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NELSON Receives ACI Awards

By: William E. Rushing, Jr., P.E. and Stephen O. Johns, P.E.

On January 17, 2014 at the Metairie Country Club, The Louisiana Chapter of the American Concrete Institute held its 15th Annual Awards Banquet recognizing outstanding concrete design and construction in Louisiana. Attended by 225 engineers, architects, material suppliers, and contractors, the event highlights all of the outstanding projects that use concrete as a major component in construction. And once again, NELSON was well-represented, receiving recognition on two projects.

First paving sections being placed at Louisiana Avenue

LOUISIANA AVENUE MARSHALLING YARD, PHASE 1

The first project receiving an award, for the Board of Commissioners of the Port of New Orleans, a long time NELSON client, the Louisiana Avenue Marshalling Yard, Phase 1 received an Award of Merit. This project is the first of three phases of construction for the Port as part of the continuing effort to upgrade the existing marshalling yards to suit stacking of containers five high. This current project replaces an existing Marshalling Yard with 18" of unreinforced concrete pavement over a 22" limestone base, designed to withstand concentrated loads of 200,000 pounds.

The concrete paving was specified as a high performance and high strength pavement achieving 900 psi flexural strength in 56 days. This mix design, specified by performance requirements instead of prescriptive requirements, prescribed specific durability and performance criteria established by the design team. That is, the specifications prescribe what characteristics are required for the project and does not state mix proportions or components. It is the contractor's responsibility to design the mix with specific ingredients and proportions to achieve the specified performance criteria. At this time, because of the extraordinary requirements of the specifications for strength and performance criteria for durability, only one producer has met the requirements and been able to consistently produce the mix designs for the pavement, demonstrating the unique and difficult requirements of the specifications. The decision to use a 56-day strength results in a concrete mix design that is more sustainable, requiring less cementitious materials when compared to the more traditional 28-day strength. The use of less cement and cementitious material will ultimately result in cost savings on the concrete mix.

This site also has a history of issues with subsurface water, which can seriously reduce the strength of

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Pavement base undergoing compaction

the base materials. Maintaining a fairly dry base beneath any pavement is vital to the pavement performance. To manage the subsurface water at the site, an extensive French drain system with a local pump station was installed to prevent degradation of the base.

Slotted drain system ready for concreting

Precast concrete manholes make up the basis for an extensive network of underground utilities for water, telephone, data, power, drainage and other miscellaneous utilities. This network of utilities has been designed for future tie-ins and connections to the other container terminal systems along the river. Over time, this will permit the Port to interconnect all of the Port properties into one integrated system.

In container yards across the country, a common point of failure and continual maintenance is the trench drain system. NELSON conducted an extensive study on the typical problems that exist at many container facilities. As part of the study, NELSON contacted Port Engineers at other ports to discuss their trench systems and failures.

As a result of the study and discussions with the engineering design team, this yard utilized two distinctly different drainage details that are unique to container terminals. One of the designs used a slotted drain system which is used at international terminals all over the world, and is the first of its type ever used at a United States port terminal. The other design is a new cast iron frame and trench specifically developed for the Port of Houston. New Orleans represents the second port to utilize this system. Extensive construction requirements were created as part of the project specifications to outline construction planning, placement methods, materials, curing and finishing in order to create the most durable system. Special attention to all of the construction details will provide a reliable system.

The use of these two systems will provide the Port with an in-place test for future applications of trench drains.

At the time of writing, the second phase of the project has been completed and the third will be started in the near future, providing the Port with another 11 acres of paving suitable for container or bulk cargo. Not only will this enhance the role of the current operations at this site, but it also will become an integral part of the Port's future intermodal operations which are currently in the design phase.

The Port's facilities include 20 million square feet of cargo handling area and more than 3.1 million square feet of covered storage area and 1.7 million square feet of cruise and parking facilities. The Port's facilities handle an average of 1,800 ocean-going vessel calls each year, connecting to the American Midwest (via the inland Waterway System, six class 1 railroads, and 3 interstate highways),

Latin America/Caribbean, Europe, Asia and Africa. The Port of New Orleans is a diverse general cargo port, handling containerized cargo, such as apparel, food products and consumer merchandise. The Port's annual general cargo volume has averaged approximately 7 million tons over the past five years. The Louisiana Avenue facility is part of the world's longest wharf, the 2-mile quay between Henry Clay Avenue and Milan Street terminals, which can accommodate up to 15 vessels simultaneously.

