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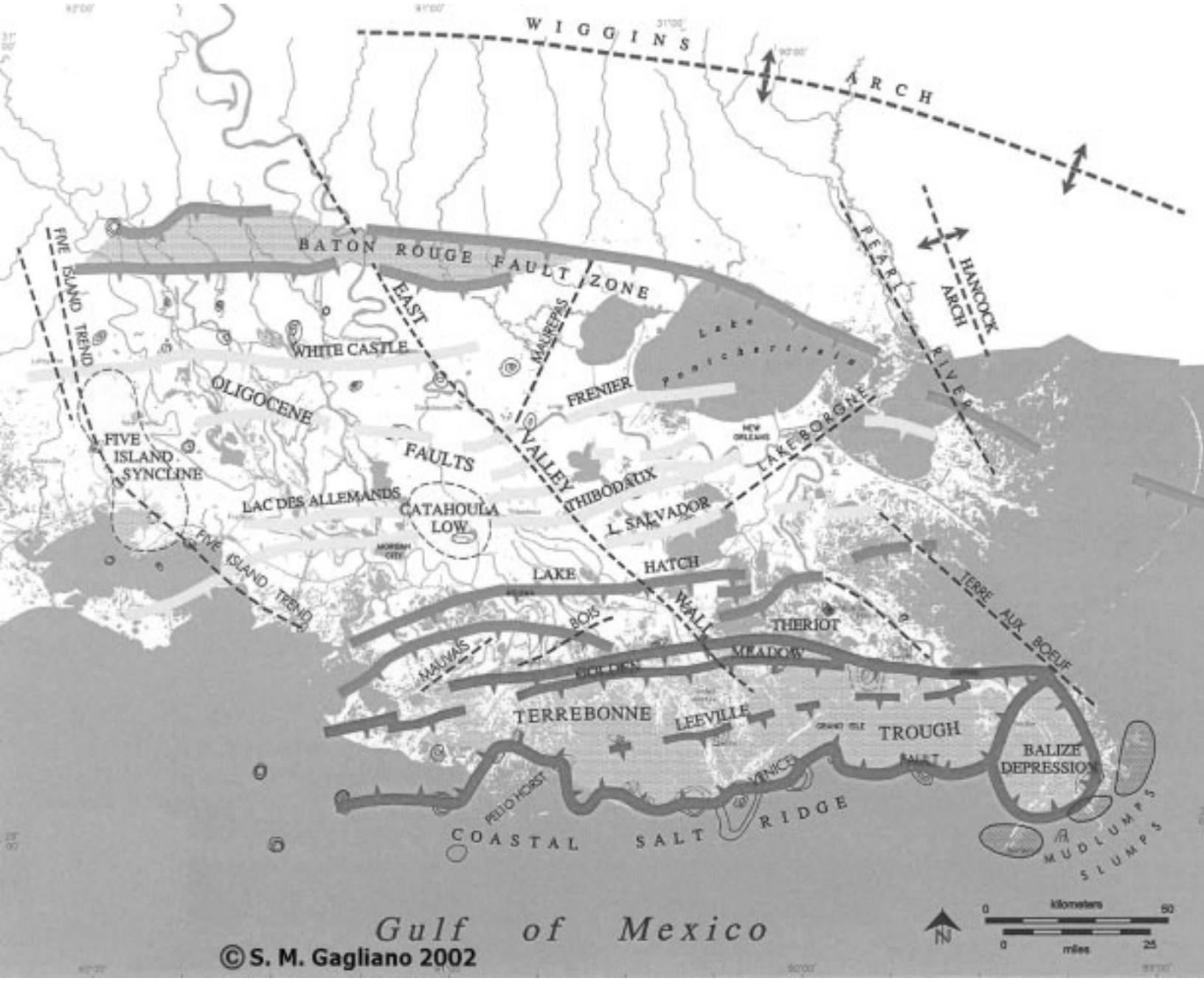

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President's Message

Norma Jean Mattei, PE

Since the beginning of the year is traditionally the time for personal reflection and New Year resolutions, I decided to make reflection and resolution the subject of my President's Message. Parts of this article are taken from the article "Lyle's Law of Becoming" by Lyle D. Feisal, PhD, PE, published in the summer 2004 issue of *The Bent of Tau Beta Pi.*

My nephew, Christopher, is a 16-year-old neophyte driver. Recently, I had the pleasure of helping him practice. He was behind the wheel and driving through the neighborhood. We avoided busy streets and the Interstate. I was understandably just a little nervous. There is a lot that a new driver has to pay attention to. He has to watch where he is going by steering, and how fast he is going by using the brake or accelerator. The perfect stop is executed when the car's velocity and its distance from the stop sign or red light location smoothly reach zero at exactly the same time.

Velocity — or rate of change in position — is important in many different kinds of systems — although most civil engineers associate it with the dreaded sophomore dynamics class. In driving as in life, while you need to know where you are, it is often even more essential to know how fast and in what direction you are going. When applied to human beings, this becomes Lyle's Law of Becoming: *What you are becoming is as important as what you are doing.*

In your working life, you are expected to do a job, no matter if you are self-employed or work for a large corporation. To prepare yourself for doing that job, you have invested a lot of years, a considerable sum of money, and a large amount of energy earning an education and gaining the required experience. As a result, you probably now find yourself in a good position. But look at the word *position.* It is where you are. It says nothing, however, about what you are becoming. This requires some separate attention.

Such attention may lead you to consider earning a graduate degree or participate in some other continuing education. Continuing education has been mandatory for licensed professional engineers in Louisiana since 2000 in the form of *professional development hours* (PDHs). While continuing education activities are important to career development, they can be both more than you need and less than you need. Taking care of what you are becoming may — or may not — require some form of continuing education, but it does demand something. Just what it demands varies from person to person. There is a simple way to check — your velocity.

Start by asking yourself this simple question, "What can I do today that I couldn't do a year ago?" If the answer is, "Nothing." It would suggest that you are becoming just what you already are today. This is probably not good enough and you would as a result probably describe yourself using one of my 8-year-old's favorite words: *bored.* In other words, your *speed* equals zero.

If, on the other hand, you can list some new skills, new knowledge, new relationships, then you do have some speed. Now you can check your *direction* — the other component of velocity — by posing a second question, "Does this get me that new job, that new position, that pay raise that I want?" If this answer is "Yes,", then you are on your way. If it is "No," you need to take another look at what you are becoming. You may need some more education, a job rotation, to attend some conferences, to get involved in your professional society, or to do whatever it takes to become what *you* want to become.

Did I say "Get involved in your professional society"? ASCE may be able to help you in your quest to become what you want to become. Each branch

- Acadiana
- Baton Rouge
- New Orleans and
- Shreveport

sponsors typically1-hour technical presentations in conjunction with the membership meetings and luncheons and/or evening seminars — both covering a variety of topics. There are two annual statewide ASCE conferences scheduled in Louisiana. One is the Section's Annual Spring Meeting and Conference, that rotates between the Acadiana, Baton Rouge and Shreveport branches, and it is hosted by them locally to be most convenient to their members. The other is The Louisiana Civil Engineering Conference and Show scheduled each fall and jointly sponsored locally by the New Orleans Branch and the Louisiana Chapter of the American Concrete Institute. They are 2-day conferences featuring a series of concurrent 1-hour technical sessions covering a broad variety of subjects. These opportunities may help you correct your velocity and provide a great way to earn those PDHs and network with your colleagues at a very reasonable cost. The 2005 Section Annual Spring Meeting and Conference this year will be hosted by the Lafayette Branch in the Holidome in Lafayette March 30th through April 1st.

If you would like to become more active in your profession, consider *joining* your branch as a member of a committee that interests you. There is a place for everyone. If your technical competence is most important to you, then service on one of the technical committees is the place for you. Your branch may have a structural, geotechnical, water resources, transportation and/or environmental committee. If you are 35 years of age or younger and networking with other like-minded young engineers is of interest to you, look into the Younger Members Committee and its activities. If mentoring high school and elementary school students floats your boat, then the Outreach Committee is for you. Of course, if you are a student, there is a student chapter on the campus of each of the seven universities in Louisiana that have a civil engineering program. Being involved in a student chapter is a lot of fun and sometimes it actually includes the consumption of beer and pizza.

Ultimately, you may become involved in the ASCE elected leadership and governance of your branch or the Section, serving on their respective boards of directors. Not only will you get to know some great people, you will also develop leadership and management skills that could be critical to the *you* that you want to become. If you are close to retirement, it is a wonderful way to give back to your profession.

Of course, we are not just engineers, we are people — the opinions of some Dilbert readers notwithstanding. In our personal lives, too, we are not only *being,* we are in the process of *becoming.* Our actions say something about what we are, but they also give direction to what we will be. *Giving* — even a little bit — will turn you into a giving person. Constant complaining will turn you into a gloomy person — not to mention a pariah. Saving and wise investing may turn you into a millionaire. Spending more than you earn will turn you into a debtor. Exercising will make you physically fit. Lying will make you a liar. What you are doing (saving, lying,...) is important. What you are becoming as a result (a millionaire, a liar,...) may be even more important.

In closing, I will cite Lyle's Law of Laws: *The better the law, the more general its applicability.* Based on that, I believe his Law of Becoming: *What you are becoming is as important as what you are doing,* is a very good law.

About the cover: *The map is of southeast Louisiana and its coast line. It shows several geological formations in the region and the active fault lines that are discussed in the feature article presented in this issue. The thesis presented in this article, if generally accepted, will have a significant impact on the practice of geotechnical engineering and the infrastructure decisions in the region, and on the strategy for accomplishing Louisiana's coastal restoration.*

Effects of earthquakes, fault movements, and subsidence on the south Louisiana landscape

By Sherwood M. Gagliano

Introduction

Recent geological findings change forever our perception of the tectonic stability of south Louisiana. Results of research in several disciplines are converging into a unified model of fault and earthquake activity called the linked tectonic system that explains many previously puzzling aspects of the ever-changing landscape. The findings also indicate that fault-earthquake effects are an underrated hazard that must be considered in planning and design for restoration of the coastal zone, including construction and maintenance of its infrastructure.

Ho hum, here comes Henny Penny again... The sky is falling!.. The earth is cracking!.. The land is sinking!.. Another hazard to worry about...

This article is not about a contrived catastrophe. The facts are compelling and the implications are far-reaching, particularly for coastal restoration.

Brief history

One of the milestones in formulating the tectonic model was the recognition and demonstration that modern movement along ancient geological faults as shown in Figure 1 that underlie Louisiana's coastal lowlands is a major cause of the catastrophic twentieth-century land loss (Gagliano 1999, Gagliano et al. 2003A). We now know that more than half of the land loss is due to submergence and not edge erosion. The primary driving process is fault-induced subsidence and not the eating away of the land along its edges by waves. Fault-bound blocks underlying the coastal zone are sinking and tilting and are being inundated by the Gulf of Mexico.

The people of south Louisiana live on top of a linked tectonic system, part of which extends under the Gulf (Peel et al. 1995). The system resides within a great trough in the earth's crust diagramed in Figure 2 that has been opening and sinking for more than 200 million years. And, that process is continuing. The tectonic system is in constant motion. As the bottom of the trough sinks, the resulting depression is filled with sediment brought in by rivers that drain the continent. If the sinking rate exceeds the sediment delivery rate, the land becomes submerged, lakes and bays form and the shoreline moves inland (transgresses).

Ironically, sediment loading may also accelerate subsidence. Thick beds of low-density salt, originally deposited at the base of the 50,000-foot thick sequence of sedimentary deposits, squeeze and shift under the weight of the heavier detrital sediment, complicating the internal adjustments to loading. The salt behaves like silly putty, working its way upward in the section along faults and fractures to form salt domes and in other places fanning out between bedding layers to form salt canopies. The folds and faults resulting from these movements form the traps that collect the rich deposits of oil and gas underlying both the onshore and offshore areas of south Louisiana.

The constant movement and adjustments within the sediment pile have dramatic effects on the surface. Large depressions develop over salt withdrawal areas. Subsidence and tilting are found at the surface on *down-dropped fault blocks* as depicted in Figure 3. Linear depressions above grabens result from vertical and lateral movement. These holes are called *accommodation space* because they make room for new deposition at the top of the upside down mountain of sedimentary deposits.

Vertical adjustment to subsidence occurs along *growth faults* as shown in Figure 3, most of which were established and have remained active for tens of millions of years. The faults are linked, or articulated, into a tectonic framework. If one segment of a fault moves, stress may be transferred and released along neighboring faults initiating a domino effect that continues until all

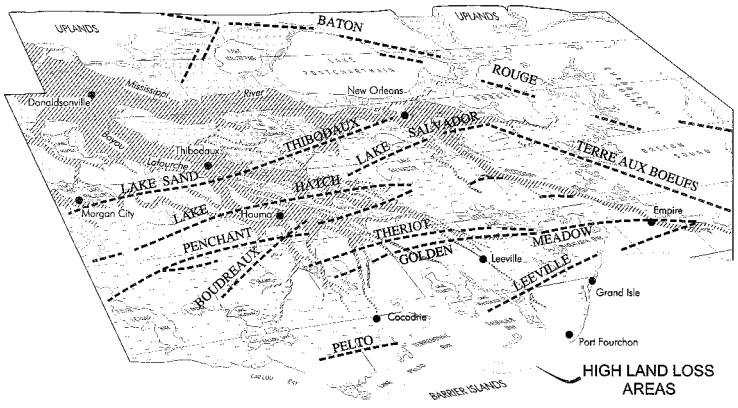


Figure 1. Relationship between faults and areas of high land loss in southeastern Louisiana is demonstrated. Fault movement is the major cause of land submergence and loss in the region (modified from Gagliano 1999).

