if a firm was properly licensed to practice and had the required licensed engineer in responsible charge, no other certifications were necessary.

Today, qualified firms can seek additional certifications as small business enterprises, disadvantaged business enterprises, minority business enterprises, women-owned enterprises, disabled service veteran enterprises, etc. when competing for contracts with entities that choose to give additional consideration to these segments of the business community. Those firms without such certifications, may be looking to add such firms to their teams, especially if required by the client

HOW WE ARE AWARDED CONTRACTS

In the past, personal relationships with the decision-makers were sufficient to receive consulting contracts. Firms had a tendency to remain in their original geographic area or niche expertise.

Acquisitions and mergers of firms were not as common today. This is probably due to an increase in ownership by venture capitalists and public stockholders that are seeking a more immediate return on their investments than firms wholly owned by its officers.

In addition, Hurricane Katrina created such an overwhelming demand in southeast Louisiana that firms lacking opportunities elsewhere came here and stayed. The quantity of licensed engineering firms increased in a very short period of time. Many of the post-Katrina firms have retained their presence in Louisiana with local offices. However, the level of disaster recovery work is never sustainable, and after ten years, most work has been completed. Most firms are now feeling the pinch of supply exceeding demand.

Transparency in selection has increased the use of the formal RFQ/RFP solicitation process in which Statements of Qualifications and Proposals are solicited for Quality Based Selection. This is often mandated in the public sector, which must comply with applicable local, state, and federal laws. Unfortunately, there still are misconceptions by many government entities about applicable statutes, such as whether price is allowed as a factor in the selection.

Having personally reviewed hundreds of these submittals in my government career, I can attest that many firms do not grasp that the goal is to have the evaluators choose your firm based on how correctly, clearly, and concisely the information is submitted, and how well it aligns with the scoring criteria. Having a strong brand that is favorable and familiar to the evaluators is certainly an advantage going into the competition. The founder of Amazon.com, Jeff Bezos, has said "Your brand is what people say about you when you're not in the room."

HOW WE MEET CLIENT NEEDS

That's up to you.

ACADIANA BRANCH

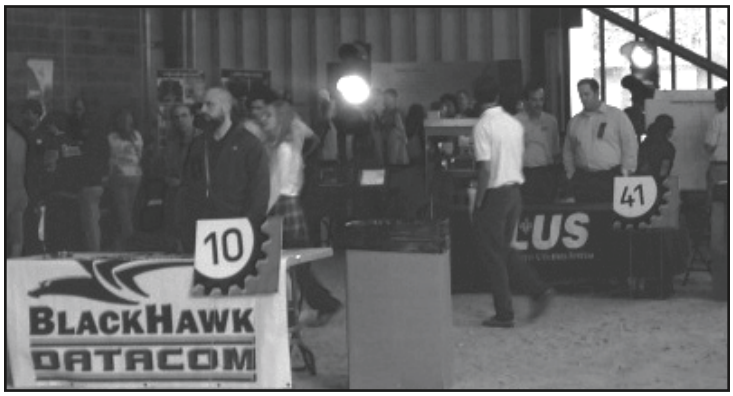
By Beau J. Tate, PE, Branch President

The Acadiana Branch had a successful February luncheon hosting Professors from the University of Louisiana at Lafayette, Matthew Fadden, PhD, and Chris Carroll, PhD. They both provided very interesting and technical presentations summarizing the Structural Engineering Research both themselves and students are currently involved with.

Switching gears from a technical luncheon our March meeting was centered on the candidates seeking election for 2016 Lafayette City/Parish President. Dee Stanley, Lafayette Consolidated Governments Chief Financial Officer, and Joel Rodideaux, State Representative, Lafayette, presented to the group and illustrated their knowledge and dedication to Acadiana, the outlying communities, and the residences. Lafayette Consolidated Government has a bright future ahead with either candidate leading the way.

In May, the board is planning to hold a meeting/luncheon in Lake Charles, so that we can increase involvement of the McNeese student chapter and Professionals from the Lake Charles area. More details will follow when the venue and meeting topic has been established.

Additional activities the Acadiana Branch participated in included The UL College of Engineering and the UL Student Chapter of the Louisiana Engineering Society, LES, held their annual Engineering and Technology Expo Day on Wednesday, March 11, 2015. This E&T Expo is an opportunity for interested students to tour UL's College of Engineering and get a "close up" look at what UL has to offer in the fields of engineering and technology. In addition to being able to interact with current students and faculty, there is many companies that hire engineers that participate in the expo showcasing their businesses. The Acadiana Branch of the ASCE has traditionally participated in this E&T Expo and this year was no different. The E&T Expo will give you an idea of what engineers do and what types of careers are available to today's engineering graduate.



