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BARNHART

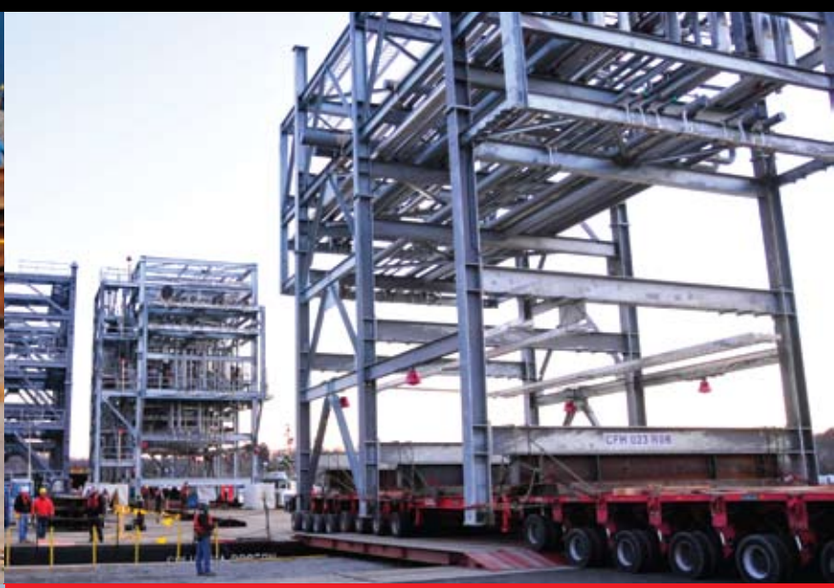
LIFTING LETTER

Vol. 47

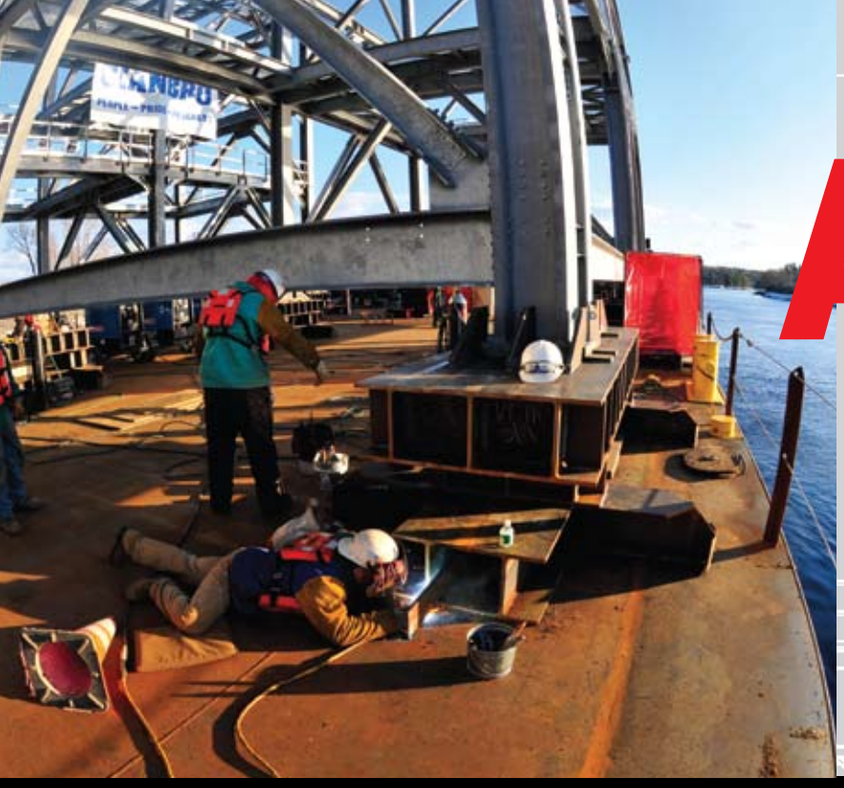
A Publication of Barnhart

MOVING

Stringent Securements for Ocean-Going Shipment: Barnhart's team of professionals



The Barnhart crew picked up the first four modules — weighing from under 100-tons up to 700-tons — where they were built, and loaded them onto a massive 94' x 354' barge.



