BARNHART

LIFTING LETTER

www.barnhartcrane.com

VOL. 59

A Publication of Barnhart

MID-SIZED COMPONENTS. TIGHT SPACES. NO PROBLEM.

COVER STORY

Equipment breaks. Units wear out. Sometimes this happens conveniently during a planned outage, but often it's unexpected and causes your operation to come to a screeching halt. In either instance, removal and replacement can be a headache.

But it's a headache we welcome. Barnhart specializes in R & R projects involving components of all sizes, including mid-sized and small components in hard-to-reach places. We relish navigating obstacles such as pipe racks, structural components, and underground utilities.

In this Lifting Letter, we have several examples. Barnhart used a Spydercrane to access a compressor at a project in South Carolina (pg. 13). A 140,000 lb. drum dryer at a plant in Tennessee was removed despite limited space and low headroom (pg. 11).

Barnhart's vast arsenal of equipment and tools give us a variety of ways to approach a difficult removal. They were especially useful at a project in the Southwest, where Barnhart was hired to remove a heat exchanger on ground level. The client had initially chosen to use a cantilever beam on a crane hook, but they discovered that wasn't an option. Traditional methods of removal weren't viable due to a narrow aisle.

The team came up with a proposed solution within 24 hours, piecing together different components from our equipment arsenal: a 6-line PSTe Goldhofer trailer, turntable and a beam from a cantilever system. We assembled a piece of machinery we called the "M1A1" that essentially resembled an army tank.

We were able to get into the narrow aisle and "crabbed in" until we could insert the beam inside the old exchanger shell and remove it. The new shell was replaced and the client was ready to restart the unit. We assembled the team and equipment, mobilized and performed the work in less than 36 hours.

The project later won the Specialized Carriers & Rigging Association (SC&RA) Rigging Job of the Year. B

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POWER GENERATION: Component Disassembly

WASHINGTON

1) Barnhart provided a CC1800-1 crawler crane, PEG equipment and qualified personnel to assist a power services company in Washington state to disassemble four steam generator towers and remove power generation components from the power house. In August 2016, the Barnhart crew assembled the CC1800-1 to begin tower disassembly.

2) Each tower had seven sections, and once the sections were removed they were staged onsite on beams for load out by others. Barnhart's selection of the CC1800-1 was based on space available on-site and between the towers. Space was so limited that the crane came within six inches of an adjacent tower while lifting and traveling. The Barnhart crew relied heavily on spotters and radio communications to insure consistent safe load handling. Barnhart's crew efficiently disassembled and staged the tower sections by mid-September.

3) The next portion of the project involved working within a short timeframe to remove several turbine room components, including a generator, turbine and condenser. There were very tight dimensional tolerances for lowering the components from the pedestal.

4) The condenser posed an interesting problem. The customer had concerns that the tube bundles inside the condenser would be damaged by lifting from just four points. Working with the customer, Barnhart developed a 4-beam arrangement to lift the condenser from eight points. The plan called for the 500T slide system, two 45 ft. multi-purpose girders and one shot gantries to lift the condenser. The condenser was removed from the building using a 6-line PSTe Goldhofer trailer. The customer's lease on the property for equipment removal ended at the new year and the Barnhart crew worked closely with the customer to efficiently stage components on-site for removal before the deadline. On a project that required over 5,000 man hours, there were no safety incidents.

REFINING: Vessel Haul

CANADA

1) Barnhart undertook a hauling project that was a journey of over 3,000 miles. It started at the port of Houston, where the team loaded the Gas Scrubber vessel onto a GS-800 trailer. Barnhart had to add two girder inserts to accommodate the length of the vessel.

2) The vessel's destination was a refinery in Northern Canada. At several points along the trip, Barnhart reconfigured the trailer to accommodate state laws.

3) Barnhart had to get permitting for the oversize load with seven state agencies. They also had to coordinate with local municipalities and utility companies to secure all permits and clearances for the haul.