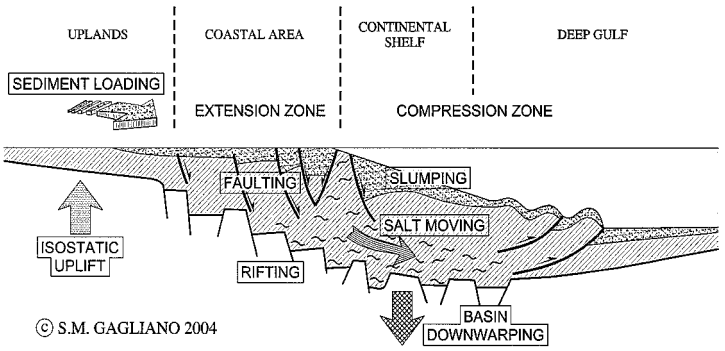


Figure 2. The linked tectonic system under south Louisiana, part of which extends under the Gulf, resides in a great trough in the earth's crust. The trough fill is riddled with faults and penetrated by salt domes, the movement of which in relation to overlying sedimentary deposits affect the surface landscape.

Sherwood M. Gagliano earned his BS in geology from LSU in 1959, his MS in geography in 1963 and his PhD in geography in 1967. He has over 40 years of research experience in the environmental sciences, geology and archaeology. Sherwood founded Coastal Environments, Inc. (CEI), an applied science and planning firm, after 12 years of service on the faculty of the Coastal Studies Institute and the Departments of Geography and Marine Sciences at LSU. He has served as the president of CEI since 1972. Sherwood is a member of the Geological Society of America, the American Association of Petroleum Geologists, the Society for Sedimentary Geology, the Society of American Archaeology, the Society of Sigma Xi, and was the founding president of the Louisiana Archaeological Society.

Editor's note: This article is based on the presentation Sherwood made during the 2004 Louisiana Civil Engineering Conference and Show by the same title.

stress is resolved and equilibrium within the framework is restored.

Subsurface geology

The locations and character of the faults and salt features have been carefully mapped as shown in Figure 3 (Tectonic Map Committee, Gulf Coast Association of Petroleum Geologists, 1972) and the driving processes are well understood as the result of a century of intensive oil and gas exploration and development within the *Gulf Salt Basin*, the name given to the sediment-filled trough by geologists (Murray 1961, Fails et al. 1995, and others). An important factor in the petroleum industry's success in finding oil and gas in the region has been attributed to development of geological process-response models. The models are fundamental tools in the search for hydrocarbons, as they depict the three dimensional relationships and geometry of source beds and hydrocarbon bearing horizons and serve as road maps for finding oil and gas from geophysical and well log data. Models developed as a result of research in the Gulf Salt Basin have been applied to deltaic and shallow marine rock sequences throughout the world and validity of the models has been proven by the success of the industry.

Remarkably, there has been an information disconnect between the geologists and geophysicists working in the petroleum industry and the community of scientists, engineers and planners engaged in coastal restoration. The restoration community is largely oblivious to the tectonic dynamics of the region. The application of the interactive tectonic-depositional models, as derived from the rock and landform record used to understand modern coastal change and restoration is a major goal of the research reported herein.

Active faults

Fault occurrence and movement is not confined to the coastal wetlands. Some faults that are part of the tectonic framework underlie the terrace uplands. For example, active fault movement occurs along the Baton Rouge Fault - Tepetate Fault zone in urban neighborhoods of Baton Rouge (McCulloh 1991), rural areas of the piney woods in Livingston and Tangipahoa parishes (Gagliano et al 2003A), as well as in the rice fields in St. Landry, Jefferson Davis and Acadia parishes (Miller and Heinrich 2003). The prominent fault line scarp of the Baton Rouge Fault in Livingston Parish is shown in Figure 4. Note the influence of the fault on the large bend of the Amite River.

Cracks in streets, building foundations and masonry structures attest to modern fault movement in Baton Rouge (McCulloh 1991). In recent years, two public school buildings that were built on faults in Baton Rouge have been abandoned and demolished. Fault damage is usually less severe, but is still discussed, only in hushed tones, by property owners fearful of property devaluation. Other evidence of movement along the Baton Rouge Fault outside of the urban area includes fault cracks and displacements documented on all highways, rail bridges and causeways that cross Lake Pontchartrain (Lopez et al. 1997). Lateral movement of six inches or more during modern decades has also been reported on one of the Mississippi River bridges in New Orleans. The faults are moving!

Faults and earthquakes

Perhaps the best evidence of fault movement is the occurrence of earthquakes. Louisiana is generally thought of as an area of low seismic activity. It is widely believed that the soft rocks of the region are not conducive to the kind of stress buildup and release that occurs in areas of more brittle rocks, such as along the San Andreas Fault in California. Nevertheless, a number of earthquakes have been recorded in south Louisiana. The best known of these was the Napoleonville Earthquake of October 19, 1930, with a *Richter scale magnitude* of 4.0 (M - 4.0) and a *Modified Mercalli felt intensity* of VI (MMI - VI). The Napoleonville Earthquake was the surface manifestation of spontaneous movement that occurred on a local subsurface fault. That is, the earthquake had a local epicenter.

Other notable historic earthquakes with local epicenters in Louisiana include the Opelousas Earthquakes of 1823 and 1870 (MMI - VI), the New Orleans Earthquake of 1958 (MMI - IV), the Cameron Earthquake of 1959 (MMI - VI), the Lake Charles earthquake of 1983 (M - 3.8, MMI - IV), and the Irish Bayou Earthquake of July 31, 1987 (M - 3.0, MMI - V). None of these local earthquakes were of high intensity or long duration. The felt effects, as reported by witnesses, had MMI values of III to VI and lasted from 10 to 15 seconds. There was no major structural damage nor any known loss of life attributed to earthquakes in the region.

Another category of surface tremors reported from south Louisiana is related to earthquakes with remote epicenters. This category includes seiches and *unusual waves.* The most notable examples occurred during the M - 9.2 Alaskan Earthquake of March 27, 1964. This was the largest historically recorded earthquake in the United States since 1900 and the second largest earthquake ever recorded. The effects of this earthquake in the vicinity of the epicenter near Prince William Sound Alaska were devastating, including extensive structural damage and landslides in Anchorage.

Newspaper articles and other contemporary reports across the region of south Louisiana and southeast Texas shown on the map in Figure 5 tell that shock waves caused unusual water disturbances from the remote 1964 Alaskan Earthquake event 3200 miles away and also shown on the map. Re-examination of the musty newspaper reports and plotting locations of effects revealed that the disturbances occurred along known faults and had MMI values that were as great or greater than those associated with the previously mentioned earthquakes with local epicenters. The evidence suggests that shock waves from the 1964 Alaskan Earthquake triggered a series of *secondary earthquakes* along faults in south Louisiana and southeast Texas shown in Figure 6 (Gagliano et al. 2003B, Gagliano 2004).

Effects of Alaskan Earthquake

At Bayou Courtableau and Darbonne Bay,

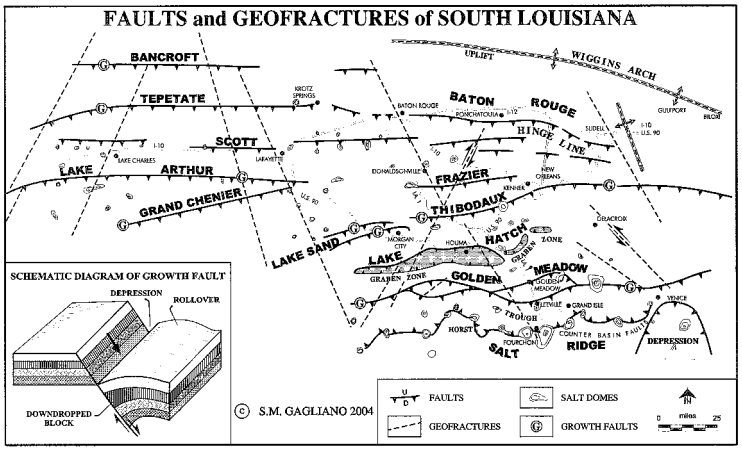


Figure 3. Map showing major structural features of south Louisiana known from a century of intensive oil and gas exploration and development within the Gulf Salt Basin.

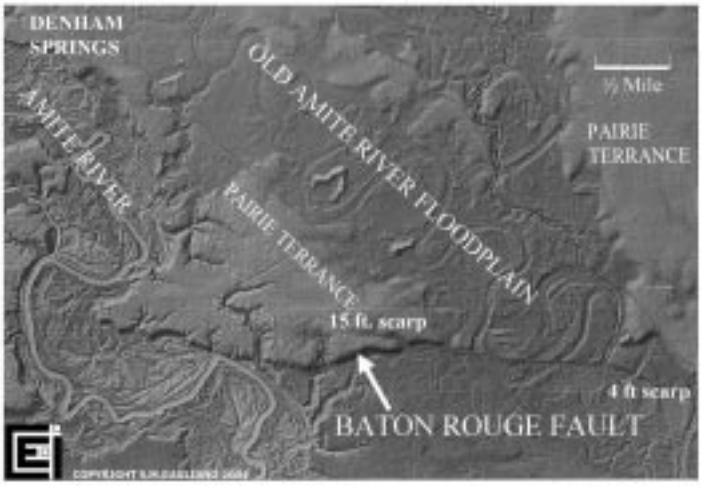
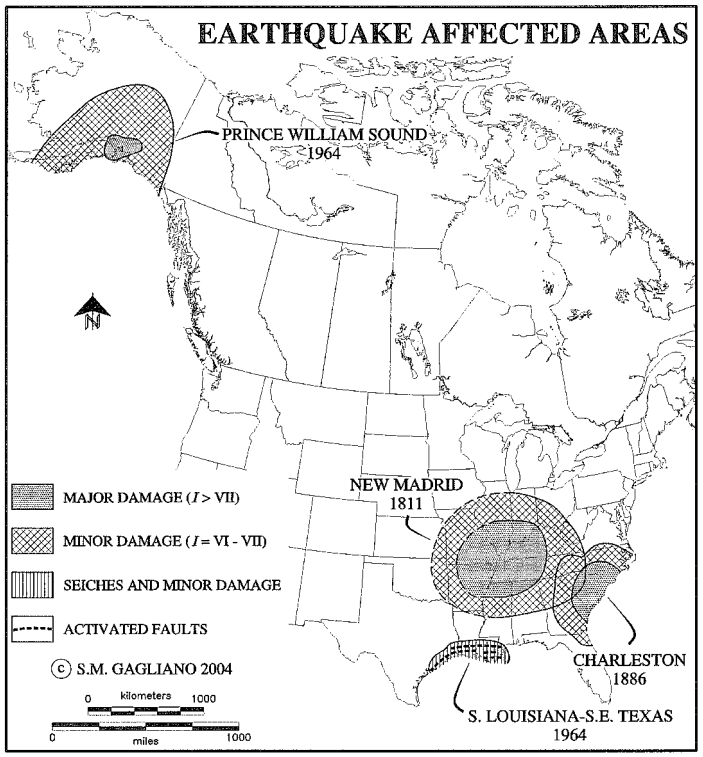
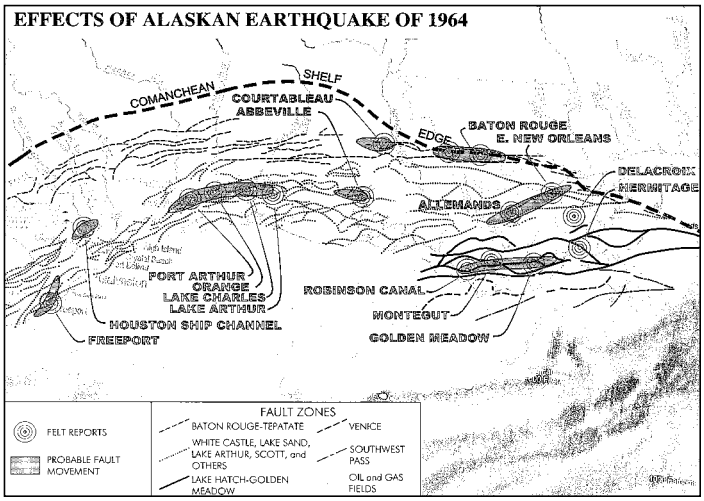


Figure 4. Light Detection and Ranging (LiDAR) image showing effects of the Baton Rouge Fault in Livingston Parish on modern and relict floodplains of the Amite River.





(Above) Figure 6. Location of the reported effects of the apparent secondary earthquakes in south Louisiana triggered by shock waves from the 1964 Alaskan Earthquake.