As crude oil prices increased in the past decade, refineries made major plant upgrades often turning to modular construction. Barnhart was selected by a northeast module manufacturer to deliver 54 pipe and process modules onto deck barges for transport to a refinery on the Gulf Coast. The steel refinery modules—self-standing building skeletons filled with pipes and utilities—were built on false-work. In this way, a hydraulic transporter could drive underneath them, use the hydraulics in the trailer to lift them off the false-work and finally drive them onto the deck barge and secure them for shipment to the refinery.

MODULAR

provided safe and efficient delivery of 54 modules onto deck barges for transport from Maine to a Gulf Coast refinery.

Barnhart Crane & Rigging crews used up to 26-lines of self-propelled Goldhofer trailer in a “double-wide” configuration. With additional spacers, the configuration resulted in a trailer deck more than 140’ long and approximately 21’ wide.

The Barnhart crew picked up the first four modules—weighing from under 100-tons up to 700-tons—where they were built, and loaded them onto a massive 94’ x 354’ barge. The customer had erected the modules as tightly as possible to conserve space, and the largest module dimensions were 54’ wide, 60’ high and 140’ long. Although maneuvering was difficult, the haul path was compacted and suitable for travel. The stability and hydraulic adjustments of the Goldhofer transporter system make it ideal for rolling onto a barge even with tidal variations of over 14’ in a 6-hour period with the majority of the swing happening in a three-hour window. With a well-engineered ballast plan and several 8” diameter pumps, the crew rolled the modules onto the barge safely and efficiently.

Barnhart provided the equipment to perform the work as well as the marine surveying and architectural requirements for the project. This consisted of the barge layout, roll-on plan including ballast plan and the design of the module securements for stringent “blue water” or ocean-going shipment.

HEAVY CIVIL: Bridge Section Removal

Barnhart was called in when the girder section of a bridge in Shreveport, Louisiana was struck by a tractor-trailer carrying a wind turbine tower base. The engineering team had to remove a damaged bridge section from a highway overpass bridge then replace it with a new box girder section.

Barnhart used two 6 line PST-e trailers equipped with a power-pack for each as well as two 10' shoring stands per trailer to remove the damaged bridge section. The team then positioned the trailers at each end of the road section and linked them together through a data cable.

After the team secured the bridge section to the trailers and removed bridge rebar, they moved the trailers away from the existing bridge. They took the damaged section to the hooks of the 300 ton and 165 ton hydro cranes that were positioned approximately 100 yards away. Barnhart then used the cranes to off load the section from the Goldhofer and lowered it to the ground for demolition.

After Barnhart removed the old bridge section from the Goldhofer, the team moved the 300 ton crane to a new position in front of the bridge where they re-rigged it to pick up the new box girder and install it into the bridge.

WIND POWER: Turbine Assembly

Barnhart was contracted by an Indianapolis-based company to install a Nordic N1000 wind turbine. The installation was part of a 2.0 MW community wind farm that features the first commercial Nordic Windpower turbines installed in the United States. Barnhart's crew set the nacelle on the Nordic 1000 1.0 MW wind turbine and performed turbine assembly as well as down tower wiring. In comparison to all other large megawatt turbines currently installed in the United States, the innovative Nordic turbine rotor uses two blades instead of three. Another unique feature of the Nordic N1000 turbine is safer ground level assembly of the nacelle and rotor blades resulting in a single lift of the complete unit to the tower top.

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The Barnhart Quality Assurance team worked with Nordic to develop rigging for all the tower lifts as well as to help refine the installation manual. Daniel Phipps, Nordic Windpower's Director of Customer Services commented, "The Barnhart team was instrumental in partnering with Nordic to achieve a successful installation and working through start-up issues."