4) The convoy had a couple of challenges that included dealing with customs crossing into Canada and encountering extremely cold and snowy weather along the way. Nonetheless, the vessel was delivered safely and successfully. B

POWER: Generator and Transformer Transport

CALIFORNIA

1) Barnhart received four generators and one transformer from ship's hook at the port of San Diego. They were loaded to a Goldhofer with 10-lines of PSTe and transported to a staging area within the port where they were offloaded onto beams and stands.

2) Barnhart loaded the generators on the GS-800 for the 20-mile long trip to the power substation. The haul route went through city and county streets, requiring permitting from multiple agencies. The weight of the transformer required the use of belly dollies on the GS-800. This increased the overall height during transport and required bucket trucks to accompany the move.

3) Even though it was only a 20-mile trek, it took a full night for the haul. In addition to bucket trucks, the trip also required private escorts, inspectors, traffic control and California Highway Patrol escorts.

4) The components were offloaded to a Goldhofer trailer with 16-lines PSTe for entrance to the jobsite. The crew faced tight turns and a steep downgrade that had to be negotiated. Once onsite, there was limited space for transloading and maneuvering the equipment. But Barnhart was able to set all the components and complete the project. B

POWER: Generator Haul and Air Handler Install

CALIFORNIA

1) Barnhart was contracted to assist with the installation of a 225,000 lb. heat recovery steam generator (HRSG) and 33' long air handlers at a power plant in California. The HRSG had to be hauled from Tulsa to Los Angeles, a 2,343-mile journey that crossed six states, and won Barnhart the **2017 SC&RA Hauling Job of the Year.** Once on site, Barnhart had to transload the HRSG from the dual lane trailer to a self-propelled modular transporter so that the equipment could be driven into the building.

2) Inside the building, Barnhart used its 500-ton one-shot gantry with multipurpose girders to lift the HRSG, side shift it to the foundation and lower it into place. Existing equipment in the unit made it difficult to maneuver and set the generator.

3) For the air handler installation, the client was unable to use a traditional crane because there was not enough room inside the building to set up a crane to set the piece without removing the existing structural framing and roofing. So Barnhart installed the air handlers through an existing hole in the side of the building using dual moveable counterweight system.

4) Once inside the building, Barnhart used a chain hoist to lower the unit to the roof of the control room. The team installed a structural steel runway which transferred the load of the air handler to temporary shoring to avoid overloading the structure. Barnhart then used rollers and jacks to move the unit into place and lowered it onto air handler supports. B

CHEMICAL: Catalyst Recharge

IOWA

1) Access to a piece of equipment is a frequent challenge in projects, as in this Barnhart job at a fertilizer plant in Iowa to remove a 45-ton catalyst reactor for refilling. Barnhart had to crawl a CC1800 crane down a narrow 30' wide alley to reach and lift the reactor.

2) Barnhart added a chain fall to accommodate the unusual shape of the 50' tall reactor just in case the CG was off. In the end it wasn't needed, because the reactor was picked level.

3) Once the reactor was placed on the ground it was refilled with catalyst. Then Barnhart reversed the process to replace the reactor. Despite having little lead time, the project was completed ahead of schedule. B

POWER: Turbine Heavy Haul

CANADA/MINNESOTA

1) The project to haul a turbine over 1,000 miles started in Alberta Canada. The turbine, which weighed over 435,000 lbs.,was brought to the border town of Sweetgrass, Montana where it was staged on stands. It was then self-loaded to Barnhart's GS-800 transporter, which brought the total size of the transport to 16'7" high, 18' wide and 316' long with a gross weight of 982,000 lbs. At the beginning of the route, the trip was hampered by severe winter weather.

2) The load was to be hauled from Sweetgrass to Dexter, Minnesota. Finding a route to accommodate the dimensions was a challenge and required multiple state and county permits. The load was followed by two trucks that assisted in pushing it up steep grades and maintaining an adequate speed.

