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FUTURE:

Louisiana Civil Engineering Conference and Show in New Orleans
September 11-12, 2003

Section Annual Meeting in New Orleans
September 12, 2003

INSIDE:

Highlights of the 2003 Annual Spring Meeting and Conference in Baton Rouge

Highlights of the 2003 Deep South Conference of ASCE Student Chapters in New Orleans

FEATURE:
Pavement Management in Jefferson Parish

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President's Message

Charles L. Eustis, PE

James P. Weidener, PLS, in his article that appeared in the December 2001 issue of *CE News,* expresses his views concerning engineers procuring the professional services of surveying firms by *bidding* based on low price when their professional services contract was awarded by the qualification-based selection method under the Brooks Act. The views he expressed are somewhat parallel to mine. If engineering firms are selected by the *qualification-based selection* (QBS) method and they in turn seek bids for their subcontracted professional engineering services, it may be neither ethical nor may it follow the spirit and the intent of the owner's desire for good quality professional services expressed in the use of the QBS method used to procure the prime engineering firm.

There was also an article in the February 10, 2003 issue of *Engineering News Record* that discusses the idea that price is not everything in the bidding of federal government construction projects. It goes on to say that so many federal government agencies are increasingly embracing various forms of *best value* procurement to avoid the adversarial relationships that are often precipitated as an outcome of the low bid process — the inadequate winning-bid price. The intent of the federal government is to improve its overall satisfaction with the contract services it purchases. It seems the private sector should be learning something from witnessing the federal experience and reaction and coming to the same conclusion — that price is not everything.

These two articles inspired me to use this forum that I briefly share with you to discuss QBS versus the low bid price selection process for professional engineering services because it has been of vital interest and concern to me for some years. To my way of thinking the premise of the QBS method of procurement that includes the selection of the most qualified firm first and then negotiating a reasonable fee for a well-developed scope of work is the best for professional engineering services.

The Brooks Act makes it mandatory for federal agencies to procure professional engineering services for public works projects using QBS and thereby awarding contracts to firms that are most qualified with a fair fee negotiated for the services. The federal government, a sophisticated client, can accurately estimate and set a fair fee in advance for some work, but the competing firms are evaluated and selected based on qualifications. QBS is often used by state and local government agencies to procure their professional engineering services. I believe that it is appropriate that QBS be used extensively for the procurement of professional engineering services including non-government work as well.

The QBS method of procurement typically has 5 procedural elements:

- publishing a public notice
- submitting qualifications
- reviewing and ranking submittals
- selecting an engineer and
- negotiating a contract.

Procuring professional engineering services by QBS brings into focus the competition for professional services based on the most meaningful factors:

- qualifications
- competence
- track record and
- availability.

Price becomes a factor only after the prime engineer and the owner mutually understand in some detail what professional services are required. The subcontracted professional engineering services are typically retained because specialized knowledge and experience are needed to supplement the services of the prime engineer and they are consistent with the scope of the work and the interests of the client. This does not negate the need to use the QBS method but would seem to clearly indicate that its application is required.

Unsophisticated owners may in good faith request bids for professional engineering services, because they do not know what a fair fee for the services would be and they do not understand the nature of the services and why bidding for them on the basis of price is not in either party's best interest. However, I am confounded when an engineer who advocates and participates in a qualification-based selection process resorts to the low bid price selection process for subcontracted professional engineering services. This is particularly true when the engineer is successful in acquiring the professional services contract based on qualifications for the same contract, and has the satisfaction of negotiating a mutually acceptable fee for the services with the owner. For that matter, why would any engineer, knowing the nature of professional services, be a party to requesting bids for subcontracted professional engineering services?

Often, to be successful in a low bid price selection process, the provider of the professional engineering services must reduce the scope of work to less than what is deemed adequate for the project. The successful firm usually cannot make up the difference in the cost of the services required to provide the scope of work deemed adequate by getting extras. Because of this, doing adequate engineering on the project is often not an option. This often results in overly conservative engineering estimates to cover the limited engineering work constrained by the inadequate contract price.

When the more comprehensive engineering appropriate to a project is not done because of inadequate fees, the owner may pay substantially more for the "engineered" project than what was saved by the lower and inadequate fee. This is because an overly conservative design product constrained by inadequate funding can be very costly. Though the engineering work may be consistent with safety and health standards and the fee paid, I believe that this process as described results in the unethical performance of engineering services. Unfortunately, it occurs all too often. This demonstrates that it is not wise under any procurement process to agree to provide services for substantially less than what is deemed necessary to provide the basic engineering services and to be fee-wise consistent with the project needs. Bidding for professional services is not wise in any event because it appears to consistently result in this unfortunate circumstance.

About the cover: *This photograph is also Figure 1 in the feature article in this issue. The vehicle contains the 4th generation Road Tester 3000 that includes the sensors and software originally built by Stantec in 1983. It is used to measure and collect the comprehensive pavement inventory data required as part of a road survey to the support of the Pavement Management Application, software also developed by Stantec. The Stantec-developed pavement management system described in the feature article was adopted by Jefferson Parish after several years of operating a pavement management system developed in-house.*

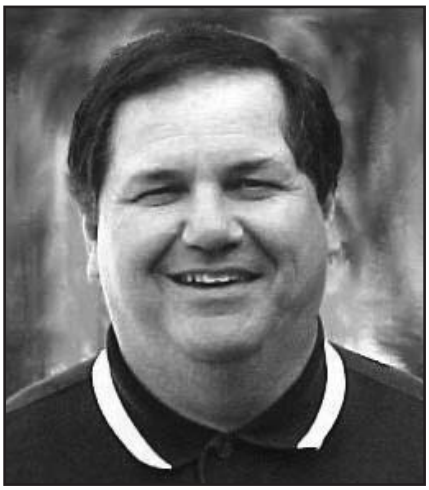
Did you know. . .

. . .that the FHWA is focusing on highway work zone safety through a partnership with 21 state departments of transportation including the Louisiana DOTD? Work zone accidents have been epidemic. In a recent year NHSTA estimated 700 fatalities and 24,000 injuries occurred nationally. Motorists account for ¾ of the fatalities and workers the remainder. This has stimulated recent research and advances in work zone safety to curb the speed of vehicles in work zones leading to the development and use of radar activated signs that display vehicle speeds. This has reduced speeding in the work zones monitored from ⅔ to ⅓ of the vehicles (the portion of speeding trucks was reduced from to ⅓ to 8%). Another less effective tool has been the use of radar drones to activate radar detectors. Motorist tendencies to ignore work zone regulatory and advisory signs when construction is not present has been recognized.

- Better Roads

Pavement Management in Jefferson Parish

By Michael D. Evans and James R. Hallman



Michael D. Evans

James R. Hallman

Introduction

The unincorporated areas of Jefferson Parish contain some 750 centerline miles of portland cement concrete streets and 395 centerline miles of asphaltic concrete streets. Together, these streets represent approximately 150 million square feet of pavement. At an average replacement cost of $5 per square foot, for the pavement section only, this represents an infrastructure asset in excess of $750 million. Pavements represent the most valuable infrastructure asset owned and managed by the Parish.

Pavements are typically designed on the basis of a 20-year life-cycle and it is fair to recognize that a 20-year-old pavement will have some salvage value. Therefore, if one considers an effective pavement service life of 30 years, the traffic needs in the Parish should consume the pavement asset of $750 million over 30 years for an annual average of $25 million. This suggests that the re-investment to protect the pavement asset by way of maintenance and rehabilitation should be at the average annual rate of $25 million.

The Parish recognizes the importance of providing a safe and efficient street network to the users, and to do so it is necessary to provide ongoing maintenance and rehabilitation to protect the value and condition of the asset. Typically, portland cement concrete pavements may be effectively maintained by the timely replacement of failed slabs. However, the failure modes of asphaltic concrete pavements generally dictate that they be either rehabilitated with overlays or, in some instances, reconstructed. Growth in traffic volume can often require the total reconstruction of a pavement section to effectively handle the higher traffic loads.

The pavement management process is an organized methodology to uniformly and objectively characterize and categorize the pavement and pavement conditions for every street section in a network. Its purpose is to identify what work is required, and to economically prioritize and program the projects that best meet the Parish's needs. The pavement management process provides the comprehensive information that public works managers can use to make more informed decisions than they could otherwise regarding the effective use of the funds they have available.

Parish roads

The native soils in Jefferson Parish are unconsolidated, organic deposits that are structurally unstable and the terrain is low-lying, characterized by many swamps, rivers and lakes. This poses a significant challenge to the engineers who are charged with designing pavements over these soils. The two pavement structures most often used are *flexible* asphaltic concrete (AC) pavements consisting of layers of asphaltic concrete over a layer of aggregate base material, and *rigid* portland cement concrete (PCC) pavements consisting of a slab placed directly on a prepared subgrade or on a relatively thin aggregate base layer on top of the subgrade.

The general design premise for the AC pavement is to construct a pavement structure of sufficient thickness to reduce the loading to a value that may be supported by the embankment and/or native soil. The AC layer is designed to provide sufficient strength to carry the traffic loading without deformation. The aggregate layers below the AC layer(s), must be thick enough to facilitate spreading and reducing the stresses such that the bearing capacity of each successive layer, and the embankment and native soils is not exceeded. The AC layer(s) over the aggregate bases used in Jefferson Parish are designed to provide a smooth, durable riding surface with a stability and thickness that will resist permanent deformation under the traffic loads.

The design premise for the PCC pavement is to construct a pavement structure with a slab supported on a base. The slab provides the flexural and shear strength required to support and spread the stresses from the concentrated wheel loads thereby reducing the stresses in the base, the embankment and/or native soil enough such that their bearing capacity is not exceeded.

Jefferson Parish is faced with some basic pavement design problems.

- Roads cannot be relocated to escape the weak soils
- aggregate layers in pavement structures lose strength under high moisture contents due to the existence of clay in the voids or its migration into the voids
- traffic volume and loads are growing at rates that exceed original design assumptions and
- trucks are operating with higher tire pressures to improve their gas mileage.

The higher tire pressures cause a smaller tire contact area on the pavement that often increases the contact pressure above that assumed in pavement design. The higher tire pressure concentrates the wheel loads often exceeding the bearing capacity of the supporting materials in existing AC and PCC pavements. This results in more rapid deterioration, and increased maintenance and rehabilitation requirements that strain the budget and resources of the Parish Streets Department. For these conditions and reasons, the Parish recognized the need to organize a more systematic approach to the preservation and management of its pavement asset.

Pavement management

In 1986, Ashvini Pandit, PE who is now the Assistant Director of Streets for Jefferson Parish, initiated a pavement management process in Jefferson Parish. He presented a thesis on the subject as the partial fulfillment toward earning his MS degree at the University of New Orleans.

In 1995, the Jefferson Parish Council hired Schmidt & Associates to investigate the options and to determine what pavement management system would best meet the needs of the Parish. William R. "Bill" Schmidt, III, the owner of Schmidt & Associates, completed the assignment in 1997 and recommended that Stantec Consulting, Inc. be selected to implement what is known as the Parish-Wide Pavement Management Application. The project was implemented under the guidance of Mike Evans, Director of Streets, Ashvini Pandit, Assistant Director of Streets and with the support of Streets Department personnel.

The Stantec team included Digital

Michael D. Evans has been the Director of Streets for Jefferson Parish since 1993 and was employed by Jefferson Parish in 1988 to serve as its Director of Parkways. He earned his BS degree with a minor in Business Administration in 1995 from the University of Southwestern Louisiana. Evans served as the President of the New Orleans Chapter of the American Public Works Association.

James R. Hallman has been responsible for project implementation and business operations for Stantec Consulting, Inc. throughout North America for over 17 years. As Senior Associate with the Infrastructure Management Group, his projects include pavement management and the broader spectrum of infrastructure management. Hallman has 32 years of experience that also includes construction materials. Hallman earned his BS degree in Civil Engineering in 1970 from the University of Waterloo, Waterloo, Ontario, Canada.