POWER GENERATION:
Feedwater Heater Replacement

Barnhart completed a removal and replacement feedwater heater (FHW) project at a North Carolina coal-fired power plant. The job required a 10 day turnaround with deliverables including calculations and PE sealed drawings for the FWH replacement.

The existing FHW was on an elevated floor in a structure with a concrete slab on metal deck. The structure itself was an elevated "turbine floor" with two "runway" embeds in the floor along the removal length. Barnhart used Hake's 500-ton gantries and all the track available on a lower floor elevation outside the structure. C-channels and 120' beams on top created elevated "removal rails" on which to roll out the FHW.

An air tugger was the force used to move the heater on its expansion wheels. After pulling the heater onto the elevated rail system, the gantries lowered the component onto the gantry track perpendicular to the removal centerline. The outside overhead gantry crane was used to pick up the FWH below it. Sections of gantry track were removed to allow the overhead gantry crane to travel over the lowered gantries. To install the new FHW, Barnhart reversed the order of steps.

While the scope of the engineering was only to provide system loads to their floor for the customer's engineers to analyze, Barnhart's Design Engineering Manager performed an approximate structural model of the area and verified that the gantry loadings would not overstress the floor.

COMMERCIAL: Cell Tower Haul

Creating a new frontage road on Mississippi's I-95 was a challenge. A cell phone tower—a 190' tall replica of the Washington Monument—needed to be moved 500'. Barnhart successfully moved the 120,000 lb. galvanized steel tower to its new foundation.

The project approach, similar to moving a home, was to insert four lifting beams under the 29' square-framed tower. Two beams were attached on each side, parallel to one another. The beams were attached to the tower's legs with steel clips welded to the beams and the tower's column legs thereby securing the tower and resulting in a fixed length of beams projecting from the tower's base.

Barnhart inserted 12-line Goldhofer PSTe trailers under each side of the tower, chained them to the beams, and used them to lift the 190' tower vertically off its anchor bolts for transport—for a 200,000 lb. total lift. Moving the tower provided additional challenges—hauling through a 60-degree curve and driving down a 2 percent downhill grade.

Barnhart used simple water levels to solve the downhill grade problem. Innovative PM Jud Parker asked a Home Depot sales associate for 100' of 1.25" clear flexible hose. "He looked at me like I was crazy," Parker laughs. "We filled it with Kool-Aid and made a water level."