In addition to the monthly meetings, I would like to mention the technical project article, which has been included in the Acadiana Branch newsletter. This quarter the branch has received a technical letter prepared by Travis Smith, PE from the Lafayette Department of Public Works entitled "Future Traffic & Roadway Projects."

Both the University of Louisiana at Lafayette (UL) and McNeese State University participated in the 2015 Deep South Conference in Oxford, Mississippi, where they competed in several competitions, including Steel Bridge, Concrete Canoe, Mead paper, concrete bowling ball, and a survey competition.

UL awards included second place in the men's endurance, women's endurance, men's sprint, and co-ed sprint concrete canoe races, and Pascal Lalande also won 3rd place in the Daniel W. Mead Professional Paper award for his paper entitled "Should an Engineer be held accountable for the safety of individuals during the construction of their design."

McNeese competed in the same events, and also competed in the mystery event that entailed designing a bridge out of spaghetti noodles, however they did not place in any event, but represented the school very well.

Students have already begun to discuss plans for the 2016 Deep South Conference, which is being hosted by McNeese for the first time. There will be a need for judges for each competition, sponsors, and volunteers to help organize the event. The Acadiana chapter will be assisting McNeese in hosting this event and looking to professionals for assistance.

BATON ROUGE BRANCH

By Kirk Lowery, PE, Branch President

The Baton Rouge Branch hosted the 2015 ASCE Annual Spring Conference at the Hilton Capitol Center on April 16th and 17th. More information about this wonderful event is presented in the Section News on page 14. In other news, the branch was very busy with the February and March luncheons as well as Engineers' Week and hosting a tailgate party at the LSU baseball game.

(left to right): Winners of the scholarships, Vernell Banks of Southern University and Alicia Fortier of LSU

After reviewing the submissions for the annual collegiate scholarship provided by the Baton Rouge Branch, two candidates emerged as the most worthy. One student from LSU and one from Southern University made a decision for either very difficult. The branch leadership decided that each student was worthy and agreed to provide each student with a $1,000 scholarship. This decision was made easier because of the generous giving of the Baton Rouge Branch membership this year. As President, I really want to say thank you to our members and their firms for their generosity. The winners of the scholarships this year were Vernell Banks at Southern University and Alicia Fortier at LSU. Both are or were the presidents of the student chapters and will be outstanding additions to the engineering profession.

The Baton Rouge Branch co-hosted with the Baton Rouge chapter of LES a luncheon at Juban's on May 28th. This year's speaker was Baton Rouge Mayor Kip Holden who spoke about the state of East Baton Rouge City Parish. This event is always well attended and allows our members to converse with other engineering disciplines.

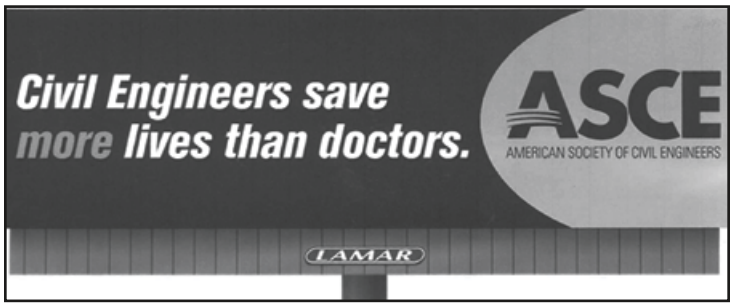
NEW ORLEANS BRANCH

By Lee M. Alexander, PE, F.ASCE, Branch President

Winter heated up in January with our guest lecturer, Charlotte Babson, speaking on the pending Fracking project in St. Tammany Parish. The event was well attended and the many questions had to be shortened due to time constraints. Helis Oil did a fine job presenting their case and expanding on the community efforts to resolve all the issues.

Following the search for new oil sources, our February guest was the COO of Entergy, Mark Savoff. Entergy is a multi-billion dollar a year firm with more than 30,000 employees. The presentation was upbeat, and vey educational. An added bonus was his announcement that Entergy will hire 1,500 engineers this year!!

February also was the month that our Chapter had two full size electronic billboards on I-10. A simple message "Civil Engineers Save more lives than Doctors". Over 750,000 vehicle passed by the billboards during the month. The Directors of three area hospitals contacted us and liked the concept that safe drinking water and sanitary sewers prevent more deaths world-wide than any medicine. Something to ponder.