(Left) Figure 5. Felt areas of three historic earthquakes that caused tremors in south Louisiana. Locations and intensity of felt effects suggest that the 1964 Alaskan Earthquake triggered secondary earthquakes along faults in the northern Gulf region.

inland water bodies near Krotz Springs, there were a series of 5 or 6 waves with peak-to-peak amplitudes of up to 4 feet over a period of 30 minutes. Logs were thrown on the banks and small boats broken loose from their moorings - *Opelousas Daily World,* 1964.

Near Port Vincent, east of Baton Rouge, there was a similar series of 3 to 4 foot waves over a period of 20 minutes. The bottom of the 5-foot deep Amite River was exposed for a short period as the water rushed out, and then back in with great force causing damage to boat docks and breaking small boats from their moorings - UPI New Orleans, 1964.

Along Bayou Lafourche between Galiano and Golden Meadow a series of 5 large waves with amplitudes of up to 6 feet swept along the bayou for a distance of 10 miles. Submerged logs and debris were thrown up onto the roads on each side of the bayou and an oyster lugger was tossed into a paint store located along the bank. Customers ran from a barroom located on the bayou fearful for their lives as the waves swept into the establishment — *New Orleans States - Item* 1964, AP New Orleans, 1964A.

In the Calcasieu River and Ship Channel at Lake Charles a 4-foot high wave jolted a large tanker — *Lake Charles American Press,* 1964.

Numerous effects were reported from the Beaumont-Port Arthur-Neches River area, where ships bobbed up and down 6 or 7 times in response to sudden drops in tide and waves with amplitudes of 6 or 7 feet. Boats and docks were damaged — *Port Arthur News,* 1964.

In Houston, a ship captain reported, "...the water was rolling and bubbling up throughout the ship channel as if something was underneath it." — AP New Orleans, 1964B. Dr. J. C. DeBremaecker, a Rice University, Houston, seismologist, reported that "...the city was lifted four inches late Friday as a gigantic surface wave from the Alaskan Earthquake passed through..." — AP Houston, as reported in the *Port Arthur News,* 1964.

The evidence suggests that the main difference between the earthquakes reported in Louisiana with local epicenters and those that occurred across the entire region from Chandeleur Island to Freeport in response to the 1964 Alaskan Earthquake is that the latter were *secondary earthquakes* caused by slippage along the local fault lines triggered by the shock waves from the distant epicenter. In 1964, 5 violent seiches occurred during a 30-minute period in comparison to the tremors of a few seconds duration that are typical for the spontaneous earthquakes with local epicenters.

There were no immediate reports of streets buckling or structures collapsing in south Louisiana or southeast Texas at the time of the 1964 earthquake, but there was structural damage. Most of the newspaper accounts focused on the "large waves" and the rocking of boats and ships. After-the-fact reports link cracks in a public swimming pool in Baton Rouge and collapse of the concrete walls of a water treatment plant in New Orleans directly to the 1964 earthquake. The local faults moved on March 27, 1964!

On November 3, 2002 an earthquake (M - 7.9) occurred at Denali, Alaska. This earthquake caused seiches at a number of locales along the same faults in south Louisiana and southeast Texas that were affected by the 1964 Alaska Earthquake, though the intensities in 2002 were less. Historically, felt effects from both the earthquakes in the New Madrid, Missouri area in 1811-1812 and the Charleston, South Carolina Earthquake of 1886 — the location of both shown on the map in Figure 5 — were reported in New Orleans.

Surface effects

Major regional fault zones where earthquakes have occurred and that also exhibit signatures of fault movement on the landscape shown in Figure 3 include the following faults

- Baton Rouge
- Tepetate
- Lake Arthur
- Lake Sands
- Lake Hatch, and
- Golden Meadow.

Fault movement affects everything on the surface, including all natural landforms and human-made features. Natural levee ridges and barrier islands located on subsiding fault blocks become increasingly submerged as a result of both slow and imperceptible movement and episodic rapid fault slippage of 3 feet or more (Gagliano et al. 2003A, Gagliano *et al.*2003B). Symptoms of active fault movement include cracks in highways and building slabs, and failures along flood protection levees. Fault and earthquake movements pose potential threats to pipelines, bridges, tunnels, refineries, petrochemical plants and power plants as well as private homes.

Human settlement in the coastal lowlands has been concentrated on the relatively higher and firmer natural levee ridges of relict Mississippi River distributaries and old Gulf beaches (cheniers). As a result of subsidence it has become necessary to protect the communities on many of these natural ridges with flood levees and forced drainage districts. Many of the natural ridges have sunk to elevations below the level of adjacent marshes and water bodies. Some communities and highways now lie below

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News from the Branches

SHREVEPORT

By Kurt M. Nixon, PE, President

The last membership meeting of the Branch was back on November 18th. It featured Jake Leininger with BridgeTek. The Branch would like to thank Jake for taking the time to share a great technical presentation with us. I would also personally like to thank Ashley T. Sears, EI, and the Branch officers for handling this meeting at the last minute. I was unable to attend because I was supporting my wife who gave birth to our firstborn the same day.

Also in November, the Chapter's Younger Member Group held our first Annual Food Drive to benefit the Providence House. We are pleased to report that we had four boxes of food to deliver on the Wednesday before Thanksgiving. The ladies at the Providence House were very excited to receive the donations. We truly made a difference for them this year! Thanks to all who helped support this food drive.

The January Branch membership meeting was held in the Petroleum Club facilities. The featured speaker scheduled is Craig Duos with the Concrete and Aggregate Association of Louisiana (CAAL). The topic of Craig's presentation was "Placing Quality Concrete." His presentation covered water/cement ratio, air entrainment, proper placing, proper finishing and light troubleshooting of concrete and it qualifies for one PDH.

The February Branch membership meeting planned will be a joint meeting with the Shreveport Chapter of the Louisiana Engineering Society. It is scheduled to be held at the Associated General Contractors building on Southern Avenue and will feature William L. Melancon, PE, an attorney and engineer. He will share a two hour presentation covering the topics of contracts and liability.

The Branch officers have been discussing the possibility of scheduling a monthly membership meeting on the Louisiana Tech campus with the Tech ASCE Student Chapter. It would be an evening meeting either in March or April and it would feature a presentation that would qualify for a PDH. It would also be a great time to visit with some of the graduating engineering students. I would like to get some feedback from Branch members and particularly from our Branch members who reside in Monroe and Ruston. Is this proposed event something you would be interested in attending? Please email me with any feedback you may have at kurt@owenandwhite.com.

ACADIANA

By Kimberly D. Landry, EI, President

The Branch recently participated in the 2005 Career Connections Exposition held in the facilities of the Cajundome Convention Center in Lafayette on January 25, 2005. This annual event is an interactive exposition and career fair intended to expose tenth-grade high school students to various possible career choices. Students are also informed about the real-life cost-of-living expenses such as utilities, groceries, etc. and they have the opportunity to learn how to relate the affordability of these expenses to the anticipated average salary earned by those in the career they may consider pursuing. Hosting a booth during this event typically involves fielding questions from interested students concerning expected salaries, work responsibilities, and how engineers interact with the public.

As was noted in the November issue of the journal, the University of Louisiana at Lafayette Student Chapter is hosting the 2005 Deep South Conference April 7-9, 2005. The activities planned for this conference include

- a concrete canoe competition
- a steel bridge competition
- an environmental engineering competition
- a land surveying competition, and
- an asphalt pigeon competition.

The Deep South Conference has grown to mammoth proportions in the past several years. For this reason, the Branch leadership would like to again encourage all Section members who are able to consider lending a helping hand to this enthusiastic group of students hosting the Conference by either volunteering as an event judge or by becoming a Conference sponsor. For more information, please contact Paul A. Richards, PE, the Student Chapter Faculty Advisor at par6763@louisiana.edu.

The Branch has been planning and looking forward to hosting the 2005 Section Spring Meeting and Conference. The Conference will be held in the facilities of the Holiday Inn — the Holidome — in Lafayette from March 30 through April 1, 2005. We hope to attract members from throughout the Section by the variety of topics to be presented in the technical sessions and by hosting numerous vendors. Additional information about the Conference is provided in this issue of the journal. As changes are made, the Conference agenda will be updated real-time and posted on the Branch website, www.asceacadiana.net, so please check there for the latest information as you may require and/or feel free to contact any Branch Board member concerning the latest Conference information.

BATON ROUGE

By André M. Rodrigue, PE, President

The Branch held its annual Christmas reception December 3rd in the facilities of the Bocage Racquet Club. The attendance appeared to be larger than the previous year's reception with a good mix of younger and older members. Members of the LSU ASCE student chapter also attended this reception that completed what was considered a successful calendar year for the Branch.

Pat Drennon of Louisiana TIMED Managers was the featured speaker during the January Branch membership meeting and luncheon. He gave a presentation on the design-build process. Drennon has over 41 years of experience in management, design and construction. His first experience with the design-build process was during his 33-year career in the U.S. Navy. The Navy uses the design-build process for approximately 70 percent of its construction projects and it requires special permission to use any other engineering and contracting methods such as design-bid-build. During the past 10 years — considering all areas of construction in the United States — the trend in the portion of engineered construction projects using the design-build process has been an increase from near nonexistent to approximately 50 percent.

The benefits typically experienced through the use of the design-build process are

- single-source responsibility
- less management required
- disputes avoided
- risk management improved
- time saved and
- cost saved.

However, adopting the design-build process often presents challenges such as

- overcoming tradition and culture
- building teamwork
- instilling trust
- transferring control
- making timely decisions and
- reasonably assuring quality.

Most of the engineers in Louisiana have exclusive experience with the design-bid-build process that is the predominant process used in state and

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NEW ORLEANS

By Deborah Ducote Keller, PE, President

The New Orleans Branch has been working on several initiatives since the start of the new administrative year and its activities. The Structures Committee, chaired by Om Dixit, PE, has presented several technical seminars and it has tentatively scheduled future presentations for March 3, May 5, June 9, August 16, and October 13. They are all scheduled for the evenings in the College of Engineering auditorium on the University of New Orleans campus.

Monthly Branch general membership meetings and luncheons featuring speakers presenting a wide variety of topics are also on tap until the annual awards luncheon in June. During this meeting the Branch will honor the outstanding achievements among its civil engineers. Director of Public Works for the City of New Orleans, John H. Shires, PE, was the speaker featured during the January Branch general membership meeting.

I have had the pleasure of meeting with the UNO ASCE Student Chapter during the fall semester and will be addressing the Tulane ASCE Student Chapter in the spring. My focus was on the many benefits of ASCE membership, both as a Student Member and throughout one's career. I encourage the senior students to mentor the freshmen engineering students who are sometimes overwhelmed by the early challenges of majoring in engineering. This is especially true when it takes a few semesters for the students to get into the core engineering subjects that probably attracted them to the profession in the first place.

I attended the Zone II Leadership Conference in January, along with Jonathan P. Hobbs, our Younger Member Chair, and other students leaders from the Branch. Jonathan continues to cultivate a group of younger members under the age of 35 for monthly socials. These have been centered recently around such events as a Tulane vs. UNO basketball game, since many of the alumni from both universities reside within the Branch.

Christopher L. Sanchez, EI, Chair of the Branch's 2005 Louisiana Civil Engineering Conference and Show, started the monthly committee planning meetings with representatives from the Louisiana Chapter of the American Concrete Institute, the co-sponsor of the event. The Conference is scheduled for September 8th and 9th in Kenner.

In March, I am looking forward to attending the ASCE National Government Leadership Training in Government Relations workshop in Washington, D.C. I will be attending this 2-day workshop of intensive training with the ASCE and National Society of Professional Engineers staff as one of the Louisiana Section's 2 representatives. The purpose of this workshop is to learn how to enhance our Section's relations with our state elected officials for communicating our vision as Louisiana's civil engineering community.

Information and registration for the many New Orleans Branch activities can be found on the branch website, www.asceno.org. Links for our Branch officers, directors, and committee chairs are provided on the website for your easy access to them. There is also a calendar of Branch events. Branch members should be sure to visit the website and register their email addresses so that they may receive timely email notices of the Branch activities.

Structures Committee seminar

By Thomas M. Smith, PE

In December, the Structures Committee hosted a seminar held in the University of New Orleans Engineering Auditorium titled "The Post Tensioning Institute (PTI) New Method for Designing Slabs on Grade." Thomas M. Smith, PE, Vice Chair of the Structures Steering Committee, made the arrangements for this seminar that was attended by approximately 60 members and other interested engineers. The seminar was presented by John Thomas Bryant, PE, the president of Bryant Consultants, Inc. (BCI) of Dallas, Texas. As part of the program, Harley A. Nethken, PE, principal of Engineering Services, Inc. of Slidell, reviewed the current and planned activities of the PTI that include design code changes, new publications and design aids, training opportunities, conferences, certification programs and cable usage categories and growth projections.

John Bryant earned a BSCE Civil Engineering, a BSCE Engineering Geology, MS Geography (Geomorphology) and a PhD Civil Engineering (Geotechnical/Constructed Facilities) from Texas A&M University between 1985 and 1991. He is a licensed professional engineer, a professional geologist and a professional geoscientist.