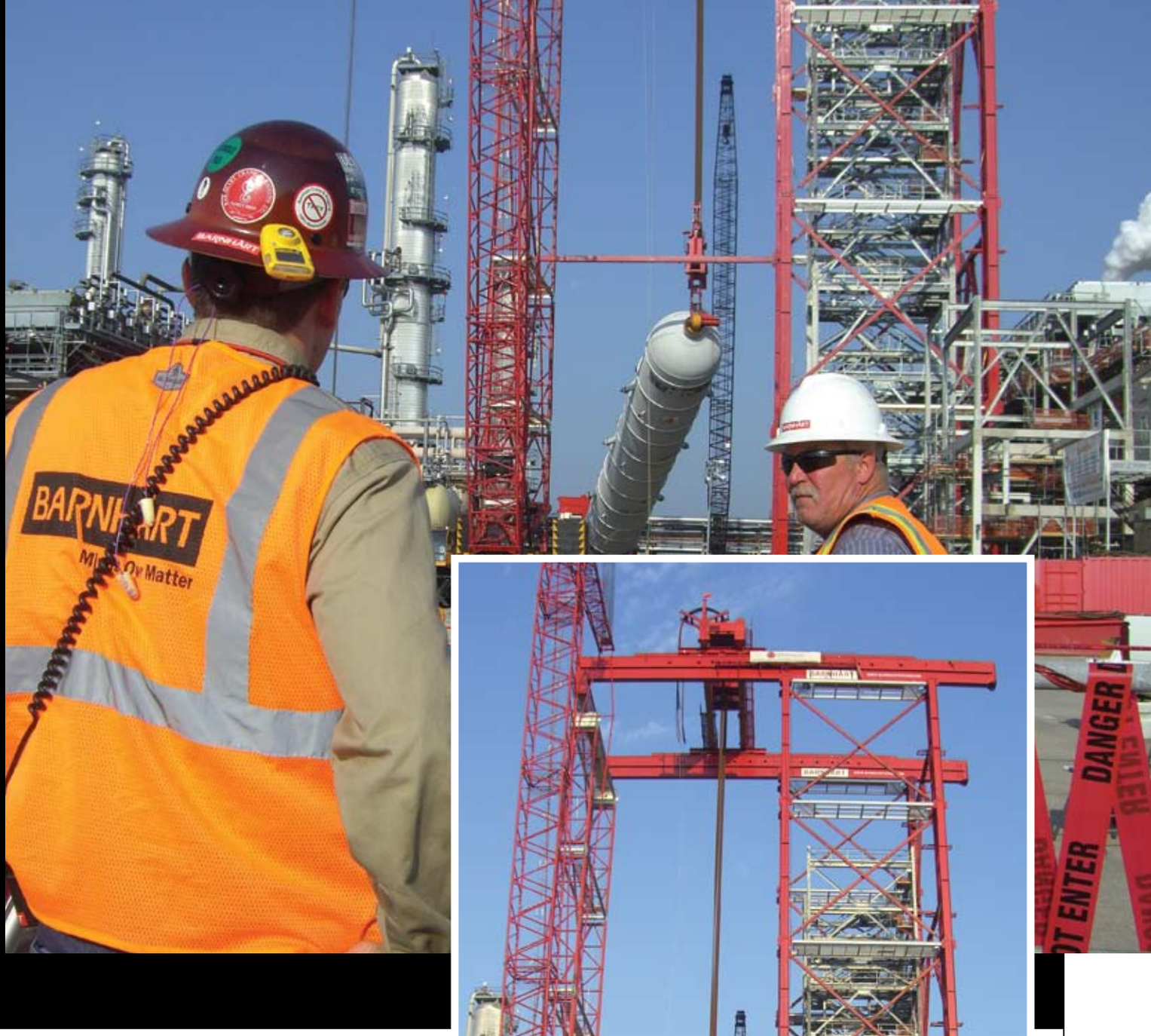
The entire move lasted just under two hours! The customer had laid the new concrete pad foundation with projecting anchor bolts. Barnhart lowered the tower and made the bolts flush.

REFINING: Reactor Move

Barnhart's recent lift at an Illinois refinery involved a 1000-ton ULSD (Ultra Low Sulfur Diesel) reactor—the sister reactor to one Barnhart also set in Texas. The Illinois project was considerably more challenging. In Texas, there was a straight shot for upending the reactor directly over the final set position. The MLT was almost centered over the foundation with no need for movement or slide systems atop the MLT.

Here, the steel structure surrounding the reactor was already in place. One side was left open to move the reactor into place. The elaborate MLT had 6 legs, 8' girders spanning the legs, and a slide system on top to move the reactor northward. Existing heater foundations blocked the original tailing direction. The team had to tail the reactor out into the alley and slide the reactor north 40' to 50'. Unable to tail the reactor up from the east to the west, Barnhart had to swap directions with the reactor and bring it into the area skirt-first and at a skew to tail up west to east.

Two 850-ton strand jacks lifted the load with the uprated 1330-ton spreader bar. Barnhart used new 25" wide slide track atop 8' girders and new, high-capacity sliding end trucks. The lift took only 13 hours to perform smoothly and safely and was within the 12- to 16-hour window promised to the client.



EQUIPMENT LIST

Modular Lift Tower

Two 850-ton Strand Jacks

1,600-ton Slide System

Assist Cranes

1,330-ton Spreader Bar

NUCLEAR: Transformer Move

Barnhart transported a new 300-ton power transformer nearly 27 miles from its roll-off site in Maryland to Pennsylvania using Hake 60' tapered-end ramps for the roll-off. The move involved several engineering challenges. The transformer was 24' high on its trailer—requiring a significant investment to remove overhead interference. The transport also required closing I-95 and crossing the interstate median at night using on and off-ramps and mats. The haul route was especially difficult since the load had to cross several bridges.