February continued to be a busy month, as our chapter was a judge and sponsor of the Greater New Orleans Science & Engineering Fair held at the University of New Orleans. We presented the following awards:

Junior Division

1. Dominic Stoner "What Ratio of Sand/Gravel is Best?" Christian Brothers-teacher Bro. Konersmann
2. Joshua Dudenhoeffer "Does a Beam Bridge Hold More Weight Than a Suspension Bridge?" John Curtis School-teacher Kathy Bush

Senior Division

1. Ashton Austin "Can You Trust a Truss?" John Curtis School-teacher Boucvalt
2. Dominic Lincoln "What Increases Load Bearing Capacity in Soil?" Holy Cross-teacher Katherine Schilling

Dr. Anna Shidlovskaya, from the University of Mines in St. Petersburg, Russia, made a interesting speaker in March for the Geotech Committee on "The Long Term Deformation of St. Isaak's Cathedral in St. Petersburg Russia-A Case History".

Dr. Norma Jean Mattei, our pride and joy from UNO was our guest speaker in March to discuss ethics and sustainability. It's now official that she is vying for the coveted title of National President of ASCE. Our Branch has unanimously endorsed her and encourages all to vote for her in the near future election by electronic vote.

SHREVEPORT BRANCH

By David Smith, PE, Branch President

The first quarter has flown by for all of us here in the Northwest region of Louisiana. With plenty of distractions, like Mardis Gras and March Madness, and a compliment of work and more work, don't forget to focus on the important things in life, Family and Fun…

The ASCE Shreveport Branch may not be the largest branch in the state, but we try to work just as hard to provide our members with quality presentations on technology, materials and procedures, and regulatory changes that are relevant to the area and profession. Our speaker for the January meeting was Dr. Henry Cardenas, a professor at Louisiana Tech, and superb engineer and scientist. Dr. Cardenas gave a mind-blowing presentation on how he and his research team have developed a way to return strength and add corrosion protection to concrete structures, by applying electricity. The process can be cost effective and with minimal disturbance to the existing structure. You can learn more in his publication Nanomaterials in Concrete: Advances in Protection, Repair, and Upgrade. In February, the new Executive Director of the Shreveport-Caddo Metropolitan Commission, Mark Sweeney, gave an enthusiastic presentation on how his office is working hard to update, improve, and streamline permitting procedures and the Unified Development Code. A large group of engineers in the Shreveport area have to work closely with the City of Shreveport and the MPC on a regular basis, so this was a particularly informative luncheon for those members.

The ASCE Shreveport Branch is also having a good year with respect to the community, and it's due to our members' selflessness. The members have been giving back to the community through different events, such as the High School Engineering Olympics, hosted by Sci-Port in Shreveport during Engineering Week, and MathCounts. With these members' support, the Branch is able to provide scholarships to outstanding junior and senior civil engineering students from LA Tech. This year, the faculty at LA Tech nominated two seniors, Mallory Dupont (Chapter President) and Graham Hogsett (Steel Bridge Capt., not pictured) and one junior, Katherine Lybrand (Conc. Canoe Capt.) for the awards. The students were presented with their scholarships at the Annual Winter Banquet held at LA Tech, hosted by ASCE, AGC, Chi Epsilon, and NASTT student chapters.

Mallory Dupont – Outstanding Senior

Katherine Lybrand – Outstanding Junior

The annual ASCE Shreveport Golf Tournament, a 4-man scramble held at Olde Oaks Golf Course, was on April 24th, 2015. We had a great day of golfing, with over 40 attendees. Local engineering firms were gracious in their support and sponsorships. At the end of the day, the gentlemen representing Raley & Associates, Inc., brought home the trophy for the 3rd year in a row. Congratulations, men!