IHNC Surge Barrier extending from the MRGO on the left extending past the Bayou Bienvenue Lift Gate on to the GIWW Sector Gate on the right

IHNC Surge Barrier Wall

NELSON also worked on the IHNC Surge Barrier, another project receiving an ACI award. The IHNC Surge Barrier has also won the American Society of Civil Engineers Outstanding Civil Engineering Award (OCEA) of 2014. The OCEA announcement was made at ASCE's national banquet in Washington D.C on March 20, 2014. This Corps of Engineers project received an ACI Award of Excellence and also was recognized as The ACI Best Concrete Project for 2013 in Louisiana.

The IHNC Surge Barrier was the largest design-build civil works contract ever awarded by the Corps of Engineers. This massive structure is a key component in the Corps' Hurricane and Storm Damage Risk Reduction System to protect the Greater New Orleans area.

The IHNC Surge Barrier consists of two miles of concrete surge barrier and two navigation gates where the barrier crosses the Gulf Intracoastal Waterway (GIWW) and Bayou Bienvenue. The surge barrier is designed to withstand a 100 year storm surge. The barrier was recently successfully tested by Hurricane Isaac's 15 foot storm surge, well below the storm surge for which it was designed.

The barrier consists of 1,271 concrete cylinder piles measuring 66" in diameter, which are 144 feet long and driven to a depth of 130 feet for the lower wall section. In addition, 647 steel batter piles were installed to provide further support to the barrier. The top of the barrier section consists of cast-in-place concrete caps as well as pre-cast concrete caps that were barged to the site. These caps are complete with parapets and a roadway that extends the length of the project. The precast hollow 66" diameter pilings were filled with self-consolidating concrete (SCC). The nominal spaces between the 66" diameter piles were closed by jet grouting 2,514 reinforced concrete closure piles in place to complete the solid barrier. The annular space between the 36" diameter steel pipe batter piles and the protective sleeve was also filled with SCC.

Three massive pile-supported gate structures permit boat and barge traffic in order to maintain the flow of commerce and recreation, as well as providing for the maintenance of this area's vital ecosystem. Some of the features which distinguished this project for the ACI Awards were the innovative ways that the construction and design teams found solutions that were a result of the challenging location and site issues. Long haul of concrete to the site by barge was accomplished in ready-mix trucks and special concrete containers called Agitors. Special chemical admixtures called hydration stabilizers were utilized to extend the plastic life out to 3 hours. Concrete was placed in 26' high walls by the use of tremie pipes after being pumped by three pump trucks in hard-to-reach places. The placing of 17,000 cy of underwater SCC seal slabs by fixed tremie pipes also eliminated the need for dewatering cofferdams, further reducing costs.

NELSON's participation in the project was to design the Bayou Bienvenue Gate as well as provide support during fabrication and installation. When requested by the Corps of Engineers for recommendations to reduce construction costs of the Surge Barrier, NELSON proposed that the Bayou Bienvenue Gate concept be changed from a sector gate to a lift gate. NELSON's design experience in marine and offshore structures led to the use of tubular members with non-gusseted connections, resulting in reduced construction

Bayou Bienvenue Lift Gate in the lowered position during construction

Bayou Bienvenue Lift Gate in the lifted position during construction

and maintenance costs. The Bayou Bienvenue Gate leaf is a vertical lift gate fabricated out of 140 tons of high strength steel and consists of a truss supported steel skin plate 60 feet wide and 34.5 feet tall. A rubber seal at the base of the skin plate rests on the monolith foundation at the bottom of the channel 8.0 feet below sea level. The ends of the gate are supported by 6 foot wide steel end posts that are guided in slots in the concrete monolith and steel lift towers. The concrete slots guide the gate from 8 feet below sea level to 26.5 feet above sea level. Above that, steel towers guide the gate up to 71.5 feet above sea level. Except when lowered due to threat of storm surge, the gate is in the raised position, which allows 37 feet of vertical clearance for passing vessels. To resist the force of a storm surge the bearing surfaces of the gate end-posts are fitted with continuous Ultra High Molecular Weight (UHMW) bearing pads. As a storm surge builds, the force presses the UHMW pads against stainless steel bearing plates embedded in the concrete slots which provide horizontal support to the gate. Precise fabrication tolerances were required due to the project's requirements that a maximum of 1/2 inch clearance is required between the UHMW pads and the stainless steel plates. Vertical support in the closed position is provided by four interior legs in the channel and four bearing plates at the base of the end posts. These 8 supports transfer the 140 ton weight to stainless steel plates embedded in the concrete monolith floor which is supported by a pile foundation. The bottom seal is compressed 1.5 inches when the gate is in the lowered position.