3) The trip ultimately took 10 days to complete. Toward the end of the route, the team had to manage Frost Laws enforced by the state to handle the reduced capacity of the roads caused by the cold weather. The final step was to offload and stage the turbine with 500 ton one-shot gantries to the client's cribbing. B

HEAVY INDUSTRIAL: Drum Dryer Remove and Replace

TENNESSEE

1) Barnhart was hired to remove and replace a 140,000 lb. drum dryer at an industrial site in Tennessee. There was limited space to set up the gantry and low headroom for the header beams. Still, Barnhart successfully used 44A gantries to lift the old dryer.

2) The dryer was set on powered saddle rollers. It was then navigated through narrow passageways within the plant as it was maneuvered to an opening in the side of of the building.

3) At the opening of the building, the dryer was removed using two 150 ton cranes.

4) The two cranes lifted the old dryer away from the building and loaded it onto the customer's truck for removal. The new dryer was installed in the reverse order. B

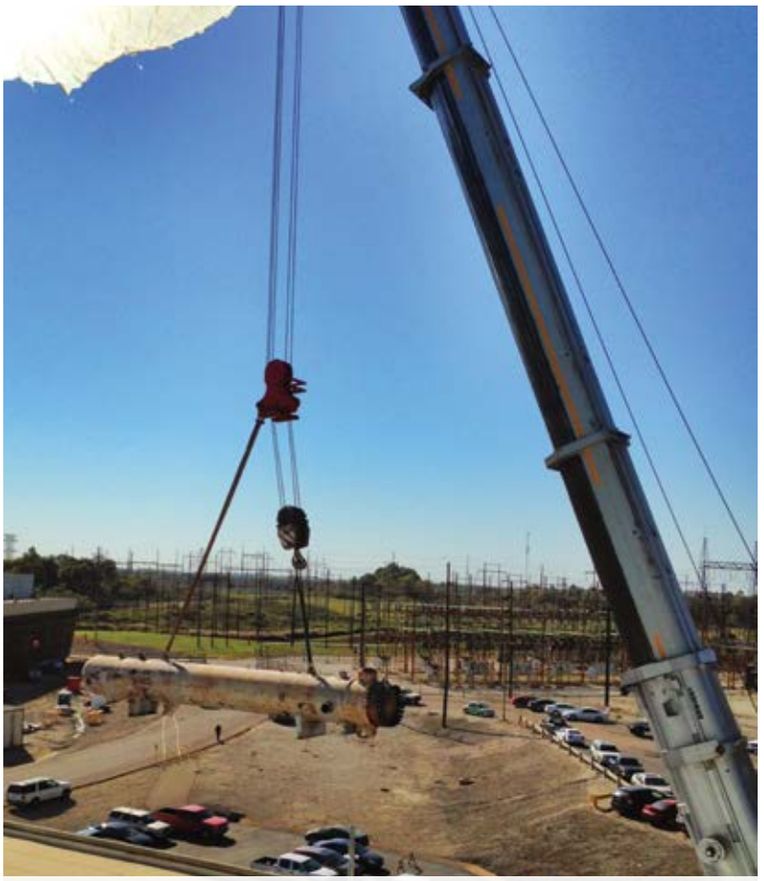
POWER: Feedwater Heater Remove and Replace

KENTUCKY

1) Barnhart was hired to remove and replace a feedwater heater (FWH) weighing 60,000 lbs. from an upper level floor in a power plant. The FWH was located 20 feet inside the building and surrounded by obstacles, which included existing piping. Barnhart used 100-ton double acting jacks and a multi-purpose pump to load the heater onto a 500-ton slide system. Other obstacles required numerous pusher gripper jumps, where the FWH had to be taken off the slide system and repositioned.

2) The customer cut a hole in the side of the building to allow for the passage of the FWH. Using a 600 ton crane with quad block, Barnhart removed it from the building.

3) This same wall opening was also used to fly in all the Barnhart equipment needed for the job, due to the turbine floor crane being unavailable.