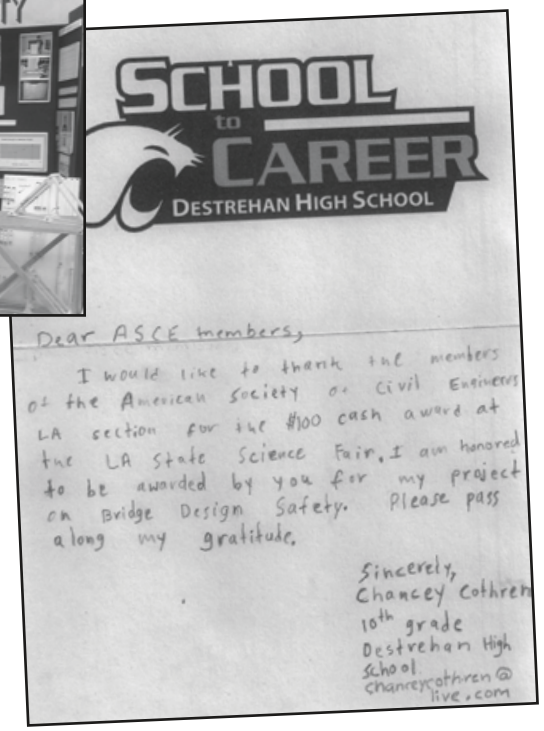
Team Raley: Bill Mayfield, Dean Mayfield, Reggie Lewis, and Michael Kelsch

The proceeds from the tournament will go to next year's scholarship allotment for a Junior and Senior Outstanding Engineering Student(s) from Louisiana Tech in Ruston.

Finally, we want to congratulate the ASCE Student Chapter at LA Tech for their impressive showing at this year's Deep South Conference. The chapter, led by Katherine Lybrand, Graham Hogsett, and other officers put forth a phenomenal effort to place 1st overall. Both the Concrete Canoe and Steel Bridge teams qualified for the National competition. Good work guys and gals.

Thanks to everyone for the support and individual efforts that make our community and profession better every day.

Chancey Cothren



ASCE-SEI New Orleans Chapter News

By Om Dixit, PE, FASCE, F-SEI & L.T. Cooper, PE, FASCE, F-SEI

The ASCE SEI New Orleans Chapter has gotten off to a fast start in 2015, hosting and planning seminars and workshops and volunteer efforts. All seminars are held from 5:30 PM to 8 PM, except for the API workshop which will be held from 8:00 AM to 4:00 PM.

On January 21, 2015, SEI New Orleans Chapter invited New Orleans speakers **Michael Folse, PhD, SE, Jay Jani, PhD, PE**, **and Steven Fall, PE** to present the seminar ***"The Direct Analysis Method in accordance with AISC Code.***" The Direct Analysis Method (DAM) is the simplest way to insure conformance with current requirements of the AISC. This presentation outlined the steps for using the DAM in steel structure design and give background and supporting information. The speakers presented a brief history and the current AISC requirements about using DAM followed by a simple example designs using "manual" computations, STAAD, and RISA. The seminar was attended by about 78 members

On February 26, SEI New Orleans Chapter invited speakers **Benan Zahawi, SE, Shaun Gill, P.Eng., Dan Grandal, PE, CFM LEED AP, Rian Johnson, PE** to present the seminar ***"USACE Permanent Canal Closures and Pumps in New Orleans"*** The seminar presented the design criteria and the software used for design. The coordination between the structural design software and pile foundation analysis was presented. The construction problems and schedules were also discussed. The seminar was attended by about 67 members.

On April 02 SEI New Orleans Chapter invited speakers **Marc L. Levitan, PhD,** (from National Institute of Standards and Technology, Washington, DC) to present the seminar **"*Tornadoes, Hurricanes, and Other Windstorms: Advances in Engineering Design for Extreme Winds"***. The first half of the presentation provided an overview of the NIST technical investigation of the May 22, 2011, EF-5 tornado that destroyed much of Joplin, Missouri. It was the deadliest single tornado since the beginning of official record keeping in 1950, causing 161 fatalities. The second half of the seminar provided a review of major changes in recent and upcoming wind loading standards, codes and guidelines, including ASCE 7-16, which has a number of significant changes on the way. The seminar was attended by 71 members.

SEI New Orleans Chapter seminar on April 2, 2015. Seminar Coordinator Dr. Norma Jean Mattei, PE (on left) with Speaker Dr. Marc Levitan, (center) and Dr. John McCorquodale, Chairman Civil and Environmental Dept

Other topics for the future seminars include:

- **The David Hunter Lecture** for 2015 will be: *The Building of a Building Code* (ACI 318-14), presented by **Randall W. Poston, PhD, PE, SE,** on April 28.

- New *API Structural Standards Workshop* (API 2A, 2SIM, 2MET, 2EQ, and 2GEO), co-sponsored with the American Petroleum Institute (API), presented by various API Subcommittee 2 members on May 12.