To cross the structures, Barnhart used temporary bridges. Sections were set up just ahead of the transporter. The bridge sections' ends were supported with beams laid on the roadway directly atop the bridge abutments. The team created wedge mats to ease the transition from the roadway to the ends of the temporary bridge.

The final detail for the temporary bridges' bearing required three layers of 1" plate of varying sizes over two beams at each bridge section bearing. The beams were placed over the back wall of the bridge abutments and the bridge sections cantilevered over that. The approach for the bridges consisted of two lengths of steel transition ramps over a conglomeration of mats to make up the height difference. The bridge ended up being about 16½" off of the road surface and had a max deflection of 10¼". Each of these engineering challenges went especially well and the work was performed over seven days, on time and on schedule with no safety incidents.

NUCLEAR: Reactor Head Replacement

Barnhart's latest success in the nuclear market required two years of planning and engineering for a California nuclear plant. Barnhart lifted the Replacement Reactor Vessel Closure Head (RRVCH) using a purpose-built "OLS" (Outside Lift System) and "Shoring Platform". Both the OLS and Shoring Platform had to be designed for high seismic loads to meet the plant's design basis.

Barnhart lifted the RRVCH from transporters at grade level with the OLS using a 650-ton strand jack, slid the 300,000 lb. load laterally once it cleared the handrail of the Shoring Platform, and then lowered the RRVCH onto a Goldhofer atop the Shoring Platform. Barnhart secured the RRVCH to the trailer, drove it through the fuel handling building and staged it in front of the containment building.

Custom tower sections were used with the OLS to absorb the seismic loads. Barnhart custom designed the Head Rigging Frame (HRF)--the red truss around the reactor head for this project--to very tight tolerances and nuclear specs. The HRF was used to lift the reactor head in both the horizontal and vertical positions as well as to serve as a connection to the custom upender constructed for use inside the containment building.

NUCLEAR POWER: Large Component Replacement

A recent engineering challenge that Barnhart faced was to remove existing components and install new ones in tight conditions while a nuclear power plant remained online. The scope of work for the Florida customer included the large component replacement of the MSRs, IHX & rotor.

The team offloaded the delivery of large components from rail and trucks. During the outage, Barnhart removed the original components, reinstalled new components and shipped the originals offsite.

The location of some components presented multiple challenges. For example, Barnhart provided the solutions for down ending heat exchangers and components. The heat exchangers—44' long vessels, weighing 44,200 lbs—on the 95' elevation had to be down ended to fit through a 25' opening, and then upended while the plant was online. There were just a few inches on both ends of the hold back that maintained clearance on the plant's critical service air supply pipe. Had the pipe been damaged, the plant would have been tripped offline. The belly drain tank had to slide under an in-service heat exchanger presenting another location problem.

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The MSRs—the largest components—were removed and replaced 10 days ahead of the schedule resulting in a customer who was very happy with the on site work Barnhart performed.

Branch Profile:

Knoxville, Tennessee is located in the foothills of the Great Smoky Mountains.

Knoxville, TN

It is perfectly placed between several major industrialized areas—Nashville, Atlanta and Charlotte—and is accessible by interstate. So the team at Barnhart's Knoxville branch can respond quickly to any project. Established in 2002 with the acquisition of C Reed Davis Company, the Knoxville Branch employs 42 hard working and dedicated employees. Branch Manager Shane Luttrell said, "Many of our employees have significant experience, many years in our industry, under their belts. Our customers often request specific operators or riggers because of the long and valued relationships these people have built over the years."