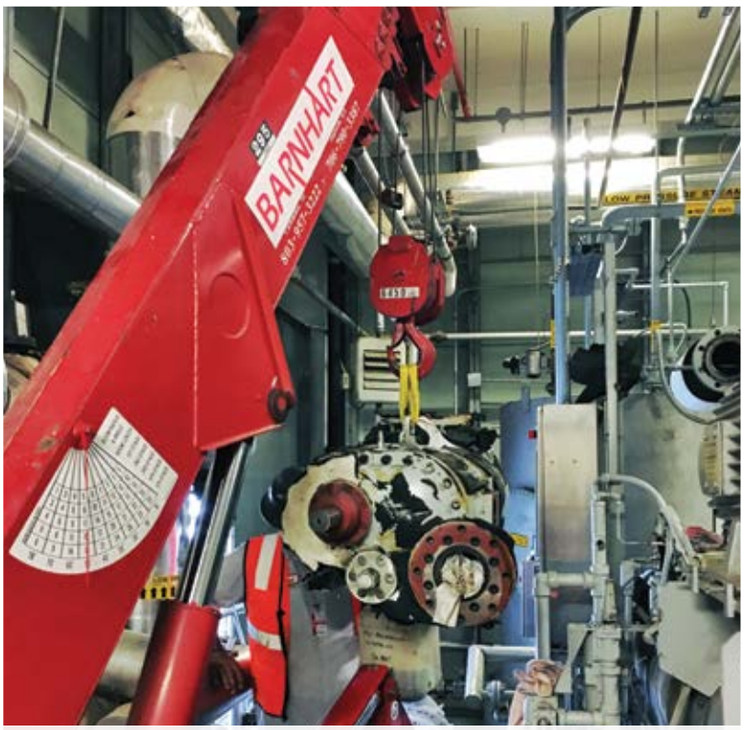
4) The heater had to be flown over additional office buildings to reach its destination, which required the plant to clear all offices below the path of the lift. It was eventually loaded to a truck where is was hauled off for scrap. To replace the new FWH, the process was reversed. B

PHARMACEUTICAL: Compressor Remove and Replace

SOUTH CAROLINA

1) Barnhart was tasked with removing and replacing a compressor from a pharmaceutical facility in South Carolina. Due to tight space considerations and rigging issues, Barnhart brought in a Spydercrane, which, due to its compact design, was able to be transported by freight elevator to the work area. Once there, Barnhart was able to set up in the corner and maneuver the crane's riggers in different configurations to safely access the compressor.

2) The crane operator was able to manipulate the Spydercrane within the confined space to reach in and remove the compressor. It was set on a pallet and eventually hauled away.



3) The new compressor was staged on site and installed. The only hitch in an otherwise successful project was the breakdown of the freight elevator, which extended the project for two days.

NATURAL GAS: Gas Compressor Install

KENTUCKY

1) Barnhart was contracted to install a gas compressor at a natural gas site in Kentucky. The compressor arrived by truck and was offloaded using a 350-ton crane.

2) The compressor was hauled to the station using two 40K forklifts through a tight path and restrictive working conditions.

3) From the forklift, the compressor was set to a 500-ton slide system. The move was complicated because the team was working in a live compressor station while navigating trenches and basements.

4) The compressor was slid and set to the pad with minimal room for error. The job was completed safely and on time. B

POWER: Feedwater Heaters Remove and Replace

KANSAS

1) Two feedwater heaters (FWH) at a power plant in Kansas needed to be removed and replaced during a planned outage. They were stacked on two floors and surrounded by a structure, out of reach of the overhead crane. The structure could not be removed and left minimal clearance for Barnhart to maneuver the vessels onto the turbine deck. For the lower old FWH, the team used its light slide system to slide it forward, jack it up with pull up jacks, lay heavy slide track underneath, and roll it out with powered saddle rollers to the awaiting overhead crane.

2) The plan for the upper vessel was to slide out, suspend and lower it through a hole in the floor. Due to limited headroom, Barnhart used a light slide system with light slide gantries to slide it to the edge of the hole and lower it.

