

Volume 52

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PROJECTS WITH HEAVY-LIFT MOVABLE FACILITIES

By: Thomas W. Wells, P.E.

Waldemar S. Nelson & Company, Inc. (NELSON), being located on the gulf coast, is heavily involved in design and construction of marine projects of all types. These include wharves, offshore structures, ferry landings, and structures in coastal wetlands. Many of these projects involve offsite construction, transportation to project site, and lifted-in installation on pre-constructed foundations. These frequently involve lifting structures weighing hundreds or thousands of tons. Almost 20 years ago, NELSON designed an offshore mining facility that included a single-lift weighing more than 5,000 tons, which is still one of the heavier lifts ever executed in the Gulf of Mexico.

NELSON also has extensive experience in the design of raising and lifting facilities for ferry ramps, ramps to barges, a railcar ferry, and other industrial facilities. A few of these are described herein.

GIWW RAIL FERRY RAMP LIFT MECHANISM (2005)

The project involved lift towers, lift beams, multi-part sheave blocks, hydraulic winches, and a hydraulic power unit to lift the ramps for loading rail cars onto ships. During the design process, other systems were investigated such as hydraulic cylinders and counterweight systems. The design specified readily available, off-the-shelf vendor items. NELSON's scope included all services from concept through detailed mechanical,

electrical and structural design, expediting of materials and construction inspection.



Lift weight was approximately 600 tons. The project was a public-private facility on the Gulf Intracoastal Waterway in New Orleans East.

MISSISSIPPI RIVER FERRY LANDING REPLACEMENT (CURRENT)

The project involves replacement of two ferry landings, one on each side of the Mississippi River. NELSON designed the existing landings at this location in



1965. The lift mechanism will consist of a lift beam and multi-part sheave blocks powered by electric winches. NELSON's scope includes surveying, geotechnical investigations and stability analyses, preliminary and final mechanical, electrical and structural design and preparation of plans, specifications, and cost estimate. The owner is a public agency.

TIDEWATER CANAL BARGE LOADING RAMP (CURRENT)

The project involved a hinged ramp for loading wheeled and tracked vehicles onto barges in a tidewater marsh canal in the Mississippi River delta. The shore end of the ramp was pinned to a pile supported foundation. The lift mechanism



on the canal end of the ramp consisted of gravity counterweights and air winches. NELSON's scope included field investigations, preliminary and final design, and preparation of plans, specifications, and construction cost estimate. The owner is a private industry.



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INNOVATIVE APPROACHES

By: Thomas W. Wells, P.E.

Through innovative design approaches, NELSON has saved millions of dollars in construction and maintenance costs on numerous projects for the Corps of Engineers as well as private industry. By providing a high level of expertise and technical knowledge, along with a routine brainstorming, value engineering, quality, and review process involving NELSON's senior engineers, we have executed designs that "think outside of the box." It is important to understand the "standard" designs and approaches, and that is the result of extensive experience embedded in NELSON's staff; but in addition, NELSON's engineers continually work on adding new insights to alternative solutions. Many of NELSON's civil engineers also have advanced degrees. This depth of expertise and experience and team collaboration has enabled NELSON to help improve projects, provide greater safety and reliability and reduce project risk, cost, and time. Some of these innovative solutions are described below.

IHNC FLOATING GUIDEWALL PIER

Use of tubular framed structure avoids dewatering cofferdam, reducing time and cost and risk.



OUACHITA RIVER LOCKS DEWATERING BULKHEADS

Innovative analysis identified inadequacy of Poiret trestles, improving safety.