Bryant's firm, BCI, provides forensic geotechnical and geo-structural consulting services and site development consulting for builders, developers and owners to mitigate problems associated with construction. These services include a unique combination of geotechnical expertise coupled with geophysical exploration technology to provide the most accurate 2- and 3-dimensional representation of subsurface conditions available. Innovative solutions to site development and construction-related distress

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John Bryant, featured speaker for Structures Committee Seminar.

Harley Nethken gives summary of Post Tensioning Institute activities.

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problems are supported using geographic information systems and computer modeling.

Bryant's presentation demonstrated the PTI method for designing slabs on grade that recognizes the movement of the soil/earth foundation as an expanding and shrinking body. This movement is caused by the variation in the moisture content of the soil, and the resulting movement in the slab induces the stresses required to be considered in its structural design.

The 2 fundamental modes of movement to be accommodated by — and evaluated in — the design of post-tensioned and regular reinforced slab-on-grade foundation systems are

- *edge lift* and
- *center lift or edge drop.*

The amount of differential settlement caused by the variation in soil moisture content over a certain distance from its edge dictates the design of the foundation. This provides the basis for beam depth, beam spacing, tendon placement and tendon spacing. The PTI method is predicated on the fundamental premise that the climate affects these movements caused by the lateral migration of the moisture in the soil at the perimeter of the slab foundation.

The goal of the design process is improved performance and mitigation of unexpected slab failures considering the economics. In support of this goal, the primary objectives of the presentation were:

- Compare and contrast salient aspects of the new and old procedure for the evaluation of soil design parameters for the PTI method.
- Discuss non-equilibrium and non-climatic factors or anomalies that affect slab-on-grade design and performance.
- Present new tools and techniques to evaluate subsurface conditions to help mitigate design issues and identify design and performance anomalies.

The new PTI method for evaluating soil parameters allows a more flexible means of evaluating some of the more extreme steady-state soil and climate conditions at the slab perimeter. This is based on a more rational method for evaluating the design parameters based on soil databases and taking into account soil permeability to model the moisture variation to edge distance. A case study using the old PTI method (2nd edition) and the new PTI method (3rd edition) was reviewed.

Discussion of the new PTI method led to a further presentation of state-of-the-art geophysical investigation methods that may be used to obtain more complete and accurate soil properties. These methods used in conjunction with the technical expertise of highly trained professionals include

- electrical resistivity profiling
- patented 2- and 3-dimensional geo-electrical moisture/material imaging resistivity (GMMIR) and
- ground penetrating radar (GPR).

In many forensic investigations of the slab-on-grade foundation system, it has been found that although the slabs were designed and constructed properly, they continue to exhibit poor performance. This situation was shown on numerous occasions to be the result of subsurface or surficial site anomalies not contemplated or considered in the original design. Several examples of these anomalies were demonstrated using relative elevation surveys, soil boring logs, and geotechnical and 2- and 3-dimensional geophysical techniques.

Several techniques using the new geophysical and geotechnical technologies were presented to more accurately determine the engineering and physical properties of the soil that determine the design parameters. Finally, it was shown how these new techniques aided in evaluating the 2- and 3-dimensional subsurface conditions so that subsurface anomalies can be more adequately discovered, considered and mitigated in the design process for post-tension slab-on-grade foundations.

(Continued from Page 8)

municipal engineered construction contract work. The challenge of the transfer of control and providing reasonable quality assurance in the design-build process as compared to the design-bid-build process is perhaps what concerns the engineers in Louisiana the most. Drennon explained why, in his estimate, these concerns about the differences in the design-build process should be allayed. He noted that engineers and owners do not lose control of the vital processes. The design-build processes resulted in merely a shift in some of the responsibility to the contractor. Drennon expressed his belief that quality assurance in the design-build process is enhanced, because the designer and contractor must develop and jointly embrace it as a team throughout the design and construction effort.

Drennon proceeded to explain some of the specifics about how the design-build process will be applied to the construction of the St. Francisville Mississippi River Bridge project that will be constructed as part of the Louisiana TIMED program. This $200 million dollar project includes the construction of approximately 14.6 miles of bridge and approaches including two major interchanges. It is anticipated that the design-build process will provide this completed project 2½ years earlier than the original estimate based on the design-bid-build process.

❖ Quote ❖

Continuing education: …*We are past the day when bustling factories and powerful trade unions made the mere willingness to work hard sufficient to guarantee a good income. These days you have to know something and show yourself ready to learn more. I'm not talking here of geniuses — only a willingness to make the sort of exertion academically that good athletes routinely make physically...*

- William Raspberry
  Columnist

— Calendar of Events —

February 23-24, 2005	**LTRC Louisiana Asphalt Technology Conference, Shreveport. For more information visit http://www.ltrc.lsu.edu/conferences.html.**
February 24-25, 2005	**ASCE Seminar * on Probabilistic Methods, Atlanta, Georgia.**
February 24-25, 2005	**ASCE Seminar * on Highway Bridge Design, Evaluation and Strengthening Using LRFD, Houston, Texas**
March 3-4, 2005	**ASCE Seminar * on Seismic Design and Performance of Building Structures, Nashville, Tennessee.**
March 10, 2005	**ASCE Seminar * on Structural Renovation of Buildings, New Orleans.**
March 10-11, 2005	**ASCE Seminar * on Fundamentals of Earthquake Engineering, Memphis, Tennessee.**
March 30-April 1, 2005	**Section Annual Spring Meeting and Conference, Lafayette.**
March 30-April 1, 2005	**ASCE Seminar * on Introduction to Streambank Investigation, Stabilization and Restoration, Grenada, Mississippi.**
March 31-April 1, 2005	**ASCE Seminar * on Design, Construction and Renovation of Masonry Structures, Dallas, Texas.**
April 7-9, 2005	**Deep South Conference for ASCE student chapters in Louisiana and region, University of Louisiana at Lafayette, Lafayette.**
May 2-5, 2005	**Offshore Technology Conference, Houston, Texas. For more information visit www.otcnet.org**

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

Student Chapter News

UNO

By Alberta Favalora and Stephanie Krebs

The student chapter is on its way back to success. Our membership base has increased with both upper and lower classmen which is mostly due to our new ASCE study room. This room on the teaching floor of the Engineering building complete with new chairs, tables, a new computer with Internet access and a printer is available to all Chapter members to use.

Monthly meetings were held this Fall featuring guest speakers to encourage participation in Chapter activities. During our November meeting, Deborah D. Keller, PE, was the featured speaker who spoke about the importance of an outreach program for students with undecided majors to present the advantages of a career in engineering. We also hosted a presentation by the Southern Forest Products Council on the use of timber products in structural design and construction. In October, several members took part in a community project known as Christmas in October. Chapter volunteers helped to repair and paint the home of a New Orleans family in need.

This Spring, the Chapter is looking forward to participating in the Deep South Conference in Lafayette, Louisiana. We began preparing for the steel bridge competition by designing and building our steel bridge in the Fall. Our concrete canoe is under construction and our team has been practicing their paddling skills on Bayou St. John. We look forward to a fun and rewarding experience at the regional conference and to an excellent year for the Chapter.

TULANE

Intramural Sports

The Chapter's intramural team, Strike Force, had some amazing results this semester. In volleyball, it went completely undefeated and won the championship T-shirts! In indoor soccer, it had an undefeated regular season, however it lost in the semifinals of the playoff. Strike Force was featured in several of the Tulane campus intramural weekly publications. Also, our Reily Cup standings are in. Strike Force was #1 in the Co-Rec division.

Parties

The Chapter's Halloween party held October 29 had a pretty decent turnout. It featured great candy, burgers, and hotdogs that were amply provided by our planner, Joel Dixon. The music was hitting pretty hard and the Halloween costumes represented a good effort. The Chapter's end-of-the-year party was held in Bruno's December 3. The Chapter is planning a Mardi Gras event possibly in cooperation with the New Orleans Branch and the traditional, annual end-of-the-year bash at the levee.

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Previous steel bridge team prepares competition steel bridge for loading.

Previous concrete canoe team poses with competition concrete canoe.

SOUTHERN UNIVERSITY

By Kevin Cowan, Jr.

Once elected president of the Chapter, I received many inquiries about the tasks that would be required. I was concerned about how to gain the support and trust of the Chapter's members so that the goals we set could be accomplished. I needed to learn the main purposes and functions of an ASCE student chapter so that our membership would benefit as much as possible from their experience. With all this uncertainty, I was pleased to learn that a 3-day student chapter leadership conference was to be held in Orlando, Florida. I was an eager participant to attend, learn, and return home to apply the newly acquired knowledge toward making our chapter as successful as possible.

It took a prayer and a determined faculty advisor with a few special supporters to get us to Orlando. We unexpectedly had to raise money at the last moment to purchase 9 seats on a flight to Orlando the day before we were scheduled to leave because of a problem with the terms of the car rental agreement. Once we arrived in Orlando and were registered, we came together to decide which of the several workshops each of us would attend. The sessions presented were designed and executed so that their structure was something from which we could learn, take home and apply to our chapters' operations.

The lessons learned about conducting successful chapter meetings were

- starting on time
- setting an allotted time for each item on the agenda

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Registration Form

2005 Annual Spring Meeting and Conference

March 30 - April 1, 2005

Holiday Inn Central - Holidome • Lafayette, Louisiana

Registration Fees *	Number	Cost	Sub-total
** Registration Fee - ASCE Member by March 16	____	@ $125.00	$_____
** Registration Fee - ASCE Member after March 16	____	@ $150.00	$_____
** Registration Fee - Non Member by March 16	____	@ $200.00	$_____
** Registration Fee - Non Member after March 16	____	@ $225.00	$_____
** Registration Fee - Student	____	@ $ 5.00	$_____
Wednesday Night Crawfish Boil			
Conference registrant	____	Free	
Those not registered for the Conference	____	@ $ 10.00	$_____
Students	____	Free	
Thursday and Friday Luncheons			
Conference registrant	____	Free	
Those not registered for the Conference -Thursday	____	@ $ 10.00	$_____
Those not registered for the Conference -Friday	____	@ $ 10.00	$_____
Students	____	Free	
Thursday Awards Banquet			
Conference registrant - ASCE Member by March 16	____	Free	
Conference registrant - ASCE Member after March 16	____	@ $ 20.00	$_____
Conference registrant - Non Member	____	@ $ 20.00	$_____
Those not registered for the Conference	____	@ $ 20.00	$_____
Life Member honoree and one guest	____	Free	
Award recipient and one guest	____	Free	
Students	____	@ $ 5.00	$_____
		Total Fee Remitted:	$_____

* Registration fee includes admission to the exhibits and technical sessions

** Registration fee includes the crawfish boil and the luncheon.

Registration will be open through March 31. However, registration discounts do not apply after March 16.

Name: _____ Section/Branch: _____

Spouse's Name (if attending Banquet or a Luncheon) _____

Company Name: _____ ASCE Member No. _____

Address: _____ City, State, Zip: _____

Telephone: Work: _____ Home: _____ Email: _____

Please make checks payable to: **ASCE Conference 2005**

Mail form with payment to:

ASCE - Acadiana Branch
Attention: Clint McDowell
4204 South Lewis Street
New Iberia, LA 70560

For any questions concerning the Conference contact Kimberly Landry by telephone at (337) 291-8522

Hotel accommodations: For the special conference group rate of $76.00 at the Holiday Inn Central call 1-800-942-4868 by March 16. Rate for the ASCE group applies to king size bed — 1 to 4 occupants. All reservations must be guaranteed.