3) Barnhart basketed the FWH under the first light slide gantry on top of heavy slide beams and slid it to second basket. It was lowered with air hoists and set to powered saddle rollers. Despite having only inches to spare, the plan was successfully executed.

4) Once on the deck, the FWH was secured to the rollers and rolled on heavy slide track to the awaiting overhead crane. The limited capacity of the turbine deck floor required cribbing under the track directly over the support beams in the floor. The process was executed in reverse for the replacement heaters, with the upper feedwater heater replaced first. Barnhart was able to complete the job four days early, saving valuable time during the outage. B

POWER: Transformer Remove and Replace

NEW HAMPSHIRE

1) Barnhart was hired to remove a 50-year old transformer from a site in New Hampshire and replace it with an onsite spare transformer. The team first had to remove concrete ballistic walls and columns to gain access to the transformers. They used pull-up gantries to lift the mammoth transformer, which weighed approximately 850,000 lbs.

2) Once lifted, Barnhart used their 16" slide system to jack and slide the old transformer to a staging area for onsite demolition. Barnhart crews slid the 425-ton piece over 125' to its staging area.

3) The spare transformer, which weighed 560,000 lbs. was readied for transport using the 16" slide.

4) It was transported 200 yards from onsite staging to its final location. The job was completed safely and efficiently. B

HEAVY CIVIL: Lock and Dam Gate Replacement

KENTUCKY

1) Barnhart was hired to replace two miter gates at a lock and dam in Kentucky. The job required Barnhart to bring in Big Al, a super-capacity barge-mounted heavy lift crane based on the Gulf Coast, which is able to lift loads of over 400 tons.

2) Barnhart mobilized Big Al, traveling up the Tombigbee/Tennessee River via tug to Paducah, Kentucky and then further up the Ohio River. The trip took 13 days to complete. At the site, the new 468,000 lb. gates had been delivered by deck barge.

3) The team put Big Al to work, using Barnhart's adjustable rigging link system and specialized turning shoes to lift the gates from horizontal to a vertical position.

4) The gates were then set at a 135 ft. radius. Big Al was demobilized and made the return trip down river back to the Gulf. The job was completed safely and ahead of schedule. B

EQUIPMENT PROFILE: Pull-Up Jack

Compact. Portable. Powerful. That's the pull-up jack, a custom-engineered, designed and fabricated tool in Barnhart's equipment inventory.

It's small, only 18" tall when collapsed and 2' wide. Weighing only 170 lbs. a piece, two pull-up jacks can easily fit in the bed of a pickup truck. Yet two jacks have a lifting capacity of 50 tons. That's a strength to weight ratio of almost 300 to 1. It's small, yet strong.

The primary benefit of pull-up jacks is they are easy to maneuver in tight, confined spaces with little headroom.

When used in conjunction with cribbing and a beam in between the two posts, they can lift a unit 12" when fully extended, to the point where another load handling system can complete the move.

Pull-up jacks are frequently used in remove & replace jobs for lifting feedwater heaters or transformers from a pad, so a slide track can be slid underneath it or lifted to a level where a truck can be driven under it.

The pull-up jack is another instance where if the right tool doesn't exist for the job, Barnhart will create it. B

BARNHART: West Monroe Branch

Barnhart removes precipitator ductwork with a 500T Liebherr at a papermill in Louisiana.

The West Monroe Barnhart team: Jet Turlington, Jeff Howie, Frank Holland, Mickey Chevallier, Joe Davis, Boyd Chandler, Jeffery Taylor II, Brad Bond, Shawn Akers, Patrick Russell, Harvey Robert.

Not pictured: Jeff Taylor, Curt Thomason, Chase Eastman, Jesse Johnson, Jean Minton, Chuck Bradberry.

Barnhart's West Monroe, Louisiana branch provides a wide variety of lifting and transportation services, including crane service and industrial machinery moving.

This northern Louisiana branch has historically served clients in south Arkansas and large geographical areas of Louisiana and parts of Texas.