ASCE SEI New Orleans Chapter sponsored Coaches Lounge at the LES Regional MathCounts competition held at University of New Orleans in February 2015 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 2015. The award winners were:

Junior Division

The First Place ($150) award was given to **Andrew Dupuy** of St. Benilde for his project "Does the design of a bridge affect the amount of weight it can support?" The Second Place ($100) award was given to **Dominic Stoner** of Christian Brothers for his project "What Ratio of Sand/Gravel is best? (in Concrete Mix)". The Third Place ($50) award went to **Deontre Ford** of Benjamin Franklin for his project "Which Bridge Design is the Strongest?"

Senior Division

The First Place ($150) award was given to **Corinna Zengel** of Benjamin Franklin High School for his project "The Effect of truss design on bridge strength?" The Second Place ($100) award was given to **Peter Howard** of Benjamin Franklin High School for his project "Effect of temperature on the tensile strength of five wood based materials?" The Third Place ($50) award went to **Dominic Lincoln** of Holy Cross for his project "What increases load bearing capacity in soil?

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 **Cecilia Wilson** (St. Benilde); **Bro Laurence Konersmann** (Christian Brothers); **Mi Wha Fontenot** (Ben Franklin), **Sally Spahn** (2 award) (Ben Franklin), and **Katherine Schilling** (Holy Cross). Starting to give the awards to the teachers of the winning projects from last year showed the results in the quality and quantities of the Structural engineering projects in this year's Science Fair.

Student Chapter News

LOUISIANA STATE UNIVERSITY

By Kelsey Schmaltz, Student Chapter Secretary

ASCE at LSU has held general student chapter meetings this spring semester on February 23rd, March 9th, and March 30th. Our guest speakers included Bryan Beyer, PE, who talked about his experience in the Navy, Brian Smith, PE, and Mark Morgan, PE, from SEMS Inc., who spoke about environmental engineering, and Matthew Blackwell, PE, from BASF, who discussed his civil/structural engineering career after graduating. Our upcoming meetings of the semester will be held on April 13th with SJB Group, LLC and April 20th with Terracon. If you are interested in speaking at one of our meetings in the fall semester about ethics, professional development, licensure, current civil/environmental projects, etc. please contact us: asce@lsu.edu

Our Steel Bridge and Concrete Canoe teams participated in the 2015 ASCE Deep South Regional competition this past March in Oxford, MS. The Concrete Canoe team members Alicia Fortier and Amy Olson placed 1st in women's sprints with a race time of 1:55, and the Concrete Canoe team placed 3rd overall in the competition. The Steel Bridge team placed 1st in construction speed with a build time of 18:41, and team member Laura Iverson placed 2nd in the Daniel W. Mead contest. We are very proud of our tigers! Thank you to all our donors and sponsors who helped us this year! It would not be possible without your donations and continued support.

To learn more about our ASCE chapter at LSU, please visit asce.lsu.edu.

LSU Steel Bridge Team 2015 - Left to right: Patrick Stiegman (Co-Captain), Brad Jacobs (Captain), Nicole Bell, Penny Lala, Miranda Vidrine, Joe Boley, Brandon Boucher, Chris Watson

LSU Concrete Canoe Team 2015 - Left to right: Christa Cook, Laura Iverson, Amy Olson, Alicia Fortier (Co-Captain), Brendan Copley (Captain), Adam Linson, Enrico Targa, Danny Gutierrez

MCNEESE STATE UNIVERSITY

By Holli Soileau

The students at McNeese State University have been busy preparing for the completion of the spring semester. Although, in the midst of all these preparations, we have remembered the families and citizens of Nepal. Members of McNeese ASCE, who are also members of Nepalese Students' Association (NSA), held an event on April 30, 2015 to raise awareness of the earthquake in Nepal. For any questions of the recent event, or question of how to help, please contact our president, Jessica Trahan.

McNeese ASCE would also like to recognize all the students who have put in so much time and hard work to making our group so successful! First, we owe a lot of gratitude to our president, Jessica Trahan. She has been a dedicated member of ASCE throughout her duration here at McNeese State University, while also serving as our president for the past three years. Recently, she was awarded as a Distinguished Civil Engineering Senior. We are very proud of Jessica and her guidance she has brought to our group.

Other students we would like to recognize are Alvin Trahan and Nicoleta Muresan. Alvin has received the ASCE Outstanding Member award. He is also the brother of Jessica, and has dedicated many hours to ASCE. We look forward to what Alvin has to offer in the future years ahead. Nicoleta has received a military engineering scholarship. She has a bright future with McNeese ASCE.