Please indicate which of the concurrent sessions you will most likely attend. This does not preclude you from attending any of the concurrent sessions. Circle one session number in each group:

[1A or 1B] [2A or 2B] [3A or 3B] [4A or 4B] [5A or 5B] [6A or 6B]

Conference Agenda (Tentative)
2005 Annual Spring Meeting and Conference
March 30 - April 1, 2005
Lafayette, Louisiana

Conference Agenda Wednesday, March 30, 2005		
Time		
6:00 pm - Until	**Welcome - Crawfish Boil - Rear of the Holidome**	
Conference Agenda Thursday, March 31, 2005		
	Technical Session A	**Technical Session B**
7:30 am - 8:30 am	Conference Registration in the Pre Function Hallway	
Location	TBA	TBA
8:00 am	**Exhibit Area Opens**	
9:00 am - 9:55 am	***STAAD.Pro: Cost benefits and design strategies to save engineers time and money*** *Amber Freund* *Research Engineers, International*	***Rammed aggregate pile foundations*** *Tommy Wilson* *Geopier Foundation Company*
10:00 am - 10:25 am	**Break in the Exhibit Area**	
10:30 am - 11:25 am	***Design methods for sheet piles and retaining walls*** *Mark Brumbaugh* *Skyline Steel Fabricators*	***Louisiana DOTD life cycle cost analysis program: How do taxpayers benefit?*** *Kirk M. Zeringue, EI* *Louisiana DOTD*
11:30 am - 11:55 am	**Break in the Exhibit Area**	
12:00 noon - 1:25 pm	**Luncheon**	
1:30 pm - 2:25 pm	***Values and challenges of restoring Louisiana's barrier shoreline*** *Christopher P. (Chris) Knotts, PE* *Louisiana Department of Natural Resources*	***Microsoft Project: A tool for engineers*** *Dennis Dworaczyk* *Berard, Habetz and Associates*
2:30 pm - 2:55 pm	**Break in the Exhibit Area**	
3:00 pm - 3:55 pm	***Cone penetrometer testing (CPT) versus conventional soils borings*** *Kieth J. Spampneto, PE* *Soil Testing Engineers*	***Recommended AASHTO Mechanistic-Empirical Pavement Design Guide & its implementation*** *Athar Saeed, PE* *Applied Research Associates, Inc.*
6:30 pm - 6:55 pm	**Social**	
7:00 pm - 10:00 pm	**Awards Banquet**	
Conference Agenda Friday, April 1, 2005		
	Technical Session A	**Technical Session B**
Location	TBA	TBA
8:00 am	**Exhibit Area Opens**	
9:00 am - 9:55 am	***Continuous flow intersections*** *Michael G. (Mike) Bruce, PE* *ABMB Engineers, Inc.*	***Hydrological effects of storms/hurricanes on local areas*** *Don Davis* *Louisiana State University*
10:00 am -10:55 am	***Numerical modeling: A tool to aid in coastal restoration*** *Ehab A. Meselhe, PE* *University of Louisiana at Lafayette* *J. Alexander (Alex) McCorquodale, PE* *University of New Orleans*	***Personality Profiling for the engineer*** *Randy Smith* *Training Solutions*
11:00 am - 11:55 am	**Section General Membership Meeting - Location TBA**	
12:00 noon - 1:30 pm	**Luncheon & Drawing for Door Prizes - Location TBA** **Speaker: Norma Jean Mattei, PE** **Engineering and business ethics: Is there a difference?**	

Highlights of the October Board of Directors meeting

The Board voted to dispense its accumulated surplus income of approximately $17,305 to the branches according to established policy. This resulted in the following distribution to the branches:

- $3,510 Acadiana
- $4,581 Baton Rouge
- $6,735 New Orleans
- $2,479 Shreveport

These are funds that are considered over and above that which is prudently considered a necessary amount for the Section to fund its planned operations and activities with a modest cash reserve to cover unexpected expenses during the 2004-2005 administrative year. With the distribution, the Board recommended that the branches consider using these funds for public relations activities promoting the civil engineering profession.

It was questioned why the Section with a budget of approximately $40,000 a year maintains in reserve approximately $36,000 considering that by some estimates approximately one half the annual budget is considered a sufficient cash reserve for unanticipated expenses. It was explained that with earnings of the Section's investments being relatively low at this time it was deemed appropriate to be a little more conservative with the level of the Section's reserves. The Board acted to maintain the Section's reserve fund at a minimum of $30,000 for the current fiscal year.

The Section website has historically suffered two failed startup attempts and is currently dormant and not accessible at this time. It was and is intended to be a sustained communications asset for the Section membership and leadership. A group of interested members including most of the Publications Committee and led by President Mattei will meet in Baton Rouge with the Louisiana Engineering Society staff in mid-November to consider contracting the necessary services with a professional website development and maintenance provider. The key functions that were to be incorporated in the dormant website but never completely implemented are still planned to be incorporated in the new website. They are:

- Section news
- Section publications
- Section policy
- Section governing documents
- Announcements of Board meetings
- Agendas and minutes of Board meetings
- Calendar of events and
- Copies of the Section journal.

The Joint Engineering Society Conference initiated annually by the Louisiana Engineering Society and held in conjunction with several sponsoring engineering societies in Louisiana is scheduled to be in New Orleans February 3-4, 2005. The New Orleans Branch plans to provide local ASCE support to the Conference in procuring technical sessions and vendor displays.

It was announced that the ASCE national conventions will move toward a long-planned change in agenda. The agenda will no longer include the extensive technical sessions that have been typically provided during the national conventions. Instead, the agenda will be restricted to the awards programs and functions other than the technical sessions. The technical sessions to be offered by the ASCE in conference form will be the exclusive domain in the technical congresses sponsored by the technical institutes. In the past some technical congresses have been scheduled concurrently with national conventions.

It was reported as a matter of interest that the Georgia Section developed a very successful and well-received infrastructure report card for the infrastructure in the state of Georgia. It was apparently done well and with integrity to the extent that a past concern and reason given for not developing an infrastructure report card in the Louisiana Section may have been nullified. The concern was that such a report card may stir animosity among state and municipal government officials and other public clients toward the engineers in private practice that are in the Section leadership. To the contrary, the infrastructure report card developed by the Georgia Section was well received and appreciated by the public owners of the infrastructure in Georgia because it made public an independent, unbiased picture of the real problems that exist and provided a baseline with which to measure the future improvement or decline of the infrastructure.

The Georgia Section also developed and supports a Fellow grade membership program to encourage its members who are eligible to advance to the grade of Fellow to do so. There was some discussion and early planning to possibly transplant this program into the Louisiana Section. Some of the issues discussed were the means to

- expedite the nomination process
- identify and prompt eligible Section members to consider the opportunity, and
- determine the current population of Fellow Members in the Section.

It was announced that William F. Marcuson, III, PE, a member of the Mississippi Section, is planning to seek the office of ASCE national President-Elect. The District 14 Council endorsed his candidacy and the Mississippi Section has donated seed money on behalf of his candidacy.

The Legislative Committee activities during the last legislative session were briefly summarized. More particularly, a bill that attempted to remove professional engineering services from the state's professional services selection process and place them in the low-cost bidding process was defeated. This defeat was accomplished by the combined efforts of the various engineering societies and interests and the bill's passage was never considered a real threat. However, this should not ease continued vigilance and concern about this issue in future legislative sessions. This is because it appears that there is a general lack of understanding by a majority of state legislators concerning the nature of professional engineering services. Therefore, their appreciation of the corresponding need for qualification-based selection and negotiated costs to obtain cost-effective engineering services is also lacking. This apparently leads them to conclude that low-cost selection leads to the most cost-effective engineering services.

The specific concerns discussed were about the appropriateness of the sub-consultant selection practices by the engineering firms who obtain their engineering services contracts in the qualifications-based selection environment in Louisiana. It is a common practice among these firms to solicit geotechnical engineering firms to compete for the sub-consultant work with cost proposals. This often occurs after cost estimates are solicited from — and provided by — a specific geotechnical engineering firm that is also named as the sub-consultant in the successful engineering proposal.

The outcome of the engineering services provided for a typical fee based on a successful low-bid cost proposal was expressed as a "less than optimum" design. Given a fee that is not sufficient to do the appropriate, project-specific, comprehensive analysis and design, a less comprehensive analysis is pursued requiring and using a larger factor of safety in the design to compensate for the higher risk involved in the less comprehensive analysis used. It is believed that this conservatism introduces through the geotechnical design process substantial increases in construction costs that are absorbed by the client in exchange for a very nominal reduction in the fee for the geotechnical engineering services to increase the profit of the prime consultant.

The working organization of the very successful Structures Committee of the New Orleans Branch was discussed in some detail. It was noted that the Committee has a traditional committee chair that manages the overall activities of the Committee for which he is responsible. The committee itself consists of 10 to 12 members led by the chair who together develop and support the committee's activities such as:

- identifying subjects of interests
- procuring speakers for seminars
- organizing seminars and
- disseminating seminar schedules.

The Structures Committee with the leadership of its chair serves its constituents — the hundreds of structural engineers who practice in and around the New Orleans Branch — by routinely providing seminars that serve their practical needs and interests.

Highlights of the November Board of Directors meeting

The planning for resuming the operation of the Section's previously inactive and now defunct website was discussed in some detail. There have been discussions and there are planned future discussions with representatives of the prospective contractor — Gator-T — that services the website of the Louisiana Engineering Society and with the LES staff in its headquarters that may aid in its support. Based on these discussions to date, the prospects of successfully resuming the operation of the Section's website in the near future appear to be very good.

With the offices and staff of the Louisiana Professional Engineering and Land Surveying Board housed in the same facility with the LES headquarters and given that the LAPELS Board is also a large customer of Gator-T, the contractor keeps a resident technician on the site who can provide more responsive site design and webmaster service than would normally be expected. The Section purchases a portion of the administrative, accounting and secretarial services to be provided by the LES-LEF-ASCE secretary in the LES headquarters. These services have been provided and accounted by hours billed independent of the individual providing them. This may offer an opportunity to obtain support services for the Section's website also in the same facility.

A future issue of funding the Section website was discussed in general without action. There was a preliminary recommendation that each sponsor of the Section's journal be listed on the Section website with a click-on link to the websites of those who have one. This is in line with considering the website an extension of the Section's communications with its membership heretofore provided entirely by the Section journal. For this, it was estimated that an approximately $20 per year increase in the business card listing and advertising rate may be applied to reasonably cover the cost of the added benefit of being acknowledged on the Section website.

The Louisiana Engineering Advancement Program (LEAP) — a nonprofit corporation established in Louisiana — supports high-school student activities to introduce them to elements of the engineering profession that may be of interest to them in making a career choice. The New Orleans Branch has been a regular contributor to the LEAP. On this basis, Branch representatives on the Board recommended that the Section consider funding the LEAP at some level since its programs appear to be consistent with the Section's goals and Section's previous funding of similar efforts.

An annual Capitol Hill *fly-in* will be sponsored by the ASCE national organization to bring ASCE members representing each section to Washington, D.C., for a 2-day workshop on effective political action and interaction with lawmakers. The workshop will culminate with participants meeting with their state congressional delegations to lobby for the political agenda of the ASCE national organization. The Section plans to send 2 representatives of which it will be responsible for the expenses of one. Deborah D. Keller, PE, of the New Orleans Branch will be sponsored by the ASCE national organization and Shannon S. Spell, PE, of the Acadiana Branch who is a previous participant, will be sponsored by the Section. He will be reimbursed by the Section according to the ASCE national organization travel policy.

An audit of the time of the LES-LEF-ASCE Secretary whose time is shared between the Louisiana Engineering Society, the Louisiana Engineering Foundation and the Section was recently provided. It was discovered that the Section has not been making full use of the time for which it pays. Approximately 5 of the 10 hours per month available to the Section are being used. The current and several proposed services are being considered by the Board to assign to the LES-LEF-ASCE Secretary to more effectively use the services and the time for which it pays. The proposed services will be prioritized and selected according to the estimated time they are expected to consume.

There has been a substantial change in the services provided by the LES-LEF-ASCE Secretary or in the name of this position since it was first established some years ago. The only service that is still carried over from that time is answering the local business telephone line of the Section that is listed in the Baton Rouge telephone directory. A history of its use provided some time back suggests that this line is little used and of no practical value to the Section. Based on this experience, the Board acted to immediately discontinue its local business telephone line. Services that are no longer performed are recording, typing and distributing the minutes of the Board meetings.

Last year a portion of the perfunctory duties of the Publications Committee Chair were transferred to the LES staff accountant rather that the LES-LEF-ASCE Secretary. This is an accounting service that absorbs most of the 5 hours a month that are now consumed. The service is billing, posting and forwarding the receipts from the Section journal listing and advertising fees remitted and reporting the status of the accounts to the Publication Committee. This is seen as a great benefit to the operating effectiveness of the Section. It was not uncommon for it to take a substantial effort on the part of the incoming Publications Committee Chair involving some months if not most of the administrative year to get up to speed on the accounting software and practices. This has freed the Publications Committee Chair from this duty to devote quality time to soliciting new listings and advertisements, and servicing delinquent accounts.

It has been proposed by the LES staff and it is being considered by the Board that the Section consider moving the accounting of the Section checking account and investments to the LES staff accountant. This would include annually executing the corporate resolution and signature card, paying the invoices for budgeted expenses, balancing the account monthly against the bank statement and providing the Secretary-Treasurer a financial report on demand for each Board meeting. All of this would be under the careful supervision of the Secretary-Treasurer. It would appear that this would free the Secretary-Treasurer from the details of the accounting to devote more time to following expenditure trends to prepare the proposed budget for the following administrative year and taking minutes and maintaining the approved minutes of the Board meetings. Another important benefit would be to provide a permanent business address for the Section. It is not unusual that invoices are paid late because of the inconsistent effort to get the annual changes in address of the Secretary-Treasurer to the various vendors and services that are regularly used by the Section.

Another service that will be considered to be performed by the LES-LEF-ASCE Secretary will be preparing the unapproved and approved minutes of the Section Board to be published on the Section website. This will primarily consist of scanning in the several usual attachments to the unapproved/approved minutes that would be provided in Microsoft Word.

The State Public Affairs Grant proposals were submitted by the New Orleans Branch and the Acadiana Branch. They will be forwarded by the Section as its SPAG proposals to the ASCE national organization to be considered for funding.

The proposed 2004-2005 Section budget was reviewed in detail and several revisions were recommended. A tentative budget will be redrafted with all of the recommended revisions that were agreed to for the consideration of the Board. The tentative budget estimates an income of approximately $39,800 and approximately $44,600 are allocated for expenses. The reserves and invested assets of the Section at this time are approximately $37,500 and they considered adequate. The deficit budget of $4,800 takes into consideration that from recent experience approximately this amount of the budgeted expenses is not claimed. The revised tentative budget will be sent by email to the Board for its consideration in advance of the next scheduled Board meeting in February when it is expected to be considered for and receive final approval.