Figure 1. The first Road Tester 3000 was built by Stantec in 1983 and the current unit represents the 4th generation of this development.

Detailed International Roughness Index							
Lane	Station	Date	Left IRI	Right IRI	Left Rut*	Right Rut*	RCI
M2	100	5/8/00	216.8	250.69	0.0	0.0	5.50
M2	200	5/8/00	124.26	137.86	0.0	0.0	7.63
M2	300	5/8/00	155.93	105.29	0.0	0.0	7.64
M2	400	5/8/00	92.14	77.40	0.0	0.0	9.24
P2	100	5/8/00	98.37	75.37	0.0	0.0	9.15
P2	200	5/8/00	96.25	86.08	0.0	0.0	8.97
P2	300	5/8/00	136.27	214.17	0.0	0.0	6.56
P2	400	5/8/00	151.06	115.84	0.0	0.0	7.56

* Note: The IRI equipment was not used to collect rut data in Jefferson Parish.

Table 1.

Engineering & Imaging, Inc., of Kenner and WaveTech, Inc. of Baton Rouge. The initial pavement condition survey project was conducted in three phases.

- Phase I covered 300 miles of major streets in 1997
- Phase II covered 700 miles of remaining major streets and some local streets in 1998 and
- Phase III covered the remaining 300 miles of local streets in 2000.

Phase I included the implementation of Stantec's Pavement Management Application (PMA) software. It provides for the storage of inventory data, attribute data, historical data, map linkage and pavement condition data. The PMA also provides more information with an analysis of the Parish's pavement maintenance and rehabilitation priorities and a recommendation on how to program the available funds to maximize the benefits to the users.

After the completion of Phase III, the Parish Council recognized the need to maintain the data in the pavement management database to reflect current pavement conditions. The Council authorized an amendment extending the original contract for an additional three years to update the pavement management database, including the pavement condition data.

Database

Phase I included the construction of the PMA inventory database on a block-to-block basis. Each block-long street section between two intersections is considered a separate street segment and a separate record in the database. The use of the term *section* here should not be confused with the term pavement section or the pavement cross section as used in the design sense. Building the database in this manner facilitates linking the pavement database records to the arcs or line-work of a *geographic information system* (GIS) street centerline file. The inventory data consists largely of a unique section identification number, the street name and the descriptions of the beginning and end of each section that are typically the names of the two intersecting cross streets.

Stantec initially populated the database with the basic attribute data such as the functional classification

- major streets
- collector streets and
- local streets

pavement widths and some traffic data. This was done by converting this data from the Parish's existing database. Prior to the actual conversion, Stantec prepared a conversion map showing which of the existing database fields would be moved into which of the PMA fields. This map was provided to the Parish for review and approval prior to the actual conversion.

Condition survey

Upon completion of the sectional database, the Parish selected the 300 miles of major streets for Phase I. A pavement condition survey for these streets was conducted that included a ride condition or roughness survey, a surface distress survey, a deflection survey and a ground penetrating radar survey.

Roughness

The roughness and surface distress survey is conducted in one pass at near normal driving speed using the Road Tester 3000 (RT 3000) developed by Stantec and shown in Figure 1. The estimated roughness is measured in *International Roughness Index* (IRI) units — a standard means to measure the pavement profile. It is an estimate of the amount of change in the profile of the pavement surface over the horizontal distance translated along the travel lane and is measured in inches per mile. The RT 3000 unit uses laser sensors mounted in the front bumper to measure their distance to the pavement surface, an accelerometer mounted in the unit to measure the relative vertical movement in the suspension of the vehicle and a distance measuring instrument or DMI to measure its horizontal travel. The relative vertical location of the unit computed from the accelerometer data is subtracted from the laser sensor measured distance to the pavement surface. This data is reduced to the measured pavement roughness in IRI units.

A new pavement considered smooth may have an IRI value of under 50 in./mi. while the IRI value for an in-service pavement considered rough can exceed 400 in./mi. IRI data collected by different IRI compliant devices such as the RT 3000 and on different pavements can be compared directly. In other words, any pavement with a given IRI will exhibit the same roughness or ride quality as any other pavement with the same IRI regardless of what IRI compliant device is used.

The RT 3000 measures and collects the IRI data continuously along the length of a section and summarizes the detailed data in 100' segments in the urban environment and in 300' to 500' segments in the rural and highway environments. The PMA stores this data over each 100' segment as the *station* IRI. The PMA also uses the station IRI data to determine an average IRI for a street section referred to as the *sectional* IRI.

For each station IRI, the PMA computes a *Roughness or Ride Condition Index* (RCI). The RCI is expressed as a score on a scale of 0 to 10 where 10 is a pavement with an IRI of 0. A new AC pavement will typically have a RCI of between 9.3 and 9.7. Table 1 demonstrates the typical roughness data collected for a section. The average RCI values in Jefferson Parish for the PCC and AC pavements are 4.3 and 6.1 respectively. It is typical that the RCI for PCC pavements will be somewhat lower than it is for AC pavements due to the transverse joints in the PCC pavements.

The conversion of IRI values to RCI values was accomplished through a Jefferson Parish specific IRI/RCI correlation developed by conducting a ride panel survey. On completion of the RT 3000 survey, Stantec selected a number of sections that represented the full range of the roughness or ride quality encountered. This was a sample of approximately 40 streets with AC pavements and 40 streets with PCC pavements. They were driven and manually rated for roughness by a ride panel. The ride panel consisted of 8 non-technical representatives chosen by the Streets Department. Driving/riding in 2 standard sedans, 4 individuals in each vehicle indicated the roughness of each pavement on a line graph

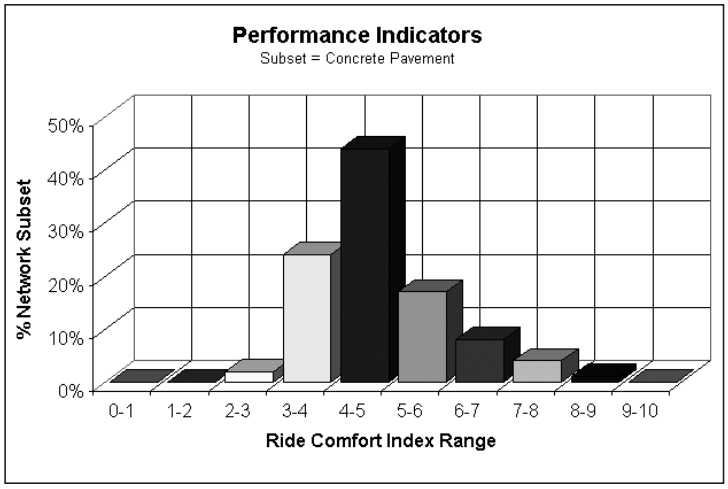


Figure 2. Distribution of the streets with PCC pavements in the given ranges for the pavement roughness condition index as a percent of the lane-miles of all the streets with PCC pavements in the network.

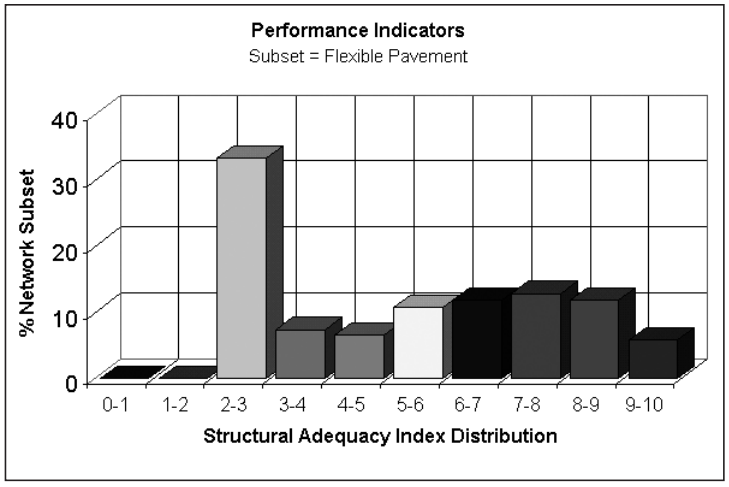


Figure 3. Distribution of the streets with AC pavements in the given ranges for the structural adequacy index as a percent of the lane-miles of all the streets with AC pavements in the network.

marked with basic indicators ranging from very rough to very smooth. Their roughness evaluation on each line was plotted against the IRI value determined by the RT 3000 survey of the same section. A separate regression analysis of the AC and the PCC pavement data sets was used to produce the best-fit nonlinear correlation curve. These correlations were used to convert the IRI data to the RCI for all of the Parish roads surveyed in Phases I, II and III. Figure 2 shows the distribution of the RCI data for the PCC pavements by percent of lane-miles of streets with PCC pavements in the network. The regression model developed from the ride panel data in the Parish is:

$$RCI = 25.620 - 3.690\ln(C)$$

where, C = Calibrated IRI

Surface distress

The RT 3000 simultaneously collects the IRI and surface distress data. Surface distresses are the defects visible to the naked eye. The 13 AC pavement distresses and the 13 PCC pavement distresses collected by experienced technicians who observe and record them via custom keybords are:

AC pavement distresses

- patching (Pat)
- flushing & bleeding (Flu)
- raveling & streaking (Rav)
- rippling & shoving (Rip)
- deformation & distortions (Dis)
- excessive crown (Exc)
- progressive edge cracking (Edg)
- alligator cracking (Alg)
- potholes (Pot)
- map cracking (Map)
- longitudinal cracking (Lon)
- transverse cracking (Trn)
- wheel track rutting (Rut)

PCC pavement distresses

- patching
- scaling
- raveling
- polishing
- distortion
- corner 'C' & 'D' cracking
- coarse aggregate loss
- potholes
- joint sealant loss
- linear cracking
- transverse cracking
- joint spalling
- joint faulting/stepping

The data recorded characterizes the *extent* and the *severity* of each type of surface distress based on observation. For example, the extent of longitudinal cracks on an AC pavement is based on their estimated total length in feet, and their severity is the width estimated as either *slight, moderate* or *severe* reflecting progressively wider crack widths. The RT computer stores the surface distress data for processing at the end of the day. Sections are sampled and reviewed by Parish inspectors on a regular basis to reasonably ensure good data quality and for data acceptance.

The surface distress data is collected continuously and summarized for the same segments as the station IRI data. For each 100' station along each urban street section, the detailed distress data is tabulated indicating the extent and severity of each of the 13 AC pavement distresses or 13 PCC pavement distresses present. *The Surface Distress Index* (SDI) is a score on a scale of 0 to 10 that summarizes and quantifies the surface distress data. It is computed with proprietary software from the detailed surface distress data — extent and severity.

In Jefferson Parish, the predominant surface distresses for AC pavements are longitudinal and alligator cracks and for PCC pavements they are longitudinal and transverse cracks, and joint faulting. Both pavement types exhibit areas of distortion or settlement in conjunction with cracking. Currently the average SDI values for the PCC and AC pavements are 6.7 and 6.9 respectively.

Deflection testing

The streets in the Phase I pavement condition survey project were all classified as major streets of which some were divided by canals or covered culverts. The Parish required that they be deflection tested. This involves using a Dynaflect device that places a known dynamic load on the pavement structure and simultaneously measures how much the pavement deflects in response to the load. When the deflection measurements are analyzed with the traffic data for a test section, a score for the strength adequacy of the pavement structure is expressed as the *Structural Adequacy Index* (SAI) on a scale of 0 to 10. Figure 3 indicates that some 47 percent of the length of AC streets deflection tested in the Parish are structurally inadequate (SAI < 5.0) for the current traffic data. Less than 2 percent of the PCC streets deflection tested were shown to be structurally inadequate.

While the SAI is expressed on the same 0 to 10 scale, it is not simply a relative scale as it is for the RCI and the SDI. The SAI scale has a critical value. The value of 5.0 indicates that the pavement strength is just adequate to carry the current traffic loads. A score of less than 5.0 indicates that the pavement strength is not adequate to carry the current traffic loads and should receive a treatment to increase its strength. The lower the score of the SAI < 5.0 the thicker the strengthening overlay that is required. The average SAI for PCC pavements in Jefferson Parish is 8.0 and 5.2 for the AC pavements.