The Knoxville team is no stranger to nuclear, fossil, gas and hydro power plant work and is known for its ability to use Goldhofer, Gantries and slide systems in critical lift situations inside confined areas as well as secure locations at Oak Ridge. From feed-water heater replacements to moving critical components inside a plant, the team has the experience and engineering knowledge to perform these tasks flawlessly. Known as a critical component in the communications industry, the Knoxville branch also specializes in tower placements—ranging from emergency communications to cell phone use. Pile driving is another area of the team's specialization. In addition, the Knoxville branch is expanding to include commercial solar panel installation projects across the Southeast. Luttrell concluded, "Knoxville is not only a great place to live, but the business relationships we foster are amazing."

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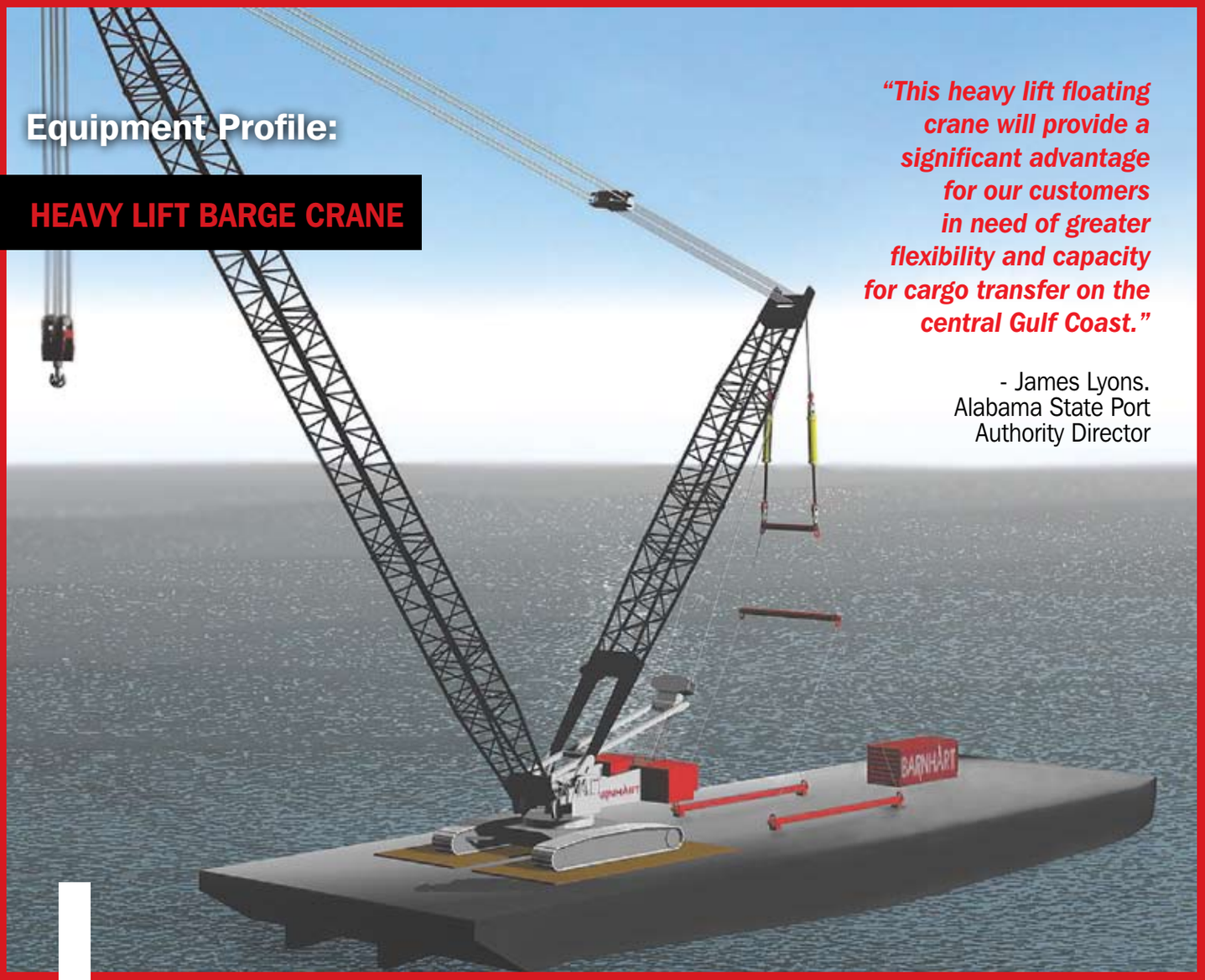
Team – This is the Knoxville team ready to serve our customers 24 hours a day. Left to Right- Mark Jetton, Dispatch; Adam Mathis – Operations Manager; James Corum- sales; Steve Thomas – Sales; Lacey Taylor- Office Manager; Scott Cameron- Project Sales; Don Thurman – inside sales. Not pictured Tommy Thomasson – Sales