SHIPYARD LIFTING DEVICE FOR TURNING HULL SECTIONS

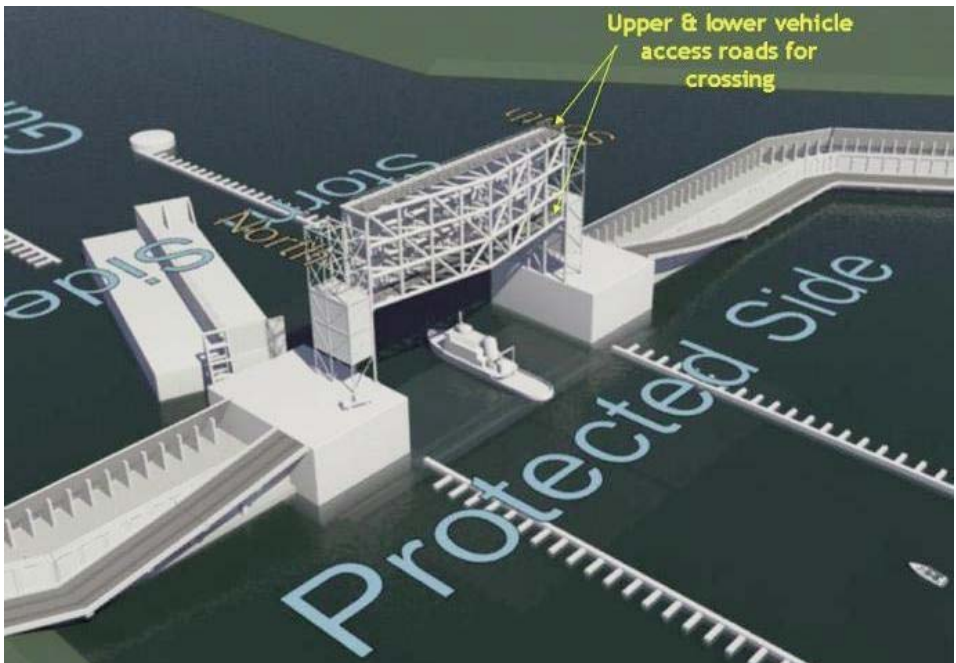
The project involved a lifting frame and associated hardware for turning over hulls of a marine craft at certain stages of the fabrication process. The lifting mechanism consisted of multi-part sheave blocks powered by a dual drum electric winch. NELSON's scope included conceptual design, detailed mechanical, electrical and structural design, preparation of plans and specifications, and locating an existing reconditioned winch. Location was adjacent to a tidal marsh in New Orleans East. Lift weight was 70 tons. The owner is a private industry.



NELSON was ranked 21st in the latest Houston Business Journal list of Houston-Area Energy Engineering Firms for 2008

IHNC NAVIGATION GATES AT GIWW & BAYOU BIENVENUE (PROPOSED)

Proposed use of lift gates with built-in vehicle ramps to reduce time and cost.



COUSINS FLOODWALL REPLACEMENTS

Alignment, design, and construction selected to eliminate temporary retaining structures and temporary hurricane protection reduces time, cost and risk.



BAYOU BEOUF SECTOR GATE

Innovative use of tubular sections (pipe) saves money, time, and maintenance. The U.S. Army Corps of Engineers New Orleans District uses only tubulars on sector gates since NELSON's introduction.



ERDC COASTAL HYDRAULICS BLDG.

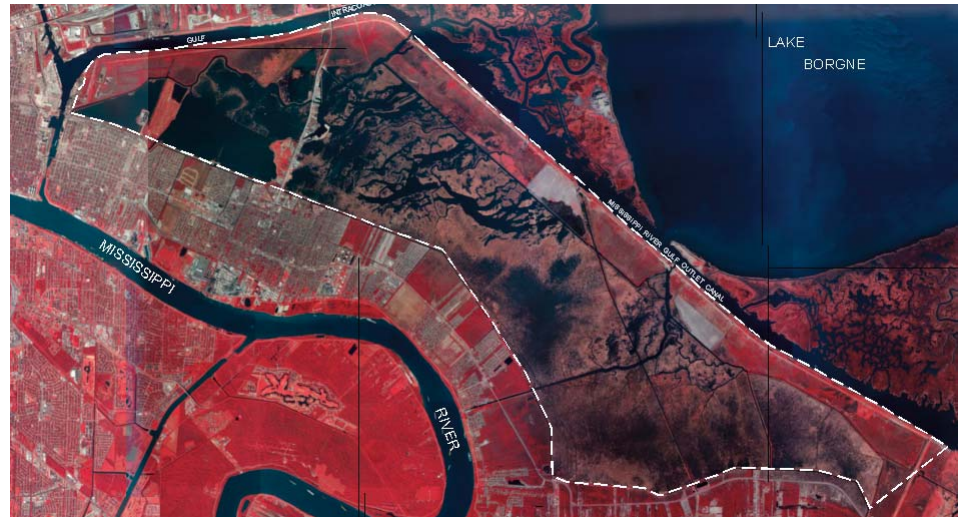
Using design-build project delivery and performance - based specifications, achieved creative alternative proposals from contractors on USACE's largest-to-date (2004) Design Build civil works project.



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NELSON is ranked #201 in the 2008 ENR Top 500 rankings, published in the April, 2009 issue

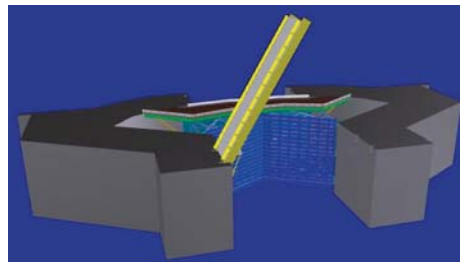
NEW ORLEANS EAST WETLANDS

A wetlands assimilation approach on this project will save the local utilities millions of dollars in avoided future sewage treatment costs while restoring a valuable wetland area.