Conventional deflection tests were performed on 300' intervals using the Dynaflect device. The conventional deflection test provides data on a 4' deflection basin using 5 sensors placed 12" on centers in the outside wheel path of the outside lane (truck lane) with the first sensor located at the load point. This deflection test provides an estimate of the strength of the entire pavement structure including all the supporting layers. The deflection data can be used to estimate the subgrade modulus, and the *California Bearing Ratio* (CBR) or the *Soil Resistance Value* (R-Value).

The structural adequacy for a PCC pavement is characterized by the effectiveness of the load transfer at the joints and by the strength of the slabs. PCC pavements must often act as a bridge over a weak supporting base, embankment and/or native soil. Hence, the ability of the pavement structure to transfer load across joints to adjacent slabs is important in preventing its fail-

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News from the Branches

ACADIANA

By Larry A. Cramer, PE, President

On behalf of the Branch, I wish to congratulate **William H. Miller,** PE, on his recent election and elevation to the ASCE membership grade of Fellow. For more about him, see the Career Benchmarks item in this issue.

The Branch is very excited to receive funding through the ASCE State Public Affairs Grant. This grant is directed toward the continuation of programs previously supported by the Branch. They include civil engineering book donations, the purchase of air time for the civil engineering related television commercial and helping to fund the Career Connections Expo. The Board of Directors decided that the book donations this year will be made to the New Iberia Parish School Board. The commercial will be aired during premium slots on Fox 15, KLFY and MTV in Lafayette during the times that will target elementary and middle school students. Additionally, these stations will air public service announcements in other time slots. These commercials will continue to stress the importance of civil engineering to the general public. The Career Connections Expo that was attended in January was a great success. All the Branch members who volunteered experienced how enjoyable it was to meet the participating students.

The Branch website address has been changed to www.asceacadiana.net. Please visit it for recent ASCE news and events. The Branch is distributing its monthly newsletter *The Acadiana Pipeline* by e-mail rather than by the US Postal Service. For this reason, please make sure your e-mail address is current.

The May membership meeting will again be a crawfish boil held at Acadiana Park on May 16th. The event is a joint meeting sponsored by the local chapters of the ASCE, the Louisiana Engineering Society and the Institute of Electrical and Electronics Engineers. This annual event is always a great opportunity for local professionals engineers, engineering students and family members to relax and socialize.

The election of the members of the Branch Board of Directors was scheduled during the April membership meeting. Dennis Truax, PE, the District 14 Director of the ASCE, was the guest speaker for the March membership meeting. Truax made a presentation on the details and issues regarding ASCE Policy 465. His presentation covered why additional education is required in civil engineering and what the required education may consist of. After the meeting, the Board handed out a questionnaire for the Branch members in attendance to voice their opinions and offer comments about ASCE Policy 465. The Board compiled the results and submitted them to the Section Board of Directors and Truax.

Robert W. Schmidt, PE, with HNTB Corporation was the featured speaker for the February membership meeting. He gave a presentation on the technical considerations for the future I-49 corridor through Lafayette Parish.

SHREVEPORT

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

The Branch is seeking nominations for the position of Secretary-Treasurer to serve if elected on its Board of Directors during the 2003 - 2004 administrative year. The induction of the newly elected officers who will serve on the Branch Board of Directors is scheduled during the luncheon following the Annual Golf Tournament.

The featured speaker for the April membership meeting is Eric England, Deputy Director of the Caddo Bossier Port Commission. Eric plans to discuss the growth of the Caddo Bossier Port and the projects planned for the anticipated future needs of the Port.

The Annual Golf Tournament sponsored by the Chapter is scheduled for May 16th at Olde Oaks Golf Club. The proceeds from this golf tournament are used to fund two scholarships for civil engineering students in the Louisiana Tech Student Chapter. The previous tournament provided the Branch the revenues to give two $250 scholarships. We are very excited about the upcoming tournament and are expecting a large turnout of golfers.

On behalf of the Branch, I wish to thank the Baton Rouge Branch for hosting such a successful Section Annual Spring Meeting and Conference. I found the technical sessions presented very informative. The Branch is now planning to host the Section's 2004 Annual Spring Meeting and Conference. The Board of Directors has already met and started making its plans to host the Conference next year. If you have any suggestions for a topic to be presented as a technical session, please contact C. Eric Hudson, PE, at 221-7501 or ehudson@alliance-ae.com.

The Branch jointly sponsored with the Shreveport Chapter of the Louisiana Engineering Society a well attended and informative membership meeting in March. The featured speaker, Andrew C. Dressel, PE, with Gulf States Engineering made a presentation concerning the design of lift stations.

BATON ROUGE

By J. Keith Shackelford, PE, President

Since the beginning of the year the Branch has had only one membership meeting and luncheon — the one in January. The membership meetings that would have been scheduled for March and April were preempted by the Engineers Week Banquet and the Section Annual Spring Meeting and Conference in Baton Rouge. We will be getting back into the swing of things in a big way with the membership meeting planned for April 17th. The Branch will jointly host a membership meeting with the Baton Rouge Chapter of the Louisiana Engineering Society at Ralph & Kacoo's restaurant. The featured speaker for this meeting will be Mayor-President Bobby Simpson.

A two-day seminar on tunneling and large pump station design was hosted by the East Baton Rouge City-Parish Department of Public Works and Montgomery-Watson-Harza April 2-3. To say that this seminar was well attended would be an understatement. Billable hours for Baton Rouge design firms were at a premium for those 2 days. Given the level of interest of design consultants in the upcoming selection for the related projects, the large attendance was no surprise. Attendees were treated to presentations by engineers with years of experience in these types of large public works projects. As Jerry Klier indicated, the presenters were clearly qualified as experts. They all carried brief cases and came from more than 50 miles away. In all seriousness, to work on projects of the type and magnitude proposed in the Baton Rouge Sanitary Sewer Overflow Elimination Program is a once in a lifetime opportunity. Given the costs and risks involved in such work, it requires our very best engineering efforts. Through such efforts, the City-Parish Department of Public Works is doing an excellent job of keeping the engineering community informed.

The Section 2003 Annual Spring Meeting and Conference was hosted by the Branch and by all measures, it was a great success. In every aspect, from the number of attendees to the slate of technical session presenters, the luncheon and banquet featured speakers to the venue, the Conference was outstanding. Roy and Day Waggenspack were responsible for the planning, preparation and execution of the Conference and they deserve our heartfelt thanks. We will be hard pressed to match the success of this conference 3 years from now when it is scheduled to return to Baton Rouge.

NEW ORLEANS

By Daniel L. Bolinger, PE, President

The Branch continues to sponsor monthly membership meetings and luncheons with guest speakers presenting topics of general interest to our membership. In addition, the Branch technical committees have also hosted several technical seminars of special interest to their constituents. See the Structures Committee entry below.

The Branch hosted a luncheon in January at Andrea's Restaurant in Metairie where the featured speaker was Roy Williams, Director of Aviation for Louis Armstrong International Airport. Williams presented to the more than 50 engineers in attendance the details of the current growth and the future plans for the Airport.

With the New Orleans Chapter of the Louisiana Engineering Society, the Branch co-hosted an evening dinner event in February. This dinner featured a seminar held in the University of New Orleans University Center Grand Hall. The guest speaker was Colonel Peter J. Rowan, New Orleans District Engineer for the United States Army Corps of Engineers. This meeting was attended by over 80 engineers to hear Rowan discuss the current status of the on-going projects being pursued under the auspices of the Corps.

The March membership meeting and luncheon was held at Cannon's Restaurant in New Orleans and attended by over 50 engineers. The featured speaker for this luncheon was Ned Peak, Director of the Louisiana Millennium Port. Peak presented an informative topic covering the current status and efforts to bring the Millennium Port to the region.

The Geotechnical Committee plans to host a panel seminar on Wednesday, May 14, 2003 at the University of New Orleans Engineering Auditorium. The topic for the panel seminar is *Residential Foundations.*

The Environmental and Water Resources Committee is hosting the Branch membership meeting luncheon on Thursday, May 1, 2003. Phil Nelson with Montgomery Watson Harza will make the presentation titled *Homeland Security — Vulnerability Assessments for Municipal Water Systems.*

The Younger Members Committee continues to host events that are of strong interest to the younger members in the Branch. In February the Committee held an event at the RC Bridge Lounge with 15 members in attendance. On April 23, 2003, the younger members will hold another event at Webster's Bar and Grill in Old Metairie on Metairie Road. All younger members are invited to attend. The Committee is planning a future event that will include both younger and older members. This event is billed as sponsor a younger member event. More details to follow.

The New Orleans Branch sent a Younger Member Committee delegate, Christopher Sanchez, to the ASCE Zone II Workshop for Section and Branch Leaders. This workshop was held January 31 through February 2, 2003 in Jacksonville, Florida. Sanchez is also a Branch officer serving as its Secretary.

The steering committee for the 2003 Louisiana Civil Engineering Conference and Show continues to hold monthly meetings in preparation for this annual event. The event is scheduled for September 11 and 12, 2003 at the Pontchartrain Center in Kenner. The committee

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Structures Committee

By Om P. Dixit, PE

The Structures Committee has hosted 2 seminars recently and has 2 more seminars in the planning stage. A goal of the Structures Committee is to present approximately 6 mostly evening seminars a year that are relevant to the practice and interests of the structural engineers in Louisiana. A summary of topics of recent and planned events follows.

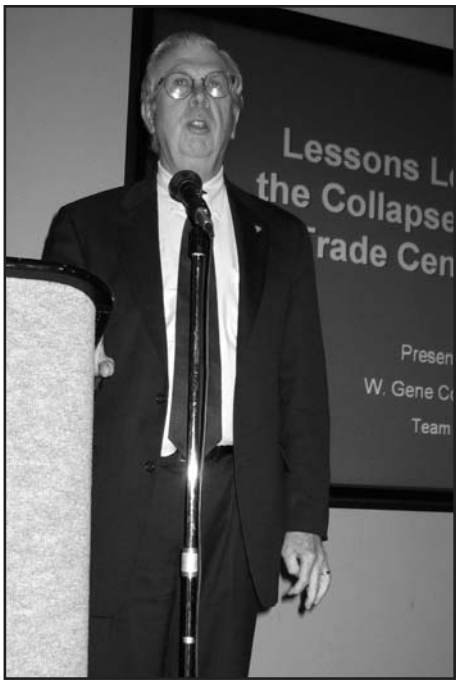
World Trade Center Building Performance Study: Data Collection, Preliminary Observations, and Recommendations was presented in February. This 2.5 hour seminar was presented by **W. Gene Corley,** PE. He is the Chairman for the ASCE-FEMA Committee for the data collection for the World Trade Center collapse in New York that resulted from the terrorist attacks of September 11, 2001. He presented various facts and images from the disaster site. Corley explained that the buildings performed very well to sustain the impact loads generated from the airplane collisions. The impact dislodged the fire protection material from the steel beams and columns on the floors adjacent to the collision site. According to Corley the field data collected indicated that the collapse of the buildings was precipitated by the weakening and failure of these unprotected steel members exposed to the fire from the jet fuel and the building contents on various floors. Over 130 Branch members from New Orleans and surrounding area attended this seminar.

Essential Requirements for Reinforced Concrete Buildings & Analysis as a Tool to Describe Actual Behavior of Reinforced Concrete Structures was presented in March. This seminar was presented by Luis E. Garcia, PE, Visiting Professor Purdue University. Garcia presented details from a recent American Concrete Institute publication that describes the simplified and conservative design requirements for buildings with 2 to 6 floors. This method is an alternative to the more complicated ACI Building Code requirements covering the design of all buildings. Garcia also discussed the performance of a building following a bomb blast that occurred in Columbia in February 2003. Approximately 60 members attended this seminar.