Two structural steel towers on the concrete gate monolith support the vertical lift gate, one located north of the Bayou Bienvenue channel and the other on the south of the channel. The towers are connected by a steel trussed equipment bridge spanning over a vehicular lift bridge and the 56-foot wide channel. The structural steel towers (top El. 80.00) extends 54 feet above the top of the monolith (El. 26.00 +), and are connected with a trussed access equipment bridge at top El. 50.00, spanning 67 feet between the two towers for equipment support and maintenance access. An independent vehicular lift bridge system (12 feet wide by 58 feet long), is located on the protected side of the lift gate to provide access as needed across the 56-foot wide channel. The bridge also provides a minimum of 35 feet of clearance in the stored raised position and 21.5 feet clearance in the lowered position from a mean high water (MHW) El. +1.25. The authors wish to acknowledge the project sponsor, the U.S. Army Corps of Engineers (USACE) Hurricane Protection Office, and the design-build project's prime contractor CB&I for their support on this important project. As the project selected by the Louisiana Chapter of the American Concrete Institute's Best Overall Project, this project will be submitted to the ACI International Awards Competition slated for 2015. Being recognized for one project at an awards program can be a significant achievement, but NELSON's having two projects in the same year is something that would make any company extremely proud. Once again, NELSON has demonstrated its continuing commitment to providing a completed project that the entire design team and the client can be proud of.

ACI Louisiana Chapter President Gavin Gillen presents Bill Rushing the award for Louisiana Avenue Phase 2

Louisiana Avenue Marshalling Yard Phase 1 Design and Construction Team

On January 16, 2015, NELSON again was recognized for another award on a related project. The **Louisiana Avenue Marshalling Yard, Phase 2** received an Award of Merit. This project is the second of three phases of construction for the Port as part of the continuing effort to upgrade the existing marshalling yards as discussed in the feature article. This project continues all of the features recognized in Phase 1 but continued to improve by drawing on lessons learned during the Phase 1

Construction. Incorporating those new concepts into the design and construction of Phase 2 resulted in this second project being recognized in the same continued drive to excellence.

Steve O. Johns, P.E.
Vice President
Co-Author of Feature Article

Stephen O. Johns is a Vice President in the Civil Engineering Department of Waldemar S. Nelson & Co., Inc. He has more than 35 years of experience as a structural engineer, project engineer and project manager on marine, offshore, civil works and industrial projects. In addition to being the design engineer of record of the Bayou Bienvenue Flood Gate which is part of the Inner Harbor Navigation Canal storm surge barrier described in this month's feature article, some of his projects include design of offshore platforms, several major expansions of ore processing facilities at a copper and gold mine in Indonesia, drainage pumping stations, numerous dock facilities on the Mississippi River and Gulf Coast, navigation locks, and offshore quarters buildings.

Johns was awarded the 2011 Presidents Medal by the New Orleans Branch of American Society of Civil Engineers, has been active in the Louisiana Engineering Society, the American Society of Civil Engineers, is a past member of the Civil & Environmental Advisory Board at UNO, and is the current President of the New Orleans Branch of the American Society of Civil Engineers.

Johns received Bachelor's Degrees in Business Administration and in Engineering from UNO and his Master's Degree from Tulane. He is a licensed professional engineer in Louisiana, Mississippi, Alabama, and Florida.

Gulf Gateway Terminal in New Orleans East Wins the COPRI Project Excellence Award

The Gulf Gateway Terminal in New Orleans East, designed by Waldemar S. Nelson and Company, was awarded the American Society of Civil Engineers (ASCE) 2014 Coasts, Oceans, Ports and Rivers Institute (COPRI) Project Excellence Award.

This award is given for innovations which decrease negative environmental impacts, significant achievement through design or construction concepts, use of new or existing analytical techniques, use of new or existing technology or adaptive reuse of existing features or infrastructure.

Charles Nelson, P.E. (center) accepts the award from (left) Jane McKee Smith, P.E., D. C.E., Dist. M. ASCE COPRI President and (right) William H. Hanson, Vice President Government Relations & U.S. Business Development, Great Lakes Dredge & Dock Company, LLC.