IHNC NAVIGATION GATE AT BAYOU BIENVENUE (PROPOSED)

Proposed hinged lift bridge to simplify sector gate to save time and cost.



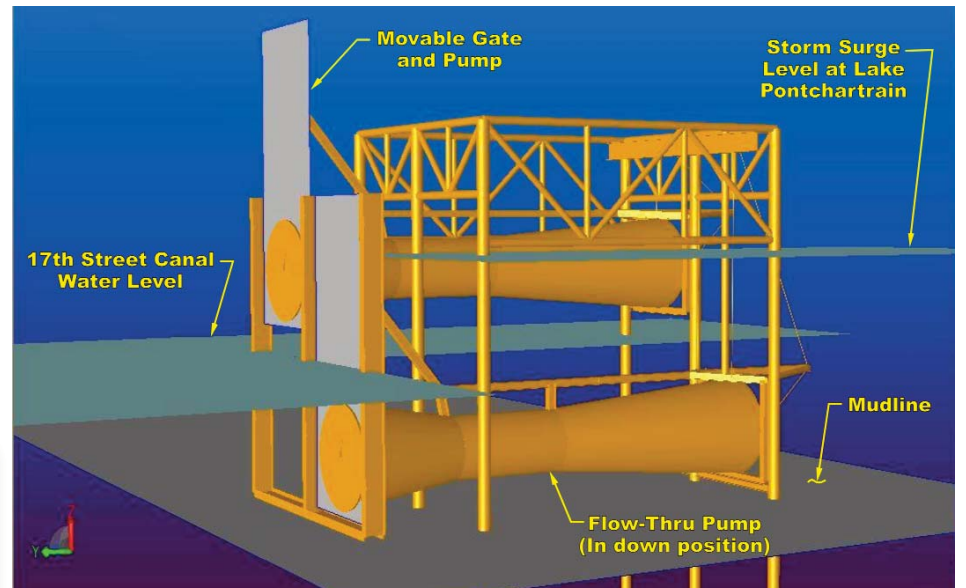
KEYED LOCK MONOLITHS, RED RIVER LOCK AND DAM #1

NELSON developed an innovative analytical method to determine the behavior of multiple, soil-supported lock monoliths and the shears at their joints, eliminating piles, reducing cost and time.



FLOW THROUGH PUMPS AT LAKE-FRONT (PROPOSED)

After Katrina, NELSON proposed using existing, available bow-thrusters at temporary replacement pump stations to improve schedule and cost.



Explorer Post 1415 Has Returned

By: Mona Lisa Della Volpe & Tommy Braud

Aspiring musicians have the school band, athletes have sports, and doctors have Grey's Anatomy. But ever since MacGyver ended in '92, there have been few attempts to inspire today's youth with the exciting opportunities in the world of engineering. Until now. 2009 marks the triumphant return of the Exploring Engineering program from its post-Katrina hiatus. No longer are the youth of New Orleans forced to sit around at home and ponder statics, propulsion, lift, and circuits. Exploring Engineering is the answer to the question our mothers all asked us when we told them our career plans: What *is* engineering??

Part of the national *Learning For Life* career education program for young adults, Exploring Engineering enlists professionals in the community to introduce engineering to interested students. In November of 2008, NELSON joined forces with Lockheed Martin, Northrop Grumman, the Greater New Orleans Area Boy Scouts of America, and the University of New Orleans to provide leadership, planning, and financial support to reinstate the local post. A result of several planning meetings in late 2008, the new Post was chartered as a subset organization of the Boy Scouts of America. High schools and junior colleges in the New Orleans area were contacted and encouraged to invite all students interested in engineering to attend the kick-off event of Exploring Engineering.

Thirty-eight students answered the engineering call of duty on a snowy December night. There was little time wasted. After establishing a basic structure to the group, the students learned basic principles of flight and got to put their knowledge to the test with a paper airplane competition. The success and interest shown on this first night established bi-monthly meetings to commence in January.