Misuse of Computers by Structural Engineers: A Clear and Present Danger, is the title of the presentation for the Annual David Hunter Lecture was planned for April 24, 2003. This seminar was presented by **Leroy Z. Emkin,** PE, Professor, School of Civil & Environmental Engineering, Georgia Institute of Technology. Emkin is the founder and Co-Director of the Computer Aided Structural Engineering (CASE) Center.

Design of Buildings with Metal Shear Studs is being planned for June 12, 2003. The details for this and future seminars can be obtained as they become available by visiting the Branch website www.asceno.org.

In other activities, Committee members judged the structural projects at Regional Science Fair in the senior and junior student categories. The first place and second place awards were $75 and $50 respectively. Structures Committee made a contribution of $500 to Tulane Student Chapter for hosting the Deep South Conference of student chapters and also donated funds to the annual MATHCOUNTS contest sponsored by Louisiana Engineering Society.



W. Gene Corley, PE

Highlights of the 2003 Section Annual Spring Meeting and Conference

By Roy A. Waggenspack, P.E.

The Annual Spring Meeting and Conference of the Section hosted by the Baton Rouge Chapter was held March 19 - 21, 2003 in the Sheraton Baton Rouge Convention Center Hotel. There were over 160 participants registered for the Conference. The agenda included a Wednesday evening social and a Thursday evening honors and awards banquet with ASCE President, Thomas L. Jackson, PE, as the featured speaker. There was a choice of 19 technical sessions available over a 2-day period with topics covering a wide spectrum of civil engineering practice and issues. The featured speaker for the Thursday luncheon was Kam K. Movassagi, PE, Secretary of the Louisiana DOTD. He discussed several pertinent issues of immediate concern to the DOTD and its relations with the engineering community at-large. The featured speaker for the Friday luncheon was State Representative Bryant O. Hammett, Jr., PE. He discussed legislative issues affecting engineering in Louisiana and the general need for engineers to develop and maintain a working relationship with their legislators if they are to have influence on legislation affecting the engineering profession.

This year 23 members of the Section achieved the membership grade of Life Member and their achievement was celebrated during the honors and awards banquet Thursday evening. Several of the new Life Members being honored were in attendance with their significant others during the banquet to personally receive their certificates from Section President Charles L. Eustis, PE. Michael N. Dooley, PE, the Baton Rouge Branch Program Committee Chairman, served as the master of ceremonies and introduced the new Life Members to those in attendance. Mike provided a brief biographical sketch of the highlights of their careers and personal lives as they were called on to come forward to receive their certificates. The biographical information for the Life Members was obtained from personal interviews conducted by the Younger Members Committee in their home branches. The names and the biographical sketches of Life Members who attended the honors and awards banquet follow.

Boyd B. Jeffers, PE, received his BS in Civil Engineering from LSU in 1961 and his MSCE in 1971. He has over 41 years of experience in engineering, all in the Baton Rouge area. His most memorable project is the cradle design for the Louisiana Naval Memorial at the *USS Kidd.* Boyd is presently employed by CDI Engineering Group. He and his wife of 43 years, Dee, have 4 children and 3 grandchildren.

Ned J. Dufour, PE, received his BS in Civil Engineering from USL in Lafayette in 1960. He is licensed in Civil Engineering and is a registered Land Surveyor. Ned began his career with the State Department of Public Works in 1960 and has worked for many consulting firms until 1990 when he began working for Walk Haydel/URS where he is presently employed. Ned enjoys golf and walking as his hobbies. He is married and has 4 grown children.

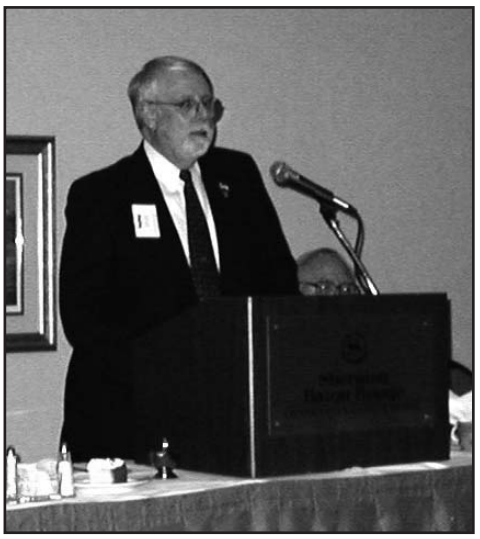
One of the technical sessions scheduled during the Conference. Three concurrent sessions were offered to provide a variety of choices for those in attendance.

Glynn P. Gautreau, PE, was born in Baton Rouge and grew up in Gonzales, LA. Glynn graduated from LSU in 1962 with a BS in Civil Engineering and did advanced studies in Geotechnical Engineering at MIT in 1974 and 1975. Glynn is a past president of the Baton Rouge Branch of ASCE and Baton Rouge Chapter of LES. He was State LES president in 1992-1993. Glynn has received the LES Outstanding Engineer in Private Practice and the Leo M. Odom Award for Services to the Profession.

Clovis L. Morrison, PE, is a registered professional engineer in 10 states, an author of various technical papers, guest lecturer, and has been active on several technical committees. He is a Fellow in the ASCE, member of the Permanent International Association of Navigation Congresses. Clovis continues to practice as a consulting engineer specializing in marine, civil and structural engineering. He has approximately 40 years experience in consulting and structural engineering on ship docks, barges docks and marine facilities on inland waterways. Clovis has been married 49 years and has one son and one grandson.

Vincent P. Pizzolato, PE, graduated from the University of Louisiana at Lafayette with a BS in CE. He began working for LA DOTD in 1962 as a project engineer in the Baton Rouge office. At various times during his career he worked as a project engineer, design engineer, and environmental engineer. He retired from LA

Kam Movassaghi, Secretary of the Louisiana DOTD, visits with a conference attendee following his luncheon presentation.



ASCE President Tom Jackson addresses those in attendance during the Section honors and awards banquet.

Bonnie and Glynn Gautreau receive Glynn's Life Member certificate from Section President Charlie Eustis.

Sardene and Roger Seals receive Roger's Life Member certificate from President Eustis.

DOTD in 1999. Vince says one of the most memorable projects was the construction of the west-bank approaches to the Mississippi River Bridge on I-10. Knowing that you played a small part in building this project from the inception to finish and seeing it physically functioning as a major transportation network was gratifying.

Gordon P. Boutwell, PE is a native of Jackson, MS. He attended Georgia Tech on a National Merit Scholarship and received a BS in Civil Engineering in 1960 and a MS in 1961. After spending a couple of years in the U.S. Marine Corps, Gordon attended Duke University 1965-1967 and received a PhD in Civil Engineering. Gordon is the author of over 40 technical publications, including ASTM Standard Test Method D6391 — a field test for the permeability of landfill liners. Gordon is married to the former Mary Lilley Heath of Baton Rouge; they have five children.

Jens J. Neilson, PE, received a BS in Civil Engineering from Tulane University in 1961 and a Master's of Mechanical Engineering in 1973. Jens' 42 years of professional experience includes a broad range of civil and structural

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Deanna and Boyd Jeffers receive Boyd's Life Member certificate from President Eustis.

Dudly Hixson receives his Life Member certificate from President Eustis.

Alison Ford receives a certificate from President Eustis commemorating her award as the Southern University distinguished civil engineering senior.

Leslie Chauvin receives a certificate from President Eustis commemorating her award as the Louisiana Tech University distinguished civil engineering senior.

Kirstin Baldwin Metzger receives a certificate from President Eustis commemorating her award as the Tulane University distinguished civil engineering senior. Kirstin also received the Section's distinguished civil engineering senior award.

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engineering projects and construction management, preparation and review of plans, specifications, and cost estimates. Jens is presently employed by C&S Consultants, Inc. as Chief Engineer in charge of a wide variety of city, state, and federal public works proects. Jens has five children and he enjoys tennis, fishing and traveling.

Samuel Z. Scandaliato, PE, is a lifelong resident of New Orleans and attended Tulane University where he received his BS in Civil Engineering in 1958. He is also a registered land surveyor. Sam has maintained and operated a consulting engineering and land surveying business for over 25 years in eastern New Orleans. In addition to his professional practice, his local interests include being the Captain and Founder of the Krewe of Pontchartrain Mardi Gras organization, and attending Tulane home football games, a practice he has continued for 49 years having only missed one game during that period for his son's wedding. Sam has been married for 42 years to his wife Kalma, they have 4 children and 7 grandchildren.

J. Alex McCorquodale, PE, is the Freeport McMoRan FMI Professor of Environmental Modeling in the department of Civil and Environmental Engineering at the University of New Orleans. He holds a PhD in Hydraulic Engineering from the University of Windsor, Canada. His bachelor's degree in CE is from the University of Western Ontario where he was awarded the Board of Governors' Medal. Before coming to UNO he served as Head of the Department of Civil Engineering at the University of Windsor. He is a past Chair of the Environmental Consortium of Louisiana and past director of the Great Lakes Institute at the University of Windsor. His wife Elizabeth is a registered nurse. They have 4 children; two are Professional Engineers, one is a veterinarian and the other is an architectural student.

Calvin Courville, PE, graduated from the

(Continued on Page 14)

Group picture of all of the distinguished civil engineering senior students from the 7 universities in the Louisiana Section.

Student Chapter News

Tulane University

Highlights of the 2003 Deep South Conference

By Kirsten Baldwin Metzger

The 2003 ASCE Deep South Regional Student Conference was hosted by the Tulane University Student Chapter March 27-29, 2003. This year's conference brought together 200 students from 10 engineering schools in Louisiana, Mississippi, Arkansas, and Tennessee with the desire to promote competition and camaraderie. A special welcome was extended to the newest student chapter to join the Conference, the University of Tennessee - Martin.

This year's festivities kicked off with a crawfish boil Thursday evening at Tulane's uptown campus. The competitions began on a warm sunny Friday with:

- the steel bridge competition
- the concrete canoe competition
- an environmental design competition
- the Mead paper competition, and
- the surveying competition.

Students from Charles J. Colton, a local middle school, were invited to explore engineering through computer simulated bridge design and by observing the Steel Bridge Competition. Saturday, students, faculty, and guests traveled to Bayou St. John in City Park for the concrete canoe races and a fried chicken lunch on the bank of the bayou. The weekend culminated with the Awards Banquet Saturday evening.

Overall Conference Standings
1 - Louisiana State University
2 - Mississippi State University
3 - Arkansas State University

Competition Rankings
Steel Bridge Competition:
1 - Arkansas State University
2 - Louisiana State University
3 - Mississippi State University
Concrete Canoe Competition:
1 - Louisiana State University
2 - McNeese State University
3 - Tulane University
Environmental Design Competition:
1 - Mississippi State University
Mead Paper Competition:
1 - Louisiana State University
2 - Mississippi State University
3 - Louisiana Tech
Surveying Competition:
1 - Louisiana State University
2 - Mississippi State University
3 - Southern University

The steel bridge team members from the host chapter, Tulane University, are setting up their competition bridge to be loaded with the competition test loads.

LSU's first place concrete canoe team experiences disaster when the hull of their competition concrete canoe fails while they were removing it from the water.

The Tulane ASCE Student Chapter would like to thank and acknowledge all of our sponsors and judges for their support in planning and carrying out this year's events. The conference proved to be a huge success!

(Continued on Page 14)

First place steel bridge team members from the Arkansas State University student chapter are setting up their bridge to be loaded with the competition test loads.

The concrete canoe team from McNeese State launches its competition canoe in preparation for the canoe races on Bayou St. John.

Louisiana Tech University
By Brooke Fletcher

On March 28, a group of brave Chapter members packed their bags and headed to Tulane University to participate in the Deep South Conference of ASCE student chapters and they prepared to compete with the student chapters from other participating schools in the surveying, steel bridge, and the Daniel Mead paper events.

Leading up to the big weekend, months of preparation were made in designing, testing, and constructing our competition steel bridge. At the beginning of this event, each bridge was weighed and judged on appearance. Going with light-weight aircraft steel, our bridge weighed in at roughly 80 pounds. This is compared to some other bridges in the competition that weighed up to 300 pounds. On this basis, the Chapter had a jump-start in this competition.