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2005 Deep South Conference

This year's Conference is scheduled for April 7-9 and it will be hosted by the University of Louisiana at Lafayette. Preparations are underway as the Chapter's concrete canoe team and steel bridge team prepare their contest entries. This year the Chapter is making every effort to participate across the board in all of the competitions during the Conference. This includes a surveying team, an environmental team, asphalt pigeons team, and a Mead Paper. Preparation for — and participation in — the Conference is a great way to be involved in Chapter activities and also a great way to meet new people from other schools and communities. For more information about the Chapter's Conference activities, visit its website and click the Conference link under the Activities menu.

Editor's note: This article was extracted from the December 3, 2004 Tulane ASCE Student Chapter newsletter.

Nominees for Section offices

The slate of *official* nominees will be presented in conjunction with the election of Section officers and directors that is part of the agenda during the Section Annual Spring Meeting — a general membership meeting of the Section. This membership meeting scheduled for April 1, 2005 in conjunction with the Annual Spring Meeting and Conference that will be hosted by the Acadiana Branch and held in Lafayette. The announcement and reservations form for this conference appear in this issue of *The Louisiana Civil Engineer*.

The Section Nominating Committee, chaired by Barbara E. Featherston, PE, recommended, and the Section Board of Directors accepted, the slate of official nominees for the offices to be filled for service on the Section Board of Directors during the 2005-2006 administrative year. The slate of official nominees for the offices on the Section Board of Directors is hereby respectfully submitted for your consideration

- Timothy M. Ruppert, PE, President-Elect
- E.R. (Ray) DesOrmeaux, PE, Vice President
- Ali M. Mustapha, PE, Secretary-Treasurer
- Kurt M. Nixon, PE, Director-at- Large
- Jerome M. Klier, PE, Director-at-Large

Kim E. Martindale, PE, the current President-Elect of the Section — according to the Constitution of the Louisiana Section — assumes the office of President by succession rather than election. Patrick J. Landry, PE, and Christopher G. Humphreys, PE, Directors-at Large, will serve the second of their 2-year term. Kurt Nixon and Jerry Klier are nominated to stand for election as Directors-at-Large — also a 2-year term. The Assigned Directors are not elected as part of the Section Annual Spring Meeting but provided by the New Orleans and Baton Rouge Branches to serve a 2-year term.

In addition to the presentation of the slate of official nominees, additional nominations from the floor will be considered during the Section Annual Spring Meeting. The nominees from the floor who are qualified to serve will be considered by the membership present. After the close of nominations, the election of the Section's offices will proceed immediately. The officers and directors elected during the Section Annual Spring Meeting will take office at the conclusion of the installation ceremonies during the Section Annual Meeting that will be hosted by the New Orleans Branch in New Orleans. It is scheduled for September 9, 2005.

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- sticking to the time allotted and
- ending on time.

Ideas were provided about how to make meetings interesting and untraditional. Examples of bringing in guest speakers and recruiters, and using interactive meeting formats were given to encourage chapter members to look forward to the next chapter meeting rather than assuming it will be just another boring meeting and deciding not to attend.

Keeping members excited about chapter activities was stressed as one of the most important things to a successful organization. Whether it is a pizza party, tailgating, bowling, or an opportunity to meet with people in the civil engineering profession, making chapter events fun, interesting, and profitable is essential to its success. We were made aware of the importance of planning and then meeting the obligations made to keep chapter members supportive. It was noted that the example we set can leave an important legacy for future student chapter operations. The importance of being active in our community by volunteering the time and skills of chapter members to help people less fortunate was stressed. This gives chapter members a positive exposure to the value and the need to give back to their community throughout their future careers.

A meeting of the Chapter officers was scheduled soon after we returned from Orlando to discuss the Chapter's goals. We discussed what we had learned and developed feasible goals for the semester. The goals we set were to

- assist the civil engineering department with some of its needs using our AutoCAD skills and
- visit high schools once a month and provide engineering-based lab competitions for stu-

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— net surfing—

ASCE national organization:
http://www.asce.org

Note: Most ASCE-related pages can also be addressed through links at this website. All section and branch officers are listed at:
http://www.asce.org/gsd/localofficers

ASCE Acadiana Branch:
http://www.asceacadiana.net

ASCE Baton Rouge Branch:
http://branches.asce.org/batonrouge/index.htm

ASCE New Orleans Branch:
http://www.asceno.org

Louisiana Tech ASCE Student Chapter:
http://www.latech.edu/tech/orgs/asce/

UNO ASCE Student Chapter:
http://www.uno/~engr/asce/asce.html

ULL ASCE Student Chapter:
http://www.engr.usl.edu/cive

Tulane ASCE Student Chapter:
http://www.tulane.edu/~asce

LSU ASCE Student Chapter:
http://www.ce.lsu.edu/~asce

ASCE Louisiana Section:
http://www.lasce.com

Louisiana Engineering Society:
http://www.les-state.org

Louisiana Professional Engineering and Land Surveying Board:
http://www.lapels.com

- Career Benchmarks -

Kam K. Movassaghi

C. H. Fenstermaker & Associates, Inc. announces the appointment of **Kam K. Movassaghi,** PE, to the position of President from where he will oversee the operations and administration of all its divisions. Movassaghi's professional career spans over 40 years in private practice, education and government. He is the immediate former Secretary of the Louisiana DOTD and he previously headed the Department of Civil Engineering at the University of Louisiana at Lafayette. Movassaghi earned his BS in civil engineering from the University of Louisiana at Lafayette and his MS and PhD from LSU.

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

Editor's note: There are three disciplines that are licensed by the Louisiana Professional Engineering and Land Surveying Board and that may be considered closely related to civil engineering. They are the environmental, structural and architectural engineering disciplines. As of January 2005, the active engineering licenses conferred by the Board were approximately 6128 in civil, 746 in environmental, 51 in structural and 1 in architectural.

❖ Quote ❖

Ethics: Do right for your own sake and be happy in knowing that your neighbor will certainly share in the benefits resulting.

-Mark Twain

An excellent time to make or review your estate plan

By Thomas R. Thurmond

An unplanned estate or an outdated estate plan can be costly. If you do not have an estate plan, the government will eventually create one for you upon your death. Not surprisingly, it will not contain too many tax-saving or wealth preservation strategies. Even if you have an estate plan but it has not been updated in several years, your family could still incur unnecessary costs because of lifestyle and tax law changes.

Many factors can affect an estate plan, so the following items should receive extra attention when you review or prepare your estate plan:

- *Growing Net Worth.* Securities and other investments, retirement plan assets, your home, your business and your life insurance policies generally are all counted as part of your estate. Investment gains and increasing real estate values may have helped move your estate into federal estate tax territory. Also, individual states may levy estate taxes of their own — check the laws of your state and consult your tax advisor for additional information.
- *Estate Taxes.* You can leave up to $1,500,000 to your heirs free of federal estate tax for the year 2004. This amount will gradually increase to $3,500,000 in 2009. In 2010, federal estate taxes are scheduled to be repealed. However, unless additional legislation is passed, federal estate taxes will return in 2011 and they will apply against estates valued at $1,000,000 or more. The uncertainty of the current estate tax system, along with the fact it is among the highest tax rates applied to individuals by the federal government, protecting your assets from their eroding effects is more important than ever.
- *New Address.* If you have moved to a new state or acquired a second home or other property in that state, your legal domicile may be uncertain. Without clearly establishing your domicile in a single state, more than one jurisdiction may successfully tax your estate. A revised estate plan can help protect your assets against this possible double taxation.
- *Life-Changing Events.* Changes within your family often necessitate changes to your estate plan — e.g., marriage, remarriage, divorce, birth, death, etc. Any such changes among your heirs should be reflected in your estate plan.
- *Health Needs.* Special health needs may have arisen within your family since your last estate plan review. These may require additional provisions to your will or the establishment of a trust.
- *Disability Protection.* Disability does not only happen to other people. A personal trust can be modified to help prevent a temporary or permanent disability from disrupting your financial affairs.
- *Business Changes.* Reviewing your estate plan can help alert you to potential disruptions to or tax implications involving your family business. Whether a sole proprietorship, partnership or closely held corporation, changes in the form of ownership will have a significant effect on the tax and succession aspects of your business.
- *Philanthropic Intentions.* A growing personal estate may encourage you to give more to charity. Maximizing the control and management of your charitable gifts now not only can provide you with significant tax savings, but can also offer you (and your favorite charities) additional financial benefits.

You have probably spent years building up an estate for your family. Having an estate plan in place that helps protect and safeguard your assets makes perfect sense. Adding estate planning to your list of priorities can add to your peace of mind and help spare your heirs from future estate tax problems.

What to bring when meeting your estate planning attorney. If you are planning your estate or updating an existing plan, you will probably be meeting with your estate planning attorney. For an efficient and effective meeting, bring copies of the following documents with you:

- your current will
- any existing trust documents
- deeds to your house and other real estate you may own
- all current financial records — such as retirement plan accounts (IRA, 401(k), SEP, etc.), brokerage accounts, loans (mortgages, credit cards, personal), bank checking/savings accounts and any other financial-related accounts
- your employee benefits handbook
- life insurance policies
- trust documents where you may be the beneficiary
- paperwork for any business you may own or have a controlling interest in
- a list of family members — including parents, siblings, children, grandchildren and anyone else who you may consider leaving an inheritance and
- a list of charities you contribute to.

Your financial advisor can help you assemble current financial information before you meet with your estate planning attorney. Also, be sure to consult your tax advisor before making any tax-related investment decisions.

Thomas R. Thurmond, Senior Vice President, Financial Advisor with Morgan Stanley in New Orleans, Louisiana. He may be contacted by e-mail at thomas.thurmond@morganstanley.com or by telephone at (504)587-9669 or (800)659-0009. *This article does not constitute tax or legal advice. Consult your tax or legal advisers before making any tax- or law-related investment decisions. Any particular investment should be analyzed based on the terms and risks as they may relate to your circumstances and objectives. Information and data in this article were obtained from sources considered reliable and published for general information purposes. Their accuracy or completeness is not guaranteed and the giving of the same is not an offer or solicitation to sell or buy any securities or commodities. Investments and services are offered through Morgan Stanley DW Inc., member SIPC.*

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dent participation.

We plan to leave a legacy by hosting an *Order of the Engineer* ceremony and spark enough interest in it to make it an annual event. It is considered highly desirable that the Chapter eventually participates in the steel bridge and concrete canoe competitions held during the Deep South Conference. It was decided to assemble the teams now to begin planning to compete in next year's Conference. During the first Chapter membership meeting, the dates were set for the Chapter's car washes, snack sales, job fair participation and crawfish boil.

With the knowledge gained about understanding and exercising leadership, the discovery of a few good ideas, and some anticipated hard work and dedication, our members, advisors, and officers are looking forward to making 2005 a year to remember.

On behalf of the Chapter, I wish to extend a very special note of gratitude to those who so generously helped make our trip to Orlando possible:

- Dr. Michael Stubblefield, Southern University Center for Energy and Environmental Studies
- Merrel Porché, EJES, Inc.
- Dalton Honoré, Krestworth Group
- David Guillory, EBR Department of Public Works and
- Larry Weatherton, Jr., J R Enterprises of Baker.

Did You Know . . .

...that structural engineers and researchers have been working on security for decades through experimental research, vulnerability assessment software, site layout criteria, and other efforts? Most of the information is government-funded, unpublished, and may be of enormous use to practicing engineers, but most secure design guidance is relatively inaccessible and often classified or given limited distribution. There are mature software tools developed by federal agencies for protective design, but use is restricted. Design standards would be improved by the dissemination of procedures for the design of structures to resist attack.

- *Structural Engineer* 4/04

Younger Member Committee

By Yvette P. Weatherton, PE

YMC Leadership Symposium

The Zone II YMC Leadership Symposium in Orlando, Florida, held in January 2005 consisted of several informative workshops and discussions related to ASCE policy. It was also an opportunity to interact with other YMC leaders from the participating sections, branches and student chapters. A few of the key sessions are summarized:

• *ASCE Policy 465.* Jeff Russell, Chair of the Committee on Academic Prerequisites for Professional Practice, gave an overview of the Policy. Particular emphasis was placed on the Body of Knowledge (BOK) that provides the foundation for implementing the policy. Specifically, the BOK Committee developed 4 outcomes, in addition to the 11 outcomes prescribed by the Accreditation Board for Engineering and Technology that need to be addressed in undergraduate civil engineering curriculum. These outcomes were devised to develop competency in a technical specialization as well as to introduce the student to project management, construction, asset management, business and public policy. The full text of the BOK Committee Report is available online at http://www.asce.org/professional/educ/bodyofknowledge.cfm.

• *Interaction of section and branch delegates, students and younger members.* One of the most discussed issues was the need for interaction between practitioners and student chapter members. The faculty advisors should play a key role in bringing them together. Of particular importance, the interaction between student chapter and YMC members was stressed. Most YMC meetings are very informal and often strictly social. Several ideas were shared for activities in which younger members and students can jointly participate, such as trivia night at a sports bar and recreational outings.