Beginning in January 2009, meetings have been held on the second and fourth Thursdays of each month at the University of New Orleans campus. Under the direction of Post Leader Ronny Myers, lessons have already covered a variety of engineering topics. The lessons have been applied in many interesting projects including tooth-



Post Leader Ronny Myers guides members in the construction of a hovercraft.

pick bridges, houses of cards, bottle rockets, and hovercraft. The students are learning how engineering principles are applied to these projects, as well as teambuilding skills vital to the industry. At the request of the members, the post will remain active in the summer months with one meeting a month. Eventually, the post hopes to participate in several national engineering competitions, including Steel Bridge Building, The Concrete Canoe Competition, and Moon Buggy Racing. Current funding restrictions will prohibit in-situ testing of the Moon Buggy; however, plans to use the rock filled parking lot of UNO should suffice.

In a region dominated by rebuilding and securing a livable area for the future, engineering is paramount. Fostering an early interest and appreciation of engineering in young adults just might be the key to ensuring our success. NELSON is proud to participate in Exploring Engineering as a way to captivate and excite our next generation of engineers. From all of the partners, we welcome the support of other engineering related companies. Please contact NELSON's Explorer Post volunteers for details on how to participate. They are: thomas.braud@wsnelson.com, or monalisa.dellavolpe@wsnelson.com.



The hovercraft is put to the test by Post member Evan Wehrer of Patrick Taylor Science & Technology Academy.

NELSON Employees Bake, Bar-b-Que and Play Volleyball for Children’s Hospital New Orleans

By: Lonnie Robin

Once again, NELSON employees had a chance to show off their culinary skills for a great cause. The annual Children’s Hospital New Orleans Telethon and Volleyball Tournament was held the last weekend in May, and NELSON employees helped raise money by baking and/or cooking their special dishes on three consecutive Wednesdays in May. This year a sugar free category was added; and as usual, NELSON bakers responded with sugar free chocolate-covered strawberries, as well as lemon cream and pecan pies. Various pies, cakes, muffins, cookies and beef jerky were sold throughout the day in the employee lounge, better known as “The Lagniappe,” with NELSON matching dollar for dollar for all bake sale proceeds. Some of the NELSON employees located offsite got into the action by organizing bake sales at their work locations.

One would be hard pressed to find someone in the New Orleans area that hasn’t been touched by Children’s Hospital in one way or another. Dan Glaviano, Civil Designer, decided to purchase a cake and donate it to the bake sale. When the store owner heard why Dan was buying the cake, the owner decided to get into the act and donated half the cost of the cake. As it turned out, his daughter had been treated at Children’s Hospital just months prior. Many locals have had a child treated at Children’s, were treated there themselves as a child, or knew someone that has or had a relative there. Just talking with several Nelson employees and hearing their stories of time spent at or in Children’s Hospital would be cause enough to help this organization.

This year, in addition to the bake sales, a special treat was added to our fundraising by Ron Walker, a Designer in our civil department in New Orleans, who cooked 104 pounds of pork for sandwich-



The NELSON sponsored volleyball team, Back l to r; Lonnie Robin, Thi Dao, Mark Neeb, Wendy, Martin Patterson, Dena Hutchinson, Front l to r; Julio Bolanos and Holly Beaulieu

es and prepared 11 heads of cabbage for coleslaw. Joey Fontenot, III from the Project Management department made German potato salad. Employees enjoyed a lunch plate of sandwiches, coleslaw, potato salad and a beverage, with NELSON once again assisting with the purchase of the food and cooking supplies.

With the overwhelming response to our bakes sales and bar-b-que lunches, we were able to raise over \$900 more than last year for a grand total of \$2,777.69!

HOW COOL IS THAT?! A check was presented to Children’s Hospital on air during their telethon and Volleyball Tournament at Coconut Beach.

I know some kids are about to have a great time during their stay at Children’s Hospital because of NELSON and its employees reaching out to the community. Thanks to everyone who helped with this great cause.

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NELSON employees proudly presented the check to Children’s Hospital. Back l to r; Nick Maalouli, Julio Bolanos, Lonnie Robin, Holly Beaulieu, Nancy Autin, Luan Tran, Staci Arceneaux (Children’s Hospital), Lynnsey Belsome (Children’s Hospital), Front Row l to r; Thi Dao, Martin Patterson, Nour Maalouli and Tala Maalouli



In 1989 NELSON undertook the design of the largest single lift module in the Gulf of Mexico to that time. Weighing in at around 5,400 short tons, the power plant for Freeport McMoRan's Main Pass sulphur mine required McDermott's two largest derrick barges in the Gulf working in tandem to lift. Pictured here is our founder, Waldemar Nelson, standing next to one of eight massive lifting eyes atop the structure. When in place, the power plant generated steam and electricity for the largest platform complex ever built in the Gulf of Mexico.

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