Next, the competition advanced to the bridge loading section, where each bridge was to be loaded with pieces of angle iron to the competition load for which the deflection under this load was to be measured. As 80 percent of the competition load was placed on our bridge, sudden failure occurred. Unfortunately, this resulted in its disqualification.

Across the clearing from the steel bridge competition, our brave surveying team pulled tapes, took shots, and solved level loops, seeking victory in the surveying competition. The team shined with the pacing and tape measurements required in the first half of the competition. However, rough waters were encountered in the second part of the competition, when competitors were required to find the angles of a transverse using a non-electronic transit covered in dust from the surveying lab in Bogard Hall's first level. Unfortunately, the task proved to be unconquerable and the team did not place in the surveying competition.

Good news did come from the Mead paper competition. Leslie Chauvin claimed a third-place finish.

Although only one trophy traveled back to Ruston, we look forward to claiming more at next year's Conference. Above all, the trip brought together civil engineering students who did not know each other well and provided the opportunity for them to meet and learn more about one another. This conference is more than your regular school event and is something everyone must experience.

(Continued from Page 12)

University of Southwestern Louisiana in 1961. After graduation he worked for the State of Louisiana Department of Public Works in Lafayette until 1966. Since 1966 to present he has worked for Domingue Szabo & Associates, Inc. where he is now a Principal. Calvin's most memorable projects are those working with small municipalities improving, expanding, and maintaining their infrastructure. Calvin and his wife Lou have 4 children and 6 grandchildren.

T. Dudley Hixson, PE, graduated from the University of South Carolina in 1961 with a BS in Civil Engineering. He also did graduate studies at the University of Montana. Dudley is a Senior Consultant with Meyer, Meyer, LaCroix & Hixson, Inc. in Alexandria, LA. He has numerous awards from the Louisiana Engineering Society and Professional Engineers In Private Practice. Dudley is also very active in civic organizations in Alexandria and his church. His hobbies include hunting, fishing, photography, and woodwork.

Other Section members who achieved the membership grade of Life Member are:

- **William L. Rose, Jr.,** PE
- **Lawrence A. Boston,** PE
- **James C. Love, III,** PE
- **Jagdish P. Bansal,** PE
- **Antonio Parjus,** PE
- **Cecil W. Soileau,** PE
- **Neil D. Logan,** PE
- **James H. Couturie,** PE
- **Walter D. Judlin,** PE
- **Agustin Chin,** PE
- **Roger K. Seals,** PE
- **James R. Hanchey,** PE

The distinguished senior civil engineering students from the 7 ASCE Student Chapters in the Louisiana Section were present during the honors and awards banquet to be formally recognized for their achievement and presented with certificates. They are:

- **Leslie Chauvin,** Louisiana Tech University
- **Kelly Ann Cook,** University of Louisiana at Lafayette
- **Alison R. Ford,** Southern University
- **Nathan E. Jordan,** McNeese State University
- **Kirsten A. Baldwin Metzger,** Tulane University
- **Najwa Obeid,** University of New Orleans and
- **Lisa Rodriguez,** Louisiana State University.

Their selection as their student chapter's distinguished senior civil engineering student by the faculty advisor of the ASCE student chapter and the civil engineering department head is also a nomination for the Section's outstanding civil engineering senior student award. The recipient of the Section's outstanding civil engineering senior student award is determined based mostly on an objective evaluation of specific activities and achievements and a resumé. On this basis, **Kirsten A. Baldwin Metzger** of Tulane University was named as the recipient of the Section's outstanding civil engineering senior student award. She was presented with a commemorative plaque and a $250 award. The Tulane University Student Chapter also receives a $250 award.

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Conference Judges

Steel Bridge Competition:
- Gus Cantrell, University of New Orleans
- Suresh Shah, Burk Kleinpeter, Inc.
- David Kanger, Modjeski and Masters
- Eddie LeBlanc, Army Corps of Engineers
- Emmanuel Plakotos, DMJM + Harris

Environmental Engineering Competition:
- Rob Bredberg, Montgomery Watson Harza
- John Klingman, Tulane University School of Architecture
- Elizabeth Larson, Exxon Mobil

Mead Paper:
- Deborah Keller, Port of New Orleans
- Heather Richey, Exxon Mobil
- Ernest Edmonston, Tulane University A.B. Freeman School of Business

Concrete Canoe Competition:
- Christine Mire, URS Corp.
- Bernie Gaten, Master Builders
- Karrie Trauth, Northrop Grumman
- James Kapesis, Louisiana DOTD
- Byron Hassenboehler, Louisiana DOTD

Surveying Competition:
- Ken Dugas, Plaquemines Parish Engineer
- Matthew Woods, Barriere Construction Project Manager
- Logan Martin, St. Bernard Parish Engineer
- David Cruseturner, Assistant Director of Construction for Arkansas Dept. of Corrections
- San Ala Aung, Tulane University School of Engineering

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- Roussel Engineering
- Wink Incorporated
- ASCE New Orleans Branch
- American Concrete Institute — LA Chapter

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- Robert E. Englekirk
- URS Corporation
- Jeffery, Thomas, Avegno, Inc.
- Digital Engineering and Imaging, Inc.
- Eustis Engineering Company, Inc.
- Louisiana Engineering Society, Inc.

Contributor:
- HISTECON Associates, Inc.

Section News and Information

Highlights of the March Board of Directors meeting

The restructuring of the Section website by its designer and our future webmaster, Robin Tenney, is near complete. However, the opening of the website had been delayed indefinitely because of what appears to have been inadequate service provided by the domain server in the attempt to preserve the Section's previous domain name lasce.org. The new restructured website should be up and running sometime in April with a new domain name, lasce.com. Members can anticipate continuous updates with recent Section news and information, and Section documents such as the minutes of Section membership meetings, the approved minutes of Section Board meetings, the Section Operating Guide and *The Louisiana Civil Engineer.* This phase of the website development should be considered the first step toward achieving the goal of making it the primary communications device for the Section's membership.

The latest version of the Section Operating Guide has been released to be published on the Section's website so that anyone who wishes information about its contents — the business operations of the Section and the charters of the Section and its associated ASCE components — may have ease of access. It is recognized that as much as the Section Operating Guide has been extensively revised recently, there is still room for substantial improvement. For this reason, it is recognized that the Guide is and will be a living document or a work in progress. Its website publication is apparently the most viable vehicle for publishing this type of document.

The Section representatives who attended the Zone II Leadership Conference in Jacksonville, Florida left with a wealth of information concerning the national ASCE issues, agenda and priorities. The 2 most significant concerns at this time are the proposed change in the governing structure of the national organization and the proposed academic prerequisites for professional practice for civil engineers embodied in the ever evolving ASCE Policy 465. There was ample opportunity for our delegates to discuss these issues with others attending the Conference, including those delegates from District 14.

The 2004 Conference is scheduled to be in New Orleans and the services of the members of the Louisiana Section were offered to the ASCE Director of Field Services, Nancy Berson, in hosting the Conference if she requests them. The Section will be encouraged to take advantage of the location of the next Conference and send several members who are in leadership roles or who are seeking leadership roles in the ASCE. The Section will be asked to encourage participation by offering assistance to its potential leaders including those in the branches and the student chapters.

The ASCE State Public Affairs Grants Committee allocated $1,454 to the Section based on its request for these funds. Of the programs proposed by the Section, the ASCE SPAG Committee approved funding for the following:

- Acadiana Branch: Developing and airing ASCE commercials for local television broadcasting
- Acadiana Branch: Career connections for high school students
- Shreveport Branch: Sponsoring the Career Fair Expo

The Committee did not fund an Acadiana Branch proposal to continue a previous program of purchasing books for public school libraries on civil engineering subjects. The Branch initially received a SPAG last year that funded the effort for one of the several parishes in the Branch area.

The Section Treasurer has received 60 percent of SPAG funds, the remainder of which will be distributed by the ASCE SPAG Committee when the final report on the funded activities is submitted. The deadline for the final reports is August 8, 2003.

There is some apparent confusion about the scope of the services to the Section that will be performed by the LES/ASCE/CECL secretary employed through the Louisiana Engineering Society. This is a result of recent negotiations to redefine the services to include:

- maintaining the database for advertisers in *The Louisiana Civil Engineer*
- billing the advertisers in *The Louisiana Civil Engineer*
- maintaining the copy of the Section's membership database

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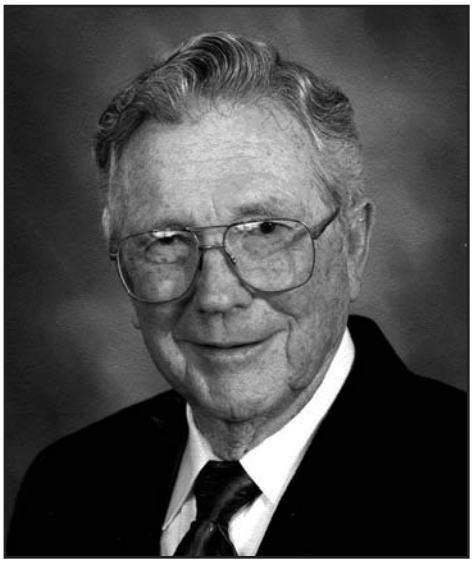
- Career Benchmarks -

William H. Miller, PE, a resident of Lake Charles, was recently elected to the membership grade of Fellow in the ASCE. Miller earned a BS degree in civil engineering from the Louisiana State University and is a registered professional engineer in Louisiana. Beginning his career in 1950, Miller is currently Vice President of F. Miller and Sons, Inc. His career has been concentrated in the field of construction engineering and much of his professional experience involves heavy construction in Louisiana requiring the driving of many types of pilings on land and in water. Notable among the projects in which Miller was involved are the Calcasieu River Bridge and Approaches on state route US 171 north of Lake Charles, the Vermilion River Bridge on state route LA 182 on Pinhook Road in Lafayette and the Bayou Teche Bridge on state route LA 96 on Bridge Street in St. Martinville; a movable bridge. Miller has served as a member of the Design of Shore Protection Standards Committee of the ASCE. He is currently serving as a member and Secretary of the Louisiana Professional Engineering and Land Surveying Board.



William H. Miller, PE

Section members **Emily B. Campbell,** PE, **Ryan M. Flanagan,** PE, **Christopher D. Guilbeau,** PE, **Robert P. Guillot, Jr.,** PE, **David E. Kunz,** PE, **Jonathan G. McDowell,** PE, **William M. Moe,** PE, **Scott H. Nelson,** PE, **Senda Ozkan,** PE, **Justin B. Reeves,** PE, **Kevin P. Rizzo,** PE, **Thomas T. Roberts,** PE, **Jamie L. Saxon,** PE, **Mark A. Schutt,** PE, **Zhong Wu,** PE, recently earned their civil and/or environmental engineering license in Louisiana. If you are in contact with any of these engineers, please offer them your congratulations on their accomplishment.

Louisiana residents **Amy K. Baker,** PE, **Kurt M. Brauner,** PE, **Gerald G. Brouillette,** PE, **Bert D. Chop,** PE, **Steven L. Davis,** PE, **John F. Ferrell,** PE, **John J. Goudeau,** PE, **Steven L. Gunter,** PE, **Shannon M. Haynes,** PE, **Leslie B. Kinchen,** PE, **David R. Kosloski,** PE, **Edgar H. Lancaster, III,** PE, **Mark B. Lavergne,** PE, **Gerard J. LeBlanc, Jr.,** PE, **Gary J. Leonards,** PE, **Christopher M. Munson,** PE, **Christopher J. Nickel,** PE, **Timothy W. Nickel,** PE, **Christopher M. Odom,** PE, **Kevin A. Parfait,** PE, **Jose L. Rodriguez,** PE, **Larry W. Sharp, Jr.,** PE, **David S. Smith,** PE, **Andrew N. Tarver,** PE, **Sadi Torres,** PE, **Sidney E. Trouard,** PE, **Stuart S. Waits,** PE, **Lan Wang,** PE, **Daniel A. Wardle, Jr.,** PE, **Richard F. Wickboldt, III,** PE, **David C. Wilkinson,** PE, recently earned their civil and/or environmental engineering license in Louisiana and are not members of the ASCE. A copy of this issue of the journal is sent to them as an informal introduction to the Section. If they wish to join and/or find out more about the ASCE, they are hereby encouraged to visit the ASCE national website, http://www.asce.org. If you are in contact with any of these engineers, please formally introduce them to the Section by inviting them to attend a branch meeting as your guest.