2014 Recognition Dinners Held in New Orleans and Houston Offices

The annual recognition dinner celebrations were held in New Orleans and Houston this fall honoring staff who have been with the company continuously for twenty or more years of service. On October 22, the New Orelans office celebrated at Ralph's on the Park. Honorees were: Steve Clavin and Roman Cybin, celebrating their twenty year anniversaries. (Roman works in our Houston office but has been on an assignment that brings him to New Orleans frequently.) Ginger Dodge and Randal Rodrigue were honored for their tenure of twenty-five years. Our chief honoree, Cliff Snow, celebrated thirty-five years with the firm.

In Houston, the inaugural recognition dinner was held on November 22nd at Amerigo's Grille in the Woodlands. Mike Harbison and Wayne Talley were both honored for twenty-five years of continuous service. Their willingness to relocate their families was a great contribution to the growth of the Houston Offices. It is the ongoing loyalty of our staff that allows for building and strengthening the teamwork necessary to service our clients' needs, and we appreciate these honorees staying the course.

Cliff Snow and Ken Nelson

Ken Nelson, Ginger Dodge, Charles Nelson

Ken Nelson, Roman Cybin, Charles Nelson

Ken Nelson, Steve Clavin, Charles Nelson

Ken Nelson, Randal Rodrigue, Charles Nelson

Mike Harbison, Jim Lane and Wayne Talley

SERVICE ANNIVERSARIES - 2014

Thank you to the following employees who have continued to offer their loyalty and talent to our company and clients. Your dedication allows NELSON to deliver the caliber of service to our clients which we all strive for. We congratulate you.

35 Years

Clifton A. Snow, Jr.

25 Years

Virginia N. Dodge
Randal J. Rodrigue
Michael D. Harbison
Wayne D. Talley

20 Years

Steven A. Clavin
Wieslaw R. Cybin

15 Years

Kent Davis
Angel M. Newman

5 Years

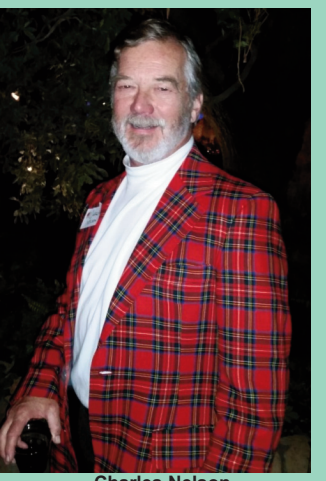
Robert P. Nelson

10 Years

William F. Berg
Richard R. Phillips

HOLIDAY CELEBRATIONS

Kenny and Leslie Hertz, Joe Lawton



Charles Nelson

l to r: Fernando Flores, Khoi Le, Robert Griffin, Elizabeth and Chris Bahr, Steve Carlson

Liem Ly and Hang Quach

Roy and Cathy Broussard, Ken Nelson

David and Melissa Richards, Mike and Andrea Selleck, Stephen Marymee

Shannon and Ian Walsdorf

Laura and Jim Lane

Lauren and Kerwyn King

l to r: Caimy Harbison, Martha and Kevin Houghton, Bryan and Julie Bye

Matt Sharp and Danielle Levron

Rob and Anna Denman

Janet and Wayne Talley

Bart and Cheryl Harris

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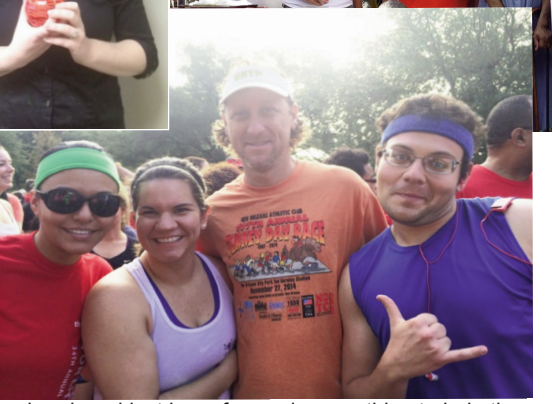

It is always fun to take a break and just have fun or do something to help the community, and NELSON employees are great at that! Houston employees dressed up for Halloween, New Orleans employees participated in the October Rebuild project as well as the 2014 Corporate Cup Run benefiting the YMCA Literacy Program. As always, employees in both offices enjoyed playing Kris Kringle for the Salvation Army and Volunteers of America.