• *Regional implementation of the new governance model.* The current governance structure of the ASCE is in transition to a new governance structure adopted in October 2004. The ASCE is progressively moving from the zone and district structure to a regional structure. Section and branch boundaries and their operations will not change. District 14, consisting of the Louisiana, Mississippi, Alabama and Georgia Sections, will be combined with District 10 — the Florida Section — to form the new Region 5. The details of the transition are fully described in the ***2005 Official Register*** on-line.

Photography contest

The Younger Member Chair of the Shreveport Branch proposed a wonderful idea for the Louisiana Section to plan and implement a statewide amateur photography contest to capture images of the civil engineering infrastructure in Louisiana. The contest will serve a couple of functions. First, the contest will be opened to high school and college students to foster their interest in — and understanding of — civil engineering by identifying and photographing examples of civil engineering works. Second, the contest can serve as a fund-raiser by using the winning photographs to produce a calendar for the student chapters to sell. The branch YMC chairs in the Louisiana Section will be contacted to schedule a conference call to brainstorm this idea and lay the groundwork for its implementation.

Editor's Journal

By James C. Porter, PE

Awards and recognition

The proliferation of awards recognizing engineers for this and that appears to be going from the sublime to the ridiculous. The Section has instituted so many awards that they appear to require more effort and resources than are available to effectively pursue the nominations. The ASCE recently spontaneously precipitated its highly touted, redundant and superfluous OPAL awards ceremony to "recognize" prominent civil engineers who have been previously recognized throughout their careers for their well-known and outstanding abilities and service. The only purpose is apparently to heap more acknowledgment on prior acknowledgment.

This demonstrates to me that the awards and the ceremonies may be degenerating into something as meaningful as a reason to have a social event to buy rounds of beer for one another at the corner pub just because we are all such good friends. The only difference is the pomp and circumstance, and certificates, plaques, medallions, trophies, and the like that are substituted for the beer. Another observation that advances this analogy is that most organizations bestow their awards on their active members. Essentially, active members are nominating and selecting each other for awards rather than attempting to reach out beyond their clique and into the community for equally if not more viable and deserving candidates.

I have nominated 4 people who I believe were deserving of recognition and who were fortunate enough to have received the awards for which they were nominated. I have also received an award — deserving or not. This was before I had the misfortune to serve on an awards selection committee. It can get pretty ugly when we mere mortals stand judgement of our peers as I witnessed. Because of personal animosity, a politically powerful committee member successfully discredited a nominee who merited the award for which he was nominated based on objective accomplishment. Another committee member submitted and aggressively and unsuccessfully promoted his own nomination for an award and then participated in the vote. He did this 3 years in a row before the awards committee apparently held its nose and voted to give him the award — I was not there for that vote. The regional distribution of the recipients took precedent over the objective merits of the awards on several occasions.

Since this experience, I have never felt right about awards. More significantly, I believe that for most of us the act of judging others (playing God) is very uncomfortable — and it should always be so for healthy people who recognize their own foibles.

Most of the awards with which I have been involved require a detailed résumé that is difficult if not impossible to obtain without the knowledge and cooperation of the prospective nominee putting him in the position of supporting his own nomination. This would seem to make awards most available to those who are most comfortable with self-promotion and who are motivated by the competitive advantage they may gain by publicizing an award. Here again I can speak from the experience of having won an award and then becoming very uncomfortable with myself and my motives.

Speaking to the ridiculous, Richard R. Weingardt, PE, a much-awarded and recognized member of our profession, proposes a new *unsung hero* award for the engineers in the structural design office (*Structural Engineer,* April 2003). The ordinary engineers who

- do their job well over a career for which they are well paid
- apparently found satisfaction, if not joy, in their work
- became particularly expert in their field, and
- on occasion — made extraordinary contributions for which they are usually not singularly responsible.

I find it difficult to believe that such a lifetime achievement award would be coveted or that meaningful to the many professionals who opt to stay — or who fall — in the trenches as technical experts and do not climb the management-money-power ladder. What ego is there to preen? What competitive edge is needed at this "top" — that is so near the bottom from the management perspective — and near the end of a career? It may be interesting to see if or how in general the unsung heros will endure the embarrassment of the self-promotion required, if any, and if they can find a driving motive to pursue their own *gold watch* before retirement.

If the proliferation of awards continues, we will surely get to the *unsung stinker* award for the engineers who consistently didn't do their job well over a career and finally to the *unsung anyone* award for anybody who wants one. Somewhere on this road to meaninglessness it will surely be realized that awards outside of peer recognition have little value, their value is enhanced by paucity and value is only in the eye of the beholder. Concerning the whole notion of proliferating awards and thereby cheapening recognition, I am reminded of an appropriate quote in the role of the fictitious, yet great, 20th-century philosopher, Forrest Gump, who admonishes, "Stupid is as stupid does."

(Continued from Page 7)

sea level within the confines of drainage districts, creating a curious reversal of topography. Likewise, as the barrier islands fringing the deltaic coast sink, they become segmented and awash. Since levees and forced drainage are not practical measures for protecting barrier islands, the approach has been to build the surface of the islands up with dredged sand. The sand budget required to keep the barrier islands above Gulf level increases geometrically through time. Consequently, it will become more and more difficult to maintain these islands.

Ecological change

As ridges sink, the live oak (*Quercus virginiana*) forests on their crests die. In the coastal marshes, lowering of the marsh floor by one or 2 feet is enough to cause the grass to drown as demonstrated in the aerial photograph in Figure 7. The brown-marsh phenomenon of 1999 was, in part, fault-induced subsidence accentuated by drought conditions (Gagliano et al. 2003A). Four clear cases have been identified where fault movement caused die-back of *Spartina sp.* (marsh grass) creating the brown marsh condition. This condition is often a stage in the breakup of the tidal marsh resulting from fault movement.

Two notable examples of fault-induced land submergence are found in Plaquemines Parish near Empire and Buras and depicted on the map shown in Figure 8. Movement in 1974-1975, along the Bastian Bay Fault, a 4.6-mile-long segment of the Golden Meadow Fault Zone, created a 23,600-acre bay with water depths of 3 to 4 feet. (Gagliano et al. 2003A, Gagliano et al. 2003B). A few years later, in 1976-1978, similar movement along the neighboring 4.8-mile-long Empire Fault added a 12,400-acre bay with water depths of 3.5 to 4.0 feet. Similar fault events have left zones of open water along the major growth faults.

Tremors and liquefaction

One of the greatest potential dangers identified in this study is the possibility of liquefaction along faults. It now appears that earthquake tremors may separate floating marsh mats from the substrate and otherwise break up marsh mats and other highly organic soils of the coastal marshes and thus may be a major contributor to coastal land loss. There is also mounting evidence that the long unexplained pimple mounds that dot the surface of the Prairie and Beaumont Terrace surfaces in a large area in southwest Louisiana and southeast Texas, including the Houston area, are relict sand blows resulting from liquefaction that occurred along faults during late Quaternary times. While this theory will require additional research to verify, if true it would further suggest that the region is not as tectonically stable as previously believed. Friction piling driven in sand deposits support many large structures in south Louisiana. Susceptibility of these sands to liquefaction and compaction from earthquake tremors warrants further investigation.

Measuring and dating fault movement

As in the case of any natural hazard, it is important to forecast the potential danger of fault movement. This can be accomplished by knowing the location and character of the faults, and by measuring the magnitude and speed of movement (vertical and lateral), the frequency of occurrence, and the duration of slippage. A variety of direct and indirect measurement techniques have been applied to the problem. Analysis of tide gauge records has proven to be most useful in determining relative changes in sea level removing the component of change caused by worldwide or eustatic sea level rise from regional and local subsidence. Use of tide gauge records to measure relative sea level rise in south Louisiana was pioneered by Shea Penland and his students. Penland — now with the University of New Orleans — and his team were among the first to report spatial and temporal variations in rates of subsidence in the northern Gulf region (Penland et al. 1988).

Modern rates of eustatic change are best measured at tectonically stable places, such as Pensacola, Florida (0.0075 ft/yr during last 40 years) and Port Isabel, Texas (0.011 ft/yr of rise during last 40 years). In contrast, the apparent rates of sea level rise in southeastern Louisiana as measured from tide gauges stations such as Grand Isle (0.064 ft/yr during last 40 years) and Little Woods (0.116 ft/yr during last 40 years) are among the highest in the world. The difference between rates of relative sea level rise recorded from tide gauges at stable locations and those from gauges at locations that are sinking is a measure of subsidence.

Another excellent data set for measuring vertical change are benchmarks for which change has been measured along highways across the coastal landscape. Recently, the National Geodetic Survey (NGS), in conjunction with the Spatial Data Center at Louisiana State University (LSU), has been re-evaluating this data. Roy Dokka, director of the LSU team, reports that "...loss of elevation ranges from 0.3 to 1.5 inches or 0.03 to 0.13 feet per year across south Louisiana..." and that much of the coastal zone will be below sea level within 70 years (*NOAA Magazine,* 2003). The NGS-LSU findings are generally consistent with those presented herein. The NGS-LSU work focuses on modern rates of movement, with emphasis on the location, character and driving processes of the tectonic structures. In the context of the linked tectonic sys-

(Continued on Page 20)

Figure 7. Brown marsh on the down-dropped block of the Lake Enfermer Fault is a segment within the Golden Meadow Fault Zone (after Gagliano et al. 2003). Much of the brown-marsh phenomenon in 1999 was caused by fault-induced subsidence accentuated by drought conditions.

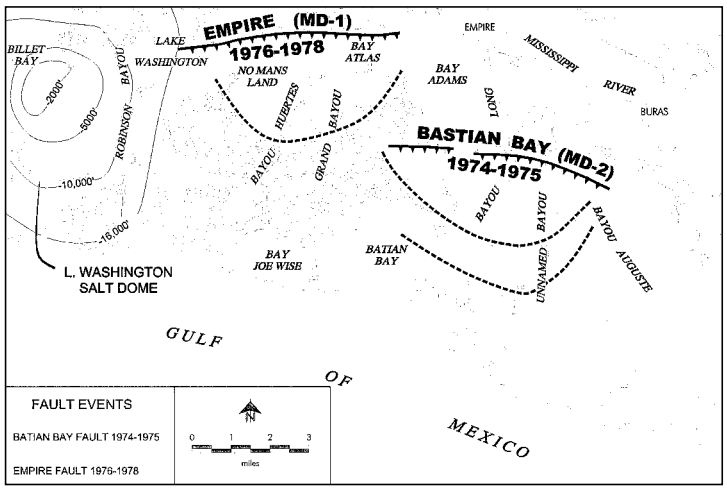

Figure 8. Fault-induced land submergence areas in Plaquemines Parish associated with the Empire and Bastian Bay Faults. These two fault segments along with the subsurface Lake Washington Salt Dome lie within the Golden Meadow Fault Zone.

(Continued from Page 19)

tem model, the highest rates reported by the NGS-LSU team appear to be measures of short duration movement on down-dropped fault blocks near fault planes.

The length of time both the tide gauge and re-surveyed benchmark records have been kept is relatively short — a few decades to a maximum of 100 years — and therefore the confidence level for prediction of recurrence is relatively low. A third technique uses geological, geomorphological and archaeological methods to extend the record by dating past fault and earthquake events. The geomorphological approach is based on identification of landform signatures of fault movement. These signatures include shapes of land loss areas, river patterns and submergence of ridges, that are distinctive enough to be recognized on modern aerial images as well as historic maps. Thus, first appearance of fault event signatures on images and/or maps of known age date the event. As the name implies, geoarchaeological dating uses archaeological sites and artifacts to date landforms and sedimentary deposits affected by fault movement. This technique can be used to date events that occurred during the 11,500 years or longer period of prehistoric Native American occupation of the region.

Borings and high-resolution seismic lines are also used to identify faults. Radiometric dating of material in the displaced beds provides the basis for calculating subsidence rates, and differences in rates across faults is a measure of movement.

Dating fault events and measuring past movement employs geo-forensic methods that draw clues and information from many sources and utilize both empirical and anecdotal data. The use of this combination of techniques has provided the basis for formulating the linked tectonic system model and conducting risk analysis of the fault-earthquake hazard on both a site specific and regional basis.

Debate over causes

Within the last few years, following the realization that much, if not most, of the subsidence and resulting land loss in south Louisiana is related to fault movement, several theories have been offered to explain the spatial variation and apparent acceleration in rates of movement that has occurred since the mid-1960s. Gerald Kuecher and Harry Roberts (Kuecher et al. 2001) were among the first to link land loss to fault movement. They concluded from studies of data collected from borings in the Terrebonne area that the geographic variation in rates can be partially explained by differential compaction and variation in thickness of poorly consolidated Holocene sediments. Vertical adjustments to differences may occur along old faults.

Kuecher et al. proposed that the mechanism for fault movement involves venting of saline fluid and gas from geopressured shales upward along growth fault planes. This loss of fluid and gas via faults results in *accommodation space* at depth that in turn causes fault-induced subsidence above the down-dropped fault block. Movement does not occur simultaneously along the entire growth fault trace, but rather along disconnected segments producing a *key-stepping* pattern, with segments of regional faults alternately being active and dormant.