Section officers elected

The Section officers and directors for the 2003-04 administrative year were elected during the Section Annual Spring Meeting held in Baton Rouge March 21, 2003. They will be installed during the Section Annual Meeting to be held in New Orleans. Their term of office begins at the conclusion of the Section Annual Meeting scheduled for September 12, 2003. The newly elected Section officers and directors are:

- Barbara E. Featherston, PE, President-Elect
- Norma Jean Mattei, PE, Vice President
- Kim E. Martindale, PE, Secretary-Treasurer
- Joe E. (Butch) Ford, Director-at-Large (2-year term)
- J. Keith Shackelford, PE, Director-at-Large (2-year term)

Pamela G. Miller, as President Elect, will succeed to the office of President as provided by the Section Constitution. Patrick J. Landry, PE, and Gustave S. "Gus" Cantrell, PE will serve the second year of a 2-year term as Directors-at-Large. Roy A. Waggenspack, PE, was appointed by the Baton Rouge Branch and Reda Bakeer, PE, was appointed by the New Orleans Branch as their respective appointed directors. The 4 current branch presidents will also serve as directors.

This rounds out the officers and directors who will serve on the Section Board of Directors during the 2003-04 administrative year.

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will be sending out requests for speakers and sponsors. Your continued help and support for the Conference is greatly appreciated.

Representatives from both the Outreach Committee and the Structures Committee provided judges for the New Orleans Science and Engineering Fair. The Branch and the Structures Committee provided $425 in prizes presented in the junior and senior divisions to 7 finalists.

The Outreach Committee is soliciting volunteers again this year for a repeat of the outreach to children event that is scheduled during the New Orleans Jazz and Heritage Festival. The event is located in the children's area of the Festival and it is called *Box City.* There are 3 areas planned. One is where the children decorate boxes to represent the various structures in the city. The second area is where the children obtain a permit to "erect" their structure. The third area is an 8'×16' grid of the city, where the children place their structures according to the rules of the permit they are issued. Volunteers are needed to serve in each of these areas. The volunteer effort is structured for service in either a morning slot or afternoon slot. Each volunteer is given a Jazz Fest ticket for the day they volunteer so they can enjoy the Jazz Fest before or after their volunteer service. Please contact Norma Jean Mattei, PE, at nmattei@uno.edu if you wish to volunteer for this event — an entertaining and rewarding experience.

Current information about future membership and committee meetings, seminars and the 2003 Conference is posted as it becomes available on the Branch website — http://www.asceno.org/ or on the Branch seminar website — http://www.cpdseminars.com/.

Please remember that the ASCE is your society and the Branch is established to serve your professional and technical needs. If you wish to have a Branch-sponsored seminar on a specific topic, please let a member of the Board of Directors know so that they can make the effort to secure and host seminars of interest to Branch members.

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- typing, copying and mailing the minutes of Board meetings

The service of attending Section Board Meetings and transcribing the minutes was eliminated. The copying and mailing of the minutes required in the last item are expected to be a temporary service that will cease once the minutes are published on the Section website. At that time there may be the added task of scanning the attachments to the minutes.

- Observation -

Life Style:

Joan Ryan in her October 16, 2002 column in *The Advocate* develops the thesis that the 21st century citizen appears unable to avoid "...the feeling that you can't ever possibly, no matter how hard you work, keep up... The busier we are the more loose ends we unleash, and the busier still we become." Ryan notes the important reality that seems to be often overlooked that "...nearly everything of real value is already right in front of you: family, tradition, loyalty, love... (and) completeness is a matter of perspective." Her conclusion is that "you can never catch up, so contentment means making do with what you have instead of always reaching for, and feeling anxious about, what's missing." I remember some engineers that were so intense on frenetically pressing every project and plan forward in every way possible to the point they were so focused that they were unintentionally rude, I suspect. I am not so sure they accomplished that much more but there is little doubt about the drain on their available energy needed to cultivate friends and family. If this sounds familiar, it may be time to clearly consider your perspective if your values are so centered around your work and not balanced against growing and discovering relationships with significant others. Steven Covey suggests that we catagorize the investment of our time and energy in terms of what is important and what is urgent. Eliminate as much of the unimportant effort — urgent or not — from our lives, do what is important and urgent first, then invest as much as possible in what is important yet not urgent: improving methods, practicing leadership, rest and relaxation, and while you are at it don't forget to connect with "family, tradition, loyalty, love...."

— Calendar of Events —

June 4-6, 2003	**ASCE Seminar * on municipal stormwater management in New Orleans.**
June 15-18, 2003	**Louisiana Engineering Society Annual Meeting in Sandestin, Florida. For more information telephone (225)924-2021 or visit www.les-state.org.**
August 7-8, 2003	**ASCE Seminar * on design of blast resistant buildings in petrochemical facilities in Houston, Texas.**
August 14-15, 2003	**ASCE Seminar * on connection design for steel structures in New Orleans.**
September 11-12, 2003	**13th Annual Louisiana Civil Engineering Conference and Show in New Orleans sponsored by the New Orleans Branch.**
September 12, 2003	**Section Annual Meeting in New Orleans hosted by the New Orleans Branch.**
September 11-12, 2003	**ASCE Seminar * on construction and contract law for engineers in New Orleans.**
September 17-19, 2003	**ASCE Seminar * on introduction to the design and construction of tunnels in Dallas, Texas.**
September 25-26, 2003	**ASCE Seminar * on water quality modeling in New Orleans.**
September 26, 2003	**Tulane Engineering Forum: "Engineering technologies for economic development." For more information contact Jenny Kottler at (504) 891-1044 or jkottler@bellsouth.net.**

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

Editor's Journal

By James C. Porter, PE

Academic requirements for licensure

If you have interest in the proposal and ongoing discussions to extend the academic requirements for licensure and more particularly the ASCE Policy Statement 465 - Academic Prerequisites for Licensure and Professional Practice, may I recommend to you the paper, "The First Professional Degree: A Historic Opportunity," by J.S. Russell et al. It was published in the April 2000 issue of the *ASCE Journal of Professional Issues in Engineering Education and Practice.* It is also posted on the ASCE website at http://www.asce.org/pdf/Russell.pdf for your convenience. Though it is authored principally by academicians, it appears to be unbiased, well researched and historically authoritative. I believe that it is developed with a breadth of perspective that would appear to significantly contribute to the interested reader developing or improving a well-informed position.

The only extension of thought that I would offer to the paper's contents is the mechanics of dividing the current curriculum from the extended curriculum. I believe that the civil engineering theory courses should be offered mostly, if not entirely, prior to the completion of a minimum, 124 semester-hour, 4-year baccalaureate degree along with the preferred dose of liberal arts and technical electives. The theory courses can be reasonably taught by the unlicensed PhD research professor without any practical experience in engineering outside of teaching and they include engineering mechanics, strength of materials, fluid mechanics, geotechnical, determinate and indeterminate structures, etc.

The extended curriculum, or the master's degree following the baccalaureate degree, would necessarily be a practice or technical-professional (not a research)-oriented curriculum. The practice courses would include technical courses like steel and concrete design, foundation design and other design lecture and laboratory courses that should be taught by experienced licensed engineers; and professional courses like management, law, and contracts and specifications. Conceptually, this is how medical and law schools educate their practitioners using the services of active practitioners. It otherwise begs the obvious question, "Would you retain a surgeon who was taught by someone with no surgical experience or an attorney who was taught by someone with no trial experience?"

It would appear appropriate that the faculty for the extended, practice-oriented curriculum consists principally of the adjunct, part-time instructors who are licensed engineers with at least a MS in civil engineering and in active civil engineering practice outside of academia. Less desirable, this faculty may include full-time instructors and research professors with a PhD in civil engineering who are licensed engineers with at least 6 years of engineering experience outside of academia and teaching preferably obtained prior to receiving their PhD. This is predicated on the premise that teaching engineering is not considered the practice of engineering and therefore it is not acceptable as experience toward licensure.

I believe that there should be a continuing concern about the character of the students who will survive a baccalaureate and the extended curriculum that may be unattractive to students with a higher propensity to develop the people skills and leadership traits desired in civil engineering. Though the first 4 years the baccalaureate degree will be accented with more liberal arts electives that may appeal to these students, the extended curriculum for civil engineering will necessarily continue to be heavily oriented toward technical knowledge, skills and ability. Because of this, the extended curriculum may be even less attractive to students with a natural propensity to develop the desired people skills and leadership traits.

Tradition has it that engineers typically have to succeed first as capable technologists before they are given the opportunity to become project managers and then industry leaders where people skills and leadership traits come more into play. I am not that concerned that all or even a large portion of the civil engineering student population has a natural propensity to develop the desired people skills. I believe that there will always be meaningful career paths for technologically accomplished and specialized engineers. Further, I believe that a civil engineering profession consisting of a large portion of strong leaders is not necessarily reasonable or healthy. If there is a real shortage in people skills and leadership traits, it may be more desirable to strive toward a critical mass needed in the student population. If they are well cultivated through effective mentoring and co-op programs, there should be more than enough civil engineers in the initial technical/leadership competence spectrum to supply the leadership needed if they proceed into the civil engineering profession.

For the students not planning to practice civil engineering in the legal sense but to become bean counters, low level technologists, salespeople or administrators not involved directly in providing engineering services, the baccalaureate degree with no license to practice engineering would appear to be sufficient. For students whose goal it is to provide and to lead engineering services in the legal sense, an extended curriculum to qualify for licensure would appear to be necessary. Depending on the goals of the baccalaureate degree and an extended curriculum, 160 to 180 total semester hours would be required (my estimate) for either a specialized or a general curriculum covering a civil engineering discipline in depth for practice.

I am particularly abhorrent of the idea that a student's poor but passing academic performance in earning the baccalaureate degree would preempt him/her from being allowed to freely take the courses for credit in an extended curriculum if it is necessarily associated with a higher degree. Similarly, the severely restricted transfer policy of course credits associated with higher degrees would appear inappropriate, as are the time limits set to complete higher degrees. I believe that earning the baccalaureate degree should qualify a student for an extended curriculum, that there should be very liberal course credit transfer policies among the accredited institutions for the extended curriculum if institutional certification is required at all, and that 10 to 15 years would be allowed to complete an extended curriculum.

The flexibility suggested here would allow the courses in an extended curriculum to appropriately support the development of the early career path chosen. It is a reasonable form of on-the-job continuing education for an engineer intern not choosing to remain in school continuously for the 5 to 6 years that would be required to complete the baccalaureate degree and the extended curriculum. I believe that more effective selection of course work will occur if the extended curriculum and engineering work are pursued in parallel. The flexibility suggested would also allow the student to be employed, mobile and able to independently support the academic requirements of the extended curriculum on a pay-as-you-go basis.

After considering the information in the subject paper, I am inclined to strongly favor encouraging the ASCE to push diligently for extending the academic requirements necessary to sufficiently educate civil engineers for licensure in substance irrelevant of form. I believe that the requirements associated with attaining higher degrees — other than professional — are not appropriate to the purpose of the extended curriculum and thereby impediments. It would appear more practical for licensing boards to have an option to independently evaluate the transcript(s) that show successful completion of an extended curriculum. This would avoid the rigidity of the institutional requirements concerning the course work for higher degrees. However, I believe that it would be frivolous and unproductive to oppose a legitimate, extended curriculum that is clearly in the best interest of the civil engineering profession and the public it serves purely because a higher professional degree with rigid requirements is imposed to authorize licensure.