Finally, we are proud to announce that the ASCE Deep South Conference will be held here in Lake Charles, Louisiana. Plans have already begun to prepare for the annual conference. We are in need of volunteers to assist with plans, areas of judging, as well as judges for each category of participation. If interested in assistance, or if you have any questions, please email MSU ASCE at mcneeseascestudentchapter@gmail.com.

UNIVERSITY OF LOUISIANA AT LAFAYETTE

By Taylor Heirsch, Student Chapter Secretary

Since the last update, the UL ASCE student chapter took 23 students and 2 faculty advisors to Oxford, MS, to compete at the 2015 Deep South Conference. In Oxford, the UL students participated in various events such as the steel bridge, concrete canoe, surveying, and bowling ball competitions.

The AISC National Student Steel Bridge Competition consists of a group of students fabricating a steel bridge and then constructing it during competition. The competition is then judged based on a weighted formula which takes into account construction speed and the weight and deflection of the bridge. The Student Steel Bridge Competition provided design and management experience, opportunity to learn fabrication processes, and the excitement of networking with and competing against teams from other colleges and universities.

The concrete canoe competition is an event in which students design and build a canoe out of concrete and then compete in various races against other teams. This year, following a Louisiana theme, the UL concrete canoe was named "S.S. Wayne Toups". After contacting Mr. Wayne Toups, a Grammy-winning Cajun musician, he agreed to sign the concrete canoe and have a meet and greet with the team. This event got a lot of attention from local media stations and brought our community together all while giving recognition to the students' hard work. The team was excited to bring home second place in the men's endurance, women's endurance, men's sprint, and co-ed sprint races.

One of the most important competitions at the conference is the Mead Paper competition. Without participation in this event, the school cannot qualify for national events. Pascal Lalande represented our University in Oxford. The topic of this year's Mead Paper was "Should an Engineer be held accountable for the safety of individuals during the construction of their design". Pascal Lalande placed 3rd in the Daniel W. Mead Professional Paper competition.

The UL ASCE student chapter also participated in the concrete bowling ball and surveying competitions in Oxford. These competitions were only part of the regional conference and acted as icebreakers throughout the conference weekend. The concrete bowling ball is a competition where teams are expected to design and construct a bowling ball made of concrete that weighs less than 16 lbs and can compete in a five frame game without losing more than 2% of its mass. The bowling balls were judged on creativity and aesthetics. This year the team chose a Mardi Gras theme and they called themselves "Laissez les Bon Temps Rouler," which translates to "let the good times roll". The team found a way to incorporate Mardi Gras beads into their concrete mix design and named the ball "Bon Temps."

The team conducted a land survey similar to those commonly practiced by licensed surveyors in an area that was chosen by the host school. The competition consisted of three events: steel tape, level loop, and coordinate determination.

The ASCE student chapter has a few more events planned before the conclusion of the 2014-2015 academic year. There is an ASCE meeting scheduled for April 14th at 6:30 pm in Oliver Hall Room 112. Guest speaker, Robert Miller, PE, will give a presentation on Flood Zone Maps.

The senior design class gives graduating seniors major design experience in an engineering project involving realistic constraints and multiple sub-discipline areas of civil engineering. The Spring 2015 graduates will showcase their hard work on April 20th in the Oliver Hall.

To wrap up a great academic year the UL Chi Epsilon Honor Society, along with the ASCE student chapter, will host the annual departmental banquet on May 1st at the Petroleum Club.

LOUISIANA TECH UNIVERSITY

By Seth Strong, Student Chapter President

The American Society of Civil Engineers chapter at Louisiana Tech University has had quite a successful year. ASCE, though active in the community, usually has two large competition aspects to it: Steel Bridge and Concrete Canoe. Both are design competitions where the students go through the entire process, from design to fabrication, and ultimately competing with their finished product. The competitions also feature display portions where information is displayed and the overall aesthetics of the creation is judged. The Steel Bridge Team made their bridge spirited, featuring Louisiana Tech's colors of red and blue, while the Concrete Canoe Team themed theirs around Tech's research involvement with NASA. The canoe was named Dawgpollo 15, playfully referencing the Apollo missions with Tech's own mascot the bulldog. The 15 was added because of the year, 2015, but also because of how they are looking forward to the future. The spaceship created on the canoe is also pointed toward the bow because of their desire to continue building and exploring new ideas in both the competition and the field of Engineering. Other design features of the canoe include galaxy scenes and the phases of the moon. Along the rib, the 12 tenants of Louisiana Tech are stained. This detail has been a tradition for many of the past canoes, linking them to the school and the teams of years past. Besides designs on the cone, the aesthetics team also created a fuel cell as a display board, and a cutaway section featuring the same galaxy design as the canoe, to showcase the entire process from mold to sealant.