Soda straw theory

Another fault-subsidence theory that has gained some recognition has been proposed by Robert Morton and his U.S. Geological Survey associates. It is based on fluid withdrawal (Morton *et al.* 2001). It is known that removal of large volumes of ground water from shallow aquifers — generally 1000 feet or less in depth — in urban and industrial areas may cause surface subsidence. In Houston, for example, surface subsidence of 8 feet or more that extends over large areas has been correlated with ground water extraction. Similar correlations between localized subsidence and ground water withdrawal have been made in New Orleans and Baton Rouge. In addition, some old oil fields with shallow production from closely spaced wells have experienced surface subsidence. A classic case is the Goose Creek Field on the edge of Galveston Bay where surface subsidence, fissures, and submergence that began in the 1920s have been attributed to withdrawal of oil and produced water. However, other geologists have found that the subsidence is only partially explained by fluid withdrawal. Faults with surface displacement attributed to *natural tectonic processes* have been mapped and measured throughout the Houston area and appear to be an important factor in the subsidence (Verbeek and Clayton 1981).

Robert Morton and his colleagues have extended the fluid withdrawal theory to Terrebonne Parish in south Louisiana to explain high rates of modern land loss. Morton et al. (Morton et al. 2003) have cited apparent correlations of changes in land loss rates — as measured from aerial photographs and subsidence rates measured from borings — with volumes of fluid extracted and pressure loss measured from production records, as evidence in support of the fluid withdrawal theory. The land loss rates accelerated and peaked in the mid 1960s at the same time that the oil field records show peak production and pressure loss.

The *soda straw theory* has gained some acceptance from the coastal restoration community who fear that if the massive land submergence is due to natural causes and that the driving processes may continue, the problem is hopeless and some of the proposed solutions are not worthy of the expenditure of tax dollars. If the theory posed by Morton et al. is correct, the apparent solution to south Louisiana's subsidence and land loss is to either stop production of oil, gas and produced water or inject the produced water supplemented with surface water to replace the volume that is withdrawn.

The soda straw theory is attractive because it provides a villain and the promise of a possible reduction in rate of subsidence. However, there are several problems with this theory. Unlike the Goose Creek Field, most production from the coastal oil fields is from relatively deep — 2,000 to 15,000 feet and greater — higher pressure deposits where the fluids removed through wells are replaced by salt water and may thereby not create *accommodation space.*

Many, if not most, of the subsiding oil fields owe their existence to structural traps on the downthrown blocks of ancient faults. The faults along which Morton and his associates cite evidence for subsidence induced by fluid withdrawal, primarily Golden Meadow, Theriot, and Lake Hatch, have long and nearly continuous, albeit episodic, histories of movement that began tens of millions of years ago and have continued into modern decades. Some segments along the Golden Meadow Fault exhibit more than 2000 feet of cumulative vertical displacement at depth. Using the geo-forensic techniques previously mentioned, movements on segments of the Golden Meadow Fault have been dated and documented and are known to have occurred periodically:

- during ancient geological times (10s of millions of years ago)
- at the base of the Pleistocene Formation (2 million years ago)
- at the top of the Pleistocene (25,000 to 5,000 years ago)
- during prehistoric Native American times (3,500 to 1,200 years ago), and
- during historic and modern times (150 years ago to present).

As discussed previously, movement and shaking effects also occurred along the Golden Meadow Fault during the 1964 Alaskan Earthquake indicating that the fault system is active. To attribute the subsidence and land loss of the last 50 years to anthropomorphic causes flies in the face of the geological record.

Linked tectonic systems

Fault induced subsidence is largely driven by ongoing, interacting, natural processes or fault movement within a linked tectonic system. As is shown in Figure 2, the driving processes include

- sinking and rifting of the earth's crust
- sediment loading
- up-fault venting of fluid and gas from geopressured shales
- salt movement
- isostatic adjustment and
- gravity slumping.

Vertical and lateral adjustments to these process interactions occur along the fault planes as part of the system expands and other parts contract. South Louisiana overlies the expansion or *pull-apart* portion of the tectonic system, where *accommodation space* develops and is expressed at the surface as cracks and depressions. Because the tectonic components are articulated, and stresses are transferred, movement along one fault may initiate movement along neighboring faults. This domino effect continues until quasi-equilibrium is reached. This interactive movement constitutes a flexing of the linked tectonic system.

Denial

The outcome of what might ordinarily be a not-too-exciting academic debate over the causes of a geological phenomenon — fault-related subsidence — has far-reaching implications. The outcome will affect the future of a large economically important area and may determine how vast sums of badly needed tax dollars are spent. The fault-subsidence issue has been on the table for discussion for 5 years. Yet, serious consideration of the issue has had — and continues to have — a low priority on the agenda of the coastal restoration community.

The response to the fault-land loss findings has been denial. Why is this? Reasons given by the restoration community include:

We'll worry about that later. Let's not delay the program. We can't have an academic debate while a huge block of the state sinks and calves into the Gulf. That would be like fiddling while Rome burns. The people of south Louisiana want the land-loss problem fixed. The fault debate will delay approval of the billions of dollars requested from the federal government for coastal restoration. Kill the messenger!

It must be unsettling for the proponents of a restoration program built on ecological models to learn that geological processes drive the landscape changes and that the biological changes are only the responses and not the driving processes.

Denial that the hazard exists has already resulted in bad decisions based on the wrong geological model. Consequently, investments of huge sums of tax dollars have been made in structures that are under-designed or in the wrong location. Continued denial will only result in a flawed restoration plan and project designs that will predictably result in a false sense of security to the communities at risk. Failure to re-evaluate the fault-earthquake hazards posed to older structures and infrastructure not designed to withstand the effects of these hazards may also result in failures. Continued denial can ultimately result in the catastrophic loss of life and property.

Conclusion

We are at a critical juncture in re-structuring our coastal area for the future. Faults and earthquakes present a clear and present danger to south Louisiana. While constructive debate among the geologists engaged in fault research continues, there is a consensus that the problem is urgent and that there is a need to expeditiously address this previously underrated natural hazard. This hazard presents a particular challenge to geologists and geotechnical engineers, since some common and invalid conceptual models must be revised. These models may have served us well but they must be updated and fine-tuned with the new information that is available. This is not a criticism of what we have done in the past or a statement that we cannot stabilize the coast for natural system sustainability and multiple-use. It is rather a plea for objective science-based land use planning and engineering design. The fault-earthquake hazard can and needs to be mitigated by

- avoidance
- monitoring and
- applying good engineering design and land use practices

because...

The faults are moving!

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References

AP, New Orleans 1964A. State's Twitch of Earth Said 'Weird.' Lake Charles American Press, March 29 1964. Lake Charles, LA.

AP, New Orleans 1964B. Tremors Churn 6-Foot Waves in Louisiana. March 27, 1964. Beaumont Enterprise, March 28, 1964. Beaumont, TX.

AP, Houston 1964. Resident Warned. Beaumont Enterprise, March 28, 1964. Beaumont, TX.

Associated Press Houston 1964. Houston Said Lifted 4 Inches. Port Arthur News, March 28, 1964. Port Arthur, TX.

Fails, T. G., G. D. O'Brien and J. A. Hartman. 1995. Exploration and Exploitation of Coastal Salt Basin Diapiric Structures in the Lower Pliocene Through Eocene Trends: Geology and Techniques. Houston Geological Society and the New Orleans Geological Society.

Frohlich, C. and S. D. Scott. 2002. Texas Earthquakes. University of Texas Press, Austin. 275 p.

Gagliano, S. M. 1999. Faulting, Subsidence and Land Loss in Coastal Louisiana: p. 21-72 in Louisiana Coastal Wetlands Conservation and Restoration Task Force and Wetlands Conservation and Restoration Authority, Coast 2050: Toward a Sustainable Coastal Louisiana, the Appendices, Appendix B-Technical Methods. Louisiana Department of Natural Resources, Baton Rouge, Louisiana.

Gagliano, S. M. 2004. Earthquakes, Faults, Subsidence and Land Loss in South Louisiana and South Texas. Abstract. *Proceedings of the South-Central – 38th Annual Meeting (March 15-16, 2004) of the Geological Society of America.* Bryan, Texas.

Gagliano, S. M., Kemp, E.B., Wicker, K.M., and Wiltenmuth, K.S. 2003A. Active Geological Faults and Land Change in Southeastern Louisiana. Prepared for U.S. Army Corps of Engineers, New Orleans District, Contract No. DACW 29-00-C-0034.

Gagliano, S. M., Kemp, E.B., Wicker, K.M., and Wiltenmuth, K.S. 2003B. New--Tectonic Framework of Southeastern Louisiana and Applications to Coastal Restoration. *Transactions of the Gulf Coast Association of Geological Societies, v. 53, pp. 262-276.*

Kuecher, G.J., H.H. Roberts, M.D. Thompson, and I. Matthews. 2001. "Evidence of Active Growth Faulting in the Terrebonne Delta Plain, South Louisiana: Implications for Wetland Loss and the Vertical Migration of Petroleum." Environmental Geosciences; 8: 2:77-94.

Lake Charles American Press 1964. Quake Makes Water in Calcasieu 'Jump.' March 29, 1964, p. 1. Lake Charles, LA.

Lopez, J. A., S. Penland and J. Williams. 1997. "Confirmation of Active Geologic Faults in Lake Pontchartrain in Southeast Louisiana. *Transactions of the Gulf Coast Association of Geological Societies,* 47th Annual Convention; 47:299-303.

McCulloh, R. P. 1991. Surface Faults in East Baton Rouge Parish. Open-File Series No. 91-02. Louisiana Geological Survey, Baton Rouge, 25p.

Miller, Byron and Heinrich, Paul V. 2003. Hydrocarbon Production and Surface Expression of the China Segment of the Tepetate Fault Zone, Louisiana. Gulf Coast Association of Geological Societies/Gulf Coast Section SEPM Transactions, v. 53, pp. 548 – 554.

Morton, R. A., Tiling, G., and N. F. Ferina. 2003. Causes of hot-spot wetland loss in the Mississippi delta plain. Environmental Geosciences; 10: 2: 71-80.

Morton, R. A., N. A. Purcell, and R. Peterson. 2001. "Field Evidence of Subsidence and Faulting Induced by Hydrocarbon Production in Southeast Texas." *Transactions of the Gulf Coast Association of Geological Societies* 51: 239-248.

Murray, G. E. 1961. *Geology of the Atlantic and Gulf Coastal Province of North America.* New York: Harper and Brothers Publishers.

New Orleans States Item. 1964. Small Tidal Wave Strikes in N.O. Area. March 28, 1964. New Orleans, LA.

NOAA Magazine 2003. NOAA-LSU Study: Portions of Gulf Coast Sinking at Significant Rate. April 16, 2003. http://www.noaanews.noaa.gov/stories/s1128.htm.

Opelousas Daily World 1964. Waves in Bayou Courtableau, Witnesses Report, Were 'Like Big Boat Went by, Only No Boat' March 29, 1964, Opelousas, LA..

Peel, F. J., Travis, C. J. H. and Hossack, J. R. 1995. "Genetic Structural Provinces and Salt Tectonics of the Cenozoic Offshore U.S.

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(Continued from Page 21)

Gulf of Mexico: A Preliminary Analysis:" pp. 153-175 in Jackson, M. P. A, Roberts, D. G. and Snelson, S., eds., Salt Tectonics, A Global Perspective: American Association of Petroleum Geologists Memoir 65.

Penland, S., K. E. Ramsey, R. A. Mcbride, J. T. Mestayer, and K. A. Westphal. 1988. Relative Sea Level Rise and Delta Plain Development in the Terrebonne Parish Region. Coastal Geology Tech. Rept. No. 4, Baton Rouge, LA: Louisiana Geological Survey.

Port Arthur News 1964. 600 Alaskan's May be Dead in Quake: Four-Foot Tide's Toll Light Here. March 28, 1964. Port Arthur, TX.

Tectonic Map Committee, Gulf Coast Association of Petroleum Geologists, compilers and eds. 1972. Tectonic Map of the Gulf Coast Region, U.S.A.: Published by Gulf Coast Association of Petroleum Geologists and American Association of Petroleum Geologists. Scale 1:1,000,000.

UPI, New Orleans 1964. South Louisiana Shakes Like Bowl of Jelly. Opelousas Daily World, March 29, 1964. Opelousas, LA.

USGS, Earthquake Hazards Program 2003. U.S. Department of the Interior, U.S. Geological Survey. Abridged from Earthquake Information Bulletin, Volume 5, Number 2, March-April 1973. http://neic.usgs.gov/neis/states/louisiana/louisiana-history.html Last modification September 15, 200313:51 MDT.

Verbeek, E. R. and U. S. Clanton. 1981. Historically Active Faults of the Houston Metropolitan Area, Texas. In E. M. Etter, editor, Houston Area Environmental Geology: Surface Faulting, Ground Subsidence, Hazard Liability, Houston Geological Society, pp. 28-69.

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