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❖ Quote ❖

Globalization: Legal and illegal immigrants now account for more that 15 percent of the population of more than 50 countries... 10 percent in the United States... Divergent demographic trends, the globalization of labor markets, and political instability and conflict will fuel (a) dramatic increase in the global movement of people through 2015... (The rising tide of the) globalization (of labor markets) will not lift all boats... (The rich will get richer.)

"Global Trends 2015"
U.S. Intelligence Agencies

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Engineering practice: The fuzzy line

I was recently reminded about an ongoing argument with a colleague that we have sustained for nearly the 35 years I have been an engineer. It concerns what work should be exclusively civil engineering, if any. Maybe more particularly, what work should be considered exclusively in the professional civil engineer's domain.

My colleague's belief is and has been that all of the work should be exclusively the civil engineer's or at least extensively accomplished by civil engineers. This work is broadly defined to include much of what may be considered civil engineering technology. In current practice much of the civil engineering technology is executed by subprofessionals under the general supervision of — rather than by — a professional engineer. It is also performed by subprofessionals using computer software for which there are varying degrees of understanding of the technological principles on which it is founded. However, civil engineers may coincidentally perform this same work, and it is considered the practice of civil engineering when they do.

My argument is that the spectrum of the practice of civil engineering from the most menial tasks to the most sophisticated analytical methods is independent of who performs the work. Depending on the applicable laws, the responsibility of the professional civil engineer is not for the execution of the specific engineering work required but for the results of the work leading to the engineering service that is provided as a result of these various tasks being performed by whomever or whatever.

One issue that causes heartburn in the profession is the attempt to define and segregate the work into bureaucratic compartments by strictly segregating the job functions into what engineers are expected or required to do and what they are not expected to do. It is not uncommon or unreasonable to expect that productivity and creativity, the stuff of which the competitive edge is made, can be adversely affected by such arbitrary rules.

Understanding the nature of engineering work and the arbitrary idiosyncracies of the governing licensing authorities as to what constitutes the responsibility of the individual licensed engineer, practicing under their jurisdiction, defines the responsible and legal practice of engineering. Whether a technology is practiced or an engineering service is rendered outside of the supervision of a licensed engineer, its significance is a matter of local law and ethical bearing. In the case of the law, its interpretation and its enforcement, like all law, only applies when the violator is caught. In the case of ethics or morality, it is difficult to get away from one's own conscience. I believe that individual moral bearing is the driving force for most engineers that keeps their practice of engineering legal, as opposed to the fear of being caught or punished.

To much of a good thing

There is a thesis that the convenience of access to information and the speed of communication provided by satellite communications systems, such as that which serves the Internet, may be creating a tyranny of conformity in the scientific research community. This was discussed by columnist Richard Reeves in his June 22, 2001 column. The thesis suggests that there is a feeding frenzy on the never-ending supply of new information instantly available on the Internet and that it is leading to little time being made available for the introspection needed to stimulate original thought and work in scientific research.

Surely, the Internet offers the community of research scientists and engineers almost instant access to the work and progress posted by their peers. Instead of fostering independent, diverse and original work in their research, the thesis is that it has broken the protracted isolation that is believed to be conducive to original thought and work. It is suggested that there is a tendency to abandon independent thinking for fear of being left behind by the herd and to adopt the path of the narrow consensus thinking posted on the Internet. This narrow consensus is characterized to be only the most promising and rapidly advancing work. Its general adoption would forego more diverse and independent research in the community that contributes to a broader course with greater potential for scientific and innovative breakthrough.

In a much lower but parallel situation, I can remember starting with a rotary calculator for computing in the design process. It often took so long to process the computations with the rotary calculator that it was not uncommon to lose sight of the problem. When electronic calculators became available for computing, their speed was more compatible, or in sync, with my problem-synthesizing skills. When access to high speed computers became available, I developed and used software that allowed me to skip whole detailed thought processes that otherwise required extensive problem synthesis and computations. At this stage, I was left to my own sense of confidence in the outcome from using software and judging its appropriate use.

Using the convenience of technology to speed up communication and the availability of information, to possibly avoid concurrent duplication, or to accelerate or advance thinking by skipping whole processes is not necessarily good or bad. It is more dependent on how it is accepted and whether it is used prudently. Whether one is disciplined and courageous enough to act with the independence of a maverick or is only willing to act within the dependence of herd mentality does speak to originality and the potential for innovation and discovery. I want to believe that independence at the highest levels of science and technology is defined as it always has been, more by the attitude and character of the individual and less by the environment.

It was observed that history suggests that young scientists acting alone — mavericks — challenge the conventional wisdom of their day, and they may be the ones most likely to significantly advance science in the future. The oft-quoted and humble words of Sir Isaac Newton, "If I have seen further, it is by standing on the shoulders of giants," should remind us that the value of the discipline of working independently and in solitude, possibly producing original thought and work, has always had to be balanced with learning from others and knowing enough to be an effective researcher. I find it difficult to accept that the independence and balance that effective researchers need are seriously threatened by the convenience of a technology environment. I accept that the perceived global bandwagon effect may be endemic to this time of convenience of access to information and speed of communication, and that it is a distraction may be a reality for many. However, I question the premise that the core of the scientific and engineering research communities is adversely affected in some substantial way.

— 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.org

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.org

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

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

Three Ways To Diversify Your Portfolio

By Blaise J. Ernst

Diversification is an investment strategy that helps you avoid the risk of putting all your eggs in one basket. When you allocate your investment dollars among many investments, you reduce the risk of loss associated with allocating your investment dollars to a single investment and help to optimize your overall return given your risk tolerance. There are a number of ways you can diversify when deciding which stocks are best suited for you. Consider the following possibilities:

Diversify among industry sectors. A sector is an area of the economy composed of industries that have certain characteristics in common. All industries in a given sector typically tend to react similarly to trends in the overall economy. In general, you should include stocks from a number of sectors, but dedicate a greater dollar amount to the sectors that are currently in favor.

Diversify by risk level. There are many categories of stocks with different degrees of volatility. A well-diversified portfolio may include stocks from a number of risk levels, since lower-risk stocks are likely to offer greater portfolio stability and higher-risk stocks tend to provide higher potential rewards. As you near retirement age, you may wish to adjust your portfolio to reduce the risk. Of course, an individual's risk tolerance will vary with the particular situation.

Diversify globally. Foreign stock markets provide an extra degree of diversification, which has been shown to reduce portfolio volatility and enhance returns over time. Keep in mind that past performance does not guarantee future results, and overseas investments are subject to certain risks beyond those that apply to domestic investments, such as political, economic and currency exchange risks.

In the end, the specific way you choose to diversify your portfolio will depend upon your individual investment objectives and risk tolerance. Your financial advisor can help you determine which methods are best for your own individual financial situation. If you would like to learn more, please feel free to contact the author.

Blaise J. Ernst, Associate Vice President, is a financial advisor and retirement planning specialist with Morgan Stanley in Covington, Louisiana. He may be contacted by e-mail at blaise.ernst@morganstanley.com or (985)893-7772 or (888)893-2743.

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ure. The deflection test to characterize the load transfer across a joint is made with sensor 1 at the load point on the "upstream" slab, and sensors 2 through 5 on the adjacent, "downstream" slab. Therefore, the SAI across the joint reflects the degree to which load is effectively transferred across the joint. The deflection test to characterize the strength of the slab is made with the load point placed at the mid-point of the slab. The first and fifth sensor readings and the spreadability are used along with the traffic level to evaluate the SAI of the slab.

As mentioned previously, the deflection test provides an estimate of the strength of the pavement structure as a whole. It offers the significant benefit of providing "x-ray" vision into the supporting structure. The SAI information can indicate if a pavement structure is weakened to the point of incipient failure. It is most beneficial to have this information before the manifestation of failure is exhibited by a rough ride and surface distresses. With the knowledge that failure is incipient, it is often possible to add an overlay sufficient to provide the additional strength to protect the existing pavement structure from costly failure.

The PMA uses the RCI and the SDI with or without the SAI to compute a composite index on a scale of 0 to10 referred to as the *Pavement Quality Index (*PQI). This flexibility in the use of the data to compute the PQI is both reasonable and important. The SAI is a valuable component of the PQI computation for major streets where traffic loads contribute significantly to their rate of deterioration and failure. The SAI is not significant for local streets where environmental conditions and age, not traffic loads, are the principal causes of deterioration and eventual failure. Therefore, deflection testing is not normally conducted on local streets. As a result, the integrity of the PMA is not compromised by this omission of the SAI and the cost of deflection testing is minimized.

Characterizing and prioritizing pavements

The 4 indexes developed and previously discussed

- PQI - pavement quality
- RCI - roughness condition
- SDI - surface distress and
- SAI - structural adequacy

are indicators of the condition of each pavement section in the PMA database. They are useful in quantifying the condition of single pavements or in demonstrating the average condition of a group of pavements. These indicators can also be used to objectively prioritize the pavements based on condition.

Elementary pavement management systems prioritize by ranking the pavements according to condition from the poorest to the best. This approach prioritized the streets according to those in the worst condition being first in priority. This is not very useful in determining what problems need attention for which additional input and/or review is required to select a strategy that is best suited to each street. Further, no attention is directed to those streets that are in fair to good condition. It can be demonstrated that prudent management requires that preventive measures be taken to sustain their better condition, rather than ignoring them until they deteriorate to a sufficiently poor condition to appear near the top of the worst first ranking. This is because the ongoing cost of preventive measures to sustain pavements in fair to good condition is substantially less than that for the rehabilitation or reconstruction required for pavements that are allowed to deteriorate to a poor or very poor condition.

Jefferson Parish uses the PMA decision modules to select the candidate projects with pavement conditions that should be addressed and then to determine the most appropriate treatment and the cost of each project if selected. Then the projects are prioritized based on cost-effectiveness and programmed so that the projects will be selected based on cost-effectiveness and the funds available. This process involves four different analyses

- a needs analysis
- a decision tree analysis
- an economic analysis and
- a budget analysis.

Needs analysis

The needs analysis is based on the entry of a *Minimum Acceptable* PQI (MAPQI) in each decision tree. This is a policy decision that usually reflects a desired target service level to be provided to the users. Typically this value is set higher for the more important streets because the benefit of a higher service level will be experienced by the larger number of drivers. The MAPQI is illustrated by the horizontal dashed line in Figure 4.

The MAPQI value is often defined by the current average PQI value. With the latest pavement condition data collected in the fall of 2002 in the database, the current average PQI value for Parish streets by functional classification is

- 4.7 for the major streets
- 4.6 for the collector streets and
- 3.4 for the local streets.

The current MAPQI values used in the rehabilitation decision trees as rehabilitation *needs triggers* for the Parish streets with AC pavements, are

- 5.0 for the for the major and collector streets and
- 4.7 for the local streets.

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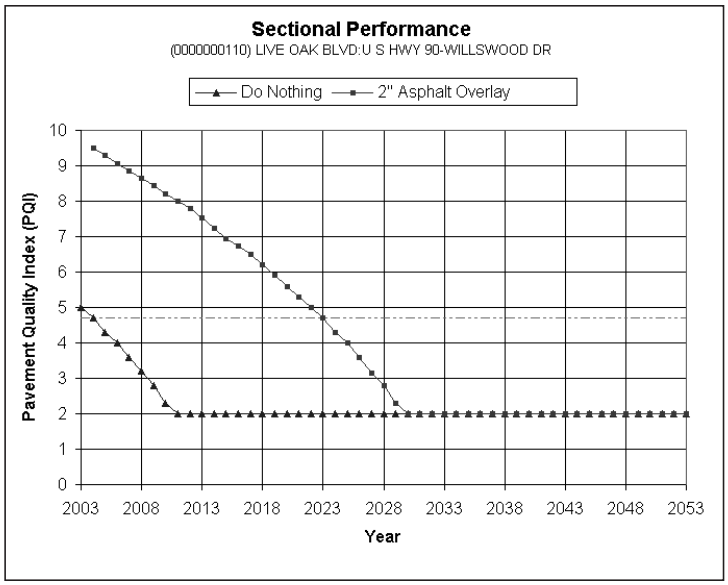

Figure 4. Sectional performance showing the change in the pavement quality index for the do-nothing and a 2" AC overlay and the minimum acceptable pavement quality index (MAPQI) of 4.7 reflected by the horizontal dashed line.