The two teams recently competed at the annual ASCE Deep South Conference hosted in Oxford, Mississippi this year. A total of eleven schools from Louisiana, Arkansas, Mississippi, and Tennessee were competing in Concrete Canoe and Steel Bridge, as well as smaller, bonus events that do not have a national level. These other events were Concrete Bowling, the Mead Paper - a paper and presentation competition on engineering ethics, and a "Mystery Event". This year the "Mystery Event" was to construct a bridge out of spaghetti noodles. Louisiana Tech competed in all of the available events, and qualified for nationals in Concrete Canoe and Steel Bridge. They received 9 awards overall, including Women's, Men's, and Coed Sprint races, Coed Endurance Race, Oral Presentation, and Design paper, earning a first place overall finish. Steel bridge received first place in display and second place overall.

The success was prefaced with a fair share of difficulties though. This year featured a high percentage of younger members for each group, and was greatly considered a "rebuilding year". The loss of the strong senior class was difficult to work through, but in the end, it allowed them to grow even stronger for the years to come. For instance, the Steel Bridge Team had to learn the fabrication processes, including how to operate the plasma cutter to make the individual steel pieces. The students even had to teach themselves how to weld so that they could construct the bridge. They also utilized as many resources as possible, such as contacting multiple professors for guidance. Currently, they have divided their group into two subgroups. One is working on fixing the bridge from regional competition. This group is composed of a few core members and some students who became interested in the event after seeing them compete. This is one step they are doing to ensure that the younger students have the opportunity to get involved and teaching methods are strong enough for if they become the future leaders. The other group of students is working on creating a new bridge design. After competing, they realized many ways that they could improve their creation, primarily focusing on structural efficiency. The goal is to make the bridge lighter while increasing strength and stiffness, two things measured at the competition. For a bridge to be eligible to be scored, it has to hold 2500 pounds without deflecting more than 3 inches vertically. It also has to pass a sway test, which puts 50 pounds on the structure laterally, and the bridge cannot deflect more than an inch.

Concrete Canoe also had their share of problems. The team is similarly highly consisting of younger students, so certain overhead tasks created some issues. For instance, when they ordered aggregates to create the concrete for the canoe, it took two months to reach them, delaying pour day as well as the subsequent curing time. This delay greatly affected the Aesthetic team who had to create the galaxy on the canoe. Another issue revolved around irrigating the canoe as it cured. The team created their own system to aid in the wet curing of the canoe. The system released water every few hours to moisten a canvas draped over the canoe, thus keeping it moist as well. This system was ideal because much of the curing time happened when the university wasn't actually in session. Unfortunately however, the system broke about halfway through the process, and team members had to manually add water every few hours, really dampening their break. Even with these issues, the team prevailed and qualified for nationals. Although improvements on the canoe cannot really be performed in preparation for nationals, the team is continuing to practice rowing to improve their race times for nationals. They are also working to perfect their oral presentation for nationals as well.

This is actually the first year since 2011 that both the Louisiana Tech Steel Bridge and Concrete Canoe teams have qualified for nationals. This success is quite promising for the futures of the individual ASCE chapter's members as well as the chapter as a whole, and the university is quite excited. Civil Engineering is one of the smaller disciplines of engineering at the university, but hopefully students seeing what Civils can do, and have done, will encourage them to consider a career in Civil Engineering, which could grow the department back up to similar numbers as when current president of Louisiana Tech, Dr. Leslie K. Guice was a student.

The Tech chapter of ASCE does more than compete though, this winter, they hosted the annual winter banquet along with the Associated General Contractors of America (AGC), Chi-Epsilon (XE), and the North American Society for Trenchless Technology (NASTT). This event is a wonderful opportunity for the chapter to meet with people in the industry and learn about what they do. The chapter then keeps those individuals updated on the various things done throughout the year. The banquet is also the time when scholarships in Civil Engineering and Construction Engineering Technology are awarded to several hard-working students.

ASCE is also active in the community. Recently, many of its members volunteered at the Boys and Girls Club of Ruston, teaching the children various things about engineering and sciences. In small groups, the participants had the opportunity to make ice cream in a bag, see the chemical reaction of baking soda and vinegar, and to

build a tower out of spaghetti noodles and tape that could still support a small weight. They also will participate in the Louisiana Tech University wide event "E&S Week" or Engineering and Science Week. This event helps promote the College of Engineering and Sciences and the various organizations to prospective high school students. Members will be both explaining what ASCE does as well as adding in the overall event organization. Another future activity is the annual "Burger Burn". This event focuses on generating student interest in ASCE and the competitions they participate in. It features free hamburgers for those that come to it, and is a generally lively event.