Equipment Profile:

HEAVY LIFT BARGE CRANE



"This heavy lift floating crane will provide a significant advantage for our customers in need of greater flexibility and capacity for cargo transfer on the central Gulf Coast."

- James Lyons.
Alabama State Port
Authority Director

In the spring of 2010, Barnhart Crane & Rigging will provide heavy lift barge crane services for the Alabama State Port Authority's cargo clients at the port of Mobile. The barge-mounted heavy lift crane—with its 184' boom tip height—will accommodate most vessels and is capable of discharging cargo up to 400-tons from mid-ship to barge, shore, rail, truck, or specialized carrier. Mobile's current heavy lift capability is limited to 110-tons.

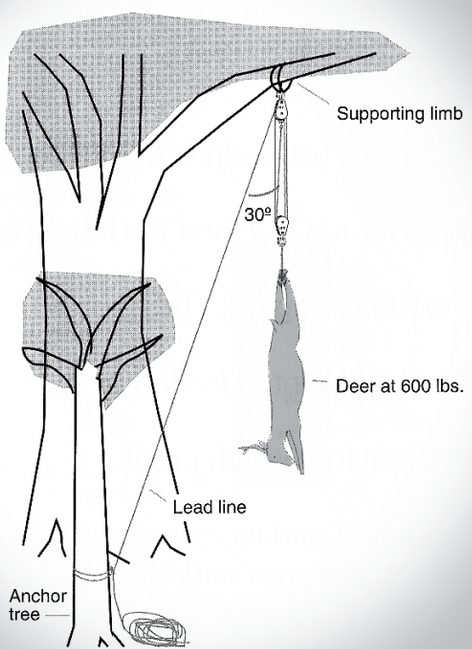
Barnhart decided to bring the $10 million crane to Mobile because current and future port business is strong. The crane will have the ability to move large pieces of equipment such as transformers, commercial wind turbines, and other heavy cargo. Barnhart will also offer project cargo customers a variety of on-carriage options including barge, rail and storage. As a leading national supplier of heavy lifting and transportation solutions, Barnhart will offer turnkey services from ship to site. Considering their engineering capabilities, specialized equipment like the hydraulic gantry, slide systems, and electronic-steer Goldhofer trailer, Barnhart will be able to handle the toughest cargo challenges.

It is anticipated that new shippers of heavy bulk cargo will use the service. The new service could save users anywhere from $60,000 to $80,000 since cargo shippers will not have to hire heavy lift cranes from other Gulf Coast ports.

Approximately 1.1 billion people do not have access to safe drinking water.

DEER SKINNING

Rigger's Corner



Hint: Block and tackle is a four-part line system.

Determine the amount of load being applied to the supporting limb and the anchor tree when the deer is fully suspended.

1. The total approximate load to the supporting limb is _____ lbs.
(A) 600 (B) 1,200 (C) 740

2. The approximate lead line tension to the anchor tree is _____ lbs.
(A) 300 (B) 150 (C) 600

For more rigging workshops or to order a copy of Mike's Rigging Mysteries, go to www.tirc.net or call 888.567.8472.

1. C, 740 lbs. *600/4 = 150 lbs. per part of line (150 x 3) + (150 x 1.93) = 450 +290 =740.* ***2. B, 150*** *600/4 = 150 lbs.*

BARNHART

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