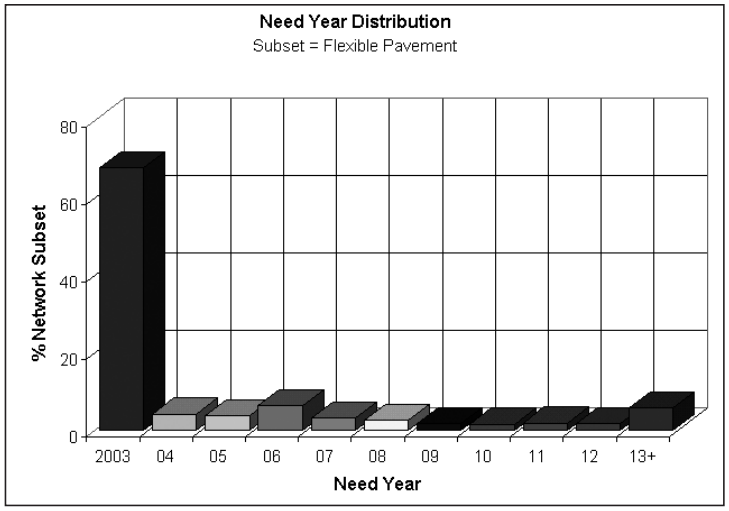

Figure 5. The streets with AC pavements predicted to be in the backlog of now needs for each of the given years as a percent of the lane-miles of all the streets with AC pavements in the network.

Streets that have PQI values below the MAPQI are considered the *now needs* and they are the current *backlog.* Streets that have PQI values above the MAPQI are processed through the needs analysis to estimate when their PQI is expected to deteriorate to the MAPQI. The year this occurs for a street section is referred to as its *need year*. In Figure 4, the *do nothing* performance curve for a street section intersects the MAPQI in 2004 and that is by definition its need year.

The needs analysis provides data that demonstrates the magnitude of the backlog. It also estimates the need year for each street that currently has a PQI above the MAPQI. This provides an estimate of the expected future backlogs from which to predict the future peak backlogs. If they can be anticipated ahead of time budgeting and programming strategies can be planned to eliminate or minimize their impact on future annual budgets that usually do not vary significantly.

Unfortunately, a significant portion of the Parish streets are in the backlog of now needs. The need year distribution shown in Figure 5 demonstrates this significant current backlog of now needs indicating that 82 percent of the streets with AC pavement are in the 2003 backlog of now needs.

Decision tree analysis

The decision tree method is an easily automated decision making process. The PMA provides for the development of a specific decision tree for each combination of functional classification and pavement type. This affords the Parish the opportunity to make different decisions based on these combinations. The decision tree method automates the process for determining the most appropriate treatment for each street section following the decision tree criteria and logic.

The first stage in the decision tree method requires the identification of all the maintenance and rehabilitation treatments the Parish plans to use, such as overlay, selective slab replacement and reconstruction. Once identified, the treatments are applied to the development of the decision trees to logically consider all the feasible treatment alternatives in the selection process. Then it is simply a matter of logically deciding where to go by incorporating into the decision tree the criteria and the plan to get there. For example, the alternative treatments might be

- curb mill and a 1.5" overlay,
- full width mill with a leveling course, paving fabric and a 2" overlay or
- reconstruction with 5" AC pavement over 24" compacted base.

The decision trees are populated with a series of criteria to query the data for each street section. Any populated field of data in the database may be used for creating decision tree queries that test the conditions such as traffic, RCI, SDI, SAI, distress, existing pavement thickness, embankment and/or native soil strength and drainage conditions that will lead to the determination as to which treatment is most appropriate.

Creation of different decision trees for each of the 3 functional classifications affords the opportunity to construct different and appropriate criteria that lead to queries and decisions that apply specifically and uniquely to each. Typically, this results in thicker overlays used for major streets than for local streets. Similarly, the effectiveness of providing different decision trees for pavement type affords the opportunity to apply different and appropriate criteria that lead to queries and decisions that apply specifically and uniquely to PCC pavements and AC pavements when either is considered as previously discussed.

Economic analysis

Once the feasible alternative for maintenance or rehabilitation treatment for each street section is made using the decision tree analysis, the PMA computes a cost-effectiveness value for the treatment selected for each street section. The *benefit value* is represented in part by the *area* between the *what-if* performance curve and the *do-nothing* performance curve demonstrated in Figure 4 where the what-if treatment is a 2" AC overlay. This area accounts for both the improvement in the service level of a street as well as the extension of its service life.

By inspection of Figure 4, the PQI model or calculator is limited to the minimum value of 2. This reflects the practical lower limit for the PQI below which an urban street would never be permitted to deteriorate. The do-nothing performance model intersects the MAPQI line defining the need year as 2004. The what-if performance model starts at the user defined *after-rehabilitation* PQI of 9.5 in this example. This point represents the improvement or the increase in the service level if the 2" AC overlay is implemented. The what-if performance model intersects the MAPQI line (4.7) defining the next need year as 2023. This point defines the life extension provided if the 2" AC overlay is implemented. The total life extension for the 2" AC overlay if implemented is 19 years (2004 to 2023).

The benefit value of implementing the rehabilitation alternative or the area between the what-if and the do-nothing curves is applied to the user benefit by multiplying it by the user-miles or the product of the traffic volume and length of the rehabilitated street section. This value is then divided by the cost of the particular

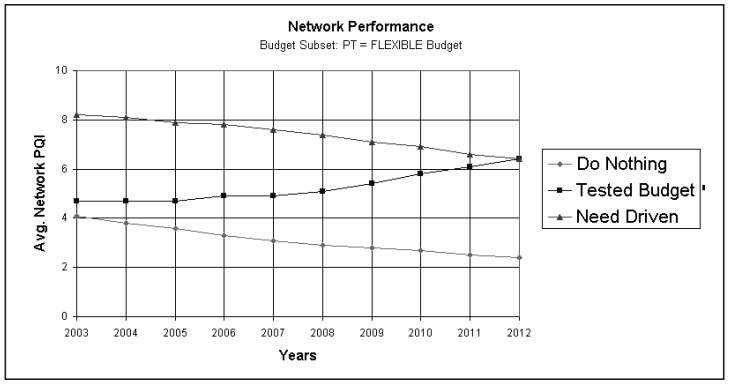

Figure 6. Network performance curves for the average network PQI for the AC pavements for a do-nothing and a need driven performance model and a tested budget program.

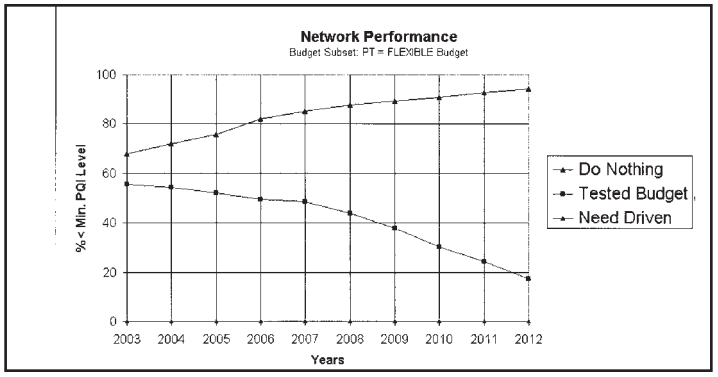

Figure 7. The streets with pavements predicted to be in the backlog of now needs for each of the given years as a percent of the lane-miles of all the streets with AC pavements in the network for a do-nothing and a need driven performance model and a tested budget program.

treatment to obtain the *benefit-cost* ratio or the cost-effectiveness.

Budget analysis

The budget analysis is conducted using the expected annual funding levels of the Parish. The PMA prioritizes and programs the needs for each year based on the cost-effectiveness by expending the budget available for the first year selecting the candidate projects with the lowest cost-effectiveness or the highest benefit-cost ratio first. When the budget for the first year is expended, the budget analysis moves to the second year budget. The candidate projects not selected in the first year are reconsidered competing with other candidate projects in the second year needs based on cost-effectiveness. Candidate projects from the first year are not automatically funded but compete with the candidate projects in the second year. The budget analysis process continues in this fashion until the end of the *budget program* which may be up to 10 years in length.

The user can then create budget reports that provide a list of all projects selected or funded in each year of the budget program. The PMA then computes the effectiveness of each tested budget in the budget program in maintaining the *average network PQI* or service level as shown in Figure 6. It may demonstrate that the funding

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levels in each of the tested budgets are sufficient to improve the average network PQI — the upward sloping tested budget line shown. A level tested budget line would indicate a budget program that will maintain the status quo of the average network PQI and a downward sloping tested budget line would an indicate budget program that will result in a deterioration of the average network PQI.

In Figure 6, the *do-nothing* budget program starts in 2003 at an average network PQI of 4.1 and declines to 2.4 in 2012. This illustrates the deterioration of the average network PQI if there is no funding available — the worst case network performance model. The *need driven* budget program starts in 2003 at an average network PQI of 8.2 and declines to 6.4 in 2012. This illustrates the average network PQI if there is unlimited funding available and all streets are funded in the need year — the ideal case network performance model. The difference between the beginning of the need driven network performance model with an average network PQI of 8.2 and the beginning of the do-nothing network performance model with an average network PQI of 4.1 corresponds to change in service level by the elimination of the backlog shown for 2003 in the needs distribution plot shown in Figure 5. Because the backlog represents such a large portion of the network, and if it is all rehabilitated in the first year, those streets will begin to deteriorate from that point forward and hence the reason for the downward slope of the need driven network performance model.

The illustration of the tested budget stream for the AC pavements in Figure 6 provides $3,000,000 for each of the first 5 years and $10,000,000 for each of the next 5 years. The budget program provides sufficient funding to improve the average PQI from 4.7 at the end of the first year to 6.4 in 2012 — the same as the average network PQI in 2012 for the unlimited funding network performance model. This indicates while the end points may be the same the users would suffer from the lack of network service represented by the area between the tested budget line and the need driven budget line, which in this case is significant.

Streets that have a PQI less than the MAPQI are defined as part of the backlog of now needs. The percent of the network length in the backlog of now needs for the do-nothing budget program shown in Figure 7 starts in 2003 with a backlog of 68 percent of the AC pavement network length and ends at 94 percent of the network length in 2012. This illustrates the increase in the backlog if there is no funding available. The need driven budget program represents the backlog for unlimited funding that is by definition 0 percent for each year. The tested budget stream provides for $3,000,000 for each of the first 5 years and then $10,000,000 for each of the next 5 years and is sufficient to reduce the backlog for the AC pavements from 55 percent of the network lane-miles in 2003 to 17.5 percent in 2012.

Summary and/or conclusion

The PMA affords the ability to store and assimilate a great deal of data concerning the condition of each individual street section in the street network and the environmental and physical characteristics that affect its condition over time. This data and its complex relationships are much more comprehensive than what one could be expected to comprehend and effectively apply in a manual process. The process of building the decision criteria for use within the PMA requires experienced public works engineers and managers to consciously participate in creating a valid decision process. This process is then automated within the PMA decision trees and applied comprehensively to the street network in a consistent fashion. This leads to the determination of what each street section will require and when. This facilitates testing of variations in the decision criteria to fine tune the criteria as deemed necessary to achieve the desired results. Without such an automated system, it would be impossible to assimilate this amount of information and then manually generate the comprehensive results.

The network performance reports provide information that has never been available before. Knowing today with reasonable and predictable accuracy what the projected network wide service level will be in 5 or 10 years based on a particular funding scenario provides invaluable insight. Public works directors and city or county engineers have used this information to authoritatively and effectively demonstrate to upper management and elected officials responsible levels of funding and the consequences for lower levels. Being able to inject hard demonstrable facts into the political process from the competent ongoing stewardship of the infrastructure can provide the public confidence and support needed to knowledgeably fund it.

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