It has also been a priority this year to get our chapter more involved with the ASCE Louisiana Section Shreveport Chapter which consists of engineering professionals. Some of our members have attended the monthly luncheons in Shreveport where a different engineering topic is discussed to keep professionals up to date on the rapidly changing engineering industry. We plan to start a Spring Mixer with our student chapter and the Shreveport Chapter. At the Spring Mixer our Steel Bridge Team will set up their bridge on display and Concrete Canoe Team will presentation their Technical Presentation as if they are at conference. This will allow the Shreveport Chapter members a chance to see our progress for the year as well as learn more technical aspects of our Steel Bridge and Concrete Canoe projects. We plan to have the Concrete Canoe Technical Presentation atmosphere as close to conference as possible to better prepare our presenters. After presentations we plan for a more relaxed atmosphere allowing the younger student members to get to know the Shreveport Chapter more for upcoming years. This will also allow all student members to ask professionals any questions they may have about the engineering field.

With the school year winding down, Louisiana Tech University's ASCE chapter is clearly far from slowing down. Preparations for national competitions for both Concrete Canoe and Steel Bridge are the organization's primary priorities as well as preparing older members to take over executive rolls. Even so, the organization finds time to be a powerful presence at the university and the entire community of Ruston.

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- The certificate courses will cover physical, hydrodynamic, geological, geotechnical, environmental, ecological, management, and social aspects of Coastal Engineering, Coastal Sciences, and Coastal Restoration.
- Each certificate can be earned after successful completion of four (4) graduate level courses offered by UNO over a two-year period (Spring and Fall semesters).
- The Cumulative Grade Point Average (GPA) of the four courses must be a minimum of a B average (3.0) to earn the certificates.
- All courses will be offered in a dual format (classroom + online over the internet).
- All courses will cover material independent of each other and none of the four (4) courses are prerequisite to any other course. Depending upon work schedule and other commitments, the student can start taking the courses at any semester, or miss a semester, and take the missing course(s) when they are offered again.
- The students can also use these courses towards their M.S. in Engineering program.

Student Academic Requirements:

- Undergraduate degree from an accredited university in Engineering and Sciences (Civil, Environmental, Earth Sciences, Geosciences, Geology, etc.)
- Current graduate students from UNO or other universities can enroll in the courses
- Practicing Engineers with a B.S. degree in Engineering, Sciences, Geology or related fields are encouraged to enroll in the courses

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• Coastal Processes	• Coastal Processes
• Sediment Transport and Dredging	• Sediment Transport and Dredging
• Design of Coastal and Hydraulic Structures	• Coastal Restoration and Management

How to Apply to UNO:

Students interested in the coastal certificates will have to get admission to the University of New Orleans (UNO) prior to registering in the courses. The successful applicants will be admitted as a non-degree seeking post-bachelorrate student. An online application to UNO can be submitted at:
http://www.uno.edu/admissions/apply/index.aspx

How to Register in a course:

The students will be able to register in a course after receiving official admission confirmation from UNO. After getting admitted to UNO, the following link can be used to register in a class:
http://webstar.uno.edu/

Faculty:

Ioannis Georgiou, PhD Associate Professor, Earth & Environmental Science The University of New Orleans	Mark Kulp, PhD Associate Professor, Earth & Environmental Science The University of New Orleans
Malay Ghose Hajra, PhD, PE Assistant Professor, Civil & Environmental Engineering The University of New Orleans	John Alex McCorquodale PhD, PE Professor, Civil & Environmental Engineering The University of New Orleans

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ADVANCED REGISTRATION DEADLINE

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CANCELLATION DEADLINE

— CALENDAR OF EVENTS —

AUGUST 2015

August 5-7, 2015	**HEC-RAS Computer Workshop** Tampa, FL
August 26-28, 2015	**Structural-Vibration Analysis: Design and Troubleshooting** Atlanta, GA

SEPTEMBER 2015

September 2-4, 2015	**Structural Design for Bomb Blast Loads and Accidental Chemical Explosions (Buildings and Industrial Facilities)** Atlanta, GA
September 10-11, 2015	**Seismic Design of Highway Bridges** Tampa, FL
September 17-18, 2015	**Wind Loads for Buildings and Other Structures** New Orleans, LA

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

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