The West Monroe branch boasts an arsenal of cranes up to a 500-ton mobile crane. It specializes in machinery moving of components like presses, CNC machines, and lathes. However, as part of the Barnhart team, the branch can tap into a nationwide inventory that includes cranes from 8.5 tons to 1,760 tons, hydraulic gantries and heavy rigging including modular lift towers, gantry systems and slide systems.

Industries served by the West Monroe branch include Pulp & Paper, Civil, Chemical Process, Petroleum Refining, and Power Generation/Distribution.

"We take our relationships with our customers to a whole new level. It's personal to us. We are a smaller community where we see our customers away from the office like at birthday parties, church and football games. These relationships are built on more than just a business deal, because to us it's a whole lot more." B

BARNHART

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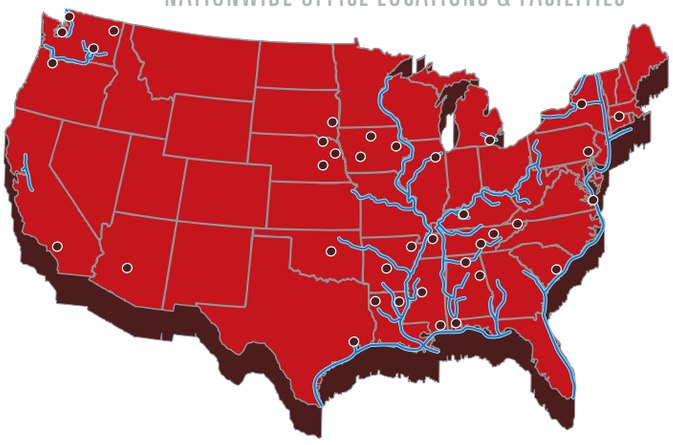
NATIONWIDE OFFICE LOCATIONS & FACILITIES



- DECATUR, AL FULL SERVICE
- FAIRHOPE, AL SERVICE CENTER
- GADSDEN, AL FULL SERVICE
- MOBILE, AL FULL SERVICE
- PHOENIX, AZ RIGGING & TRANSPORT
- BLYTHEVILLE, AR FULL SERVICE
- LITTLE ROCK, AR FULL SERVICE
- LONG BEACH, CA RIGGING & TRANSPORT
- MIDDLETOWN, CT FULL SERVICE
- CHICAGO, IL RIGGING & TRANSPORT, HEAVY LIFT TERMINAL
- EAST MOLINE, IL (CATTANI) FULL SERVICE
- LADD, IL (CATTANI) FULL SERVICE
- AMES, IA FULL SERVICE
- CEDAR RAPIDS, IA FULL SERVICE
- DES MOINES, IA FULL SERVICE
- CALVERT CITY, KY RIGGING & TRANSPORT
- OWENSBORO, KY RIGGING & TRANSPORT
- BATON ROUGE, LA FULL SERVICE
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- PHILADELPHIA, PA RIGGING & TRANSPORT
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- CHATTANOOGA, TN FULL SERVICE
- KINGSPORT, TN FULL SERVICE
- KNOXVILLE, TN FULL SERVICE
- MEMPHIS, TN FULL SERVICE, HEAVY LIFT TERMINAL, SERVICE CENTER
- COLUMBIA, TN SALES
- HOUSTON, TX RIGGING & TRANSPORT
- HAMPTON, VA RIGGING & TRANSPORT
- MT. VERNON, WA FULL SERVICE
- RICHLAND, WA RIGGING & TRANSPORT
- SEATTLE, WA FULL SERVICE
- SPOKANE, WA FULL SERVICE

BARNHART EQUIPMENT

ALTERNATIVE HEAVY LIFT
- Modular Lifting Tower
- Pull-Up Gantry
- Hydraulic Slide System
- Jacks & Rams
- 4-point Gantry System
- Strand Jacks
- Modular Hoists

TRANSPORTATION SYSTEMS
- Dual Lane Transporters
- Goldhofer PSTe
- Hydraulic Dolly Systems
- Barging
- Ramps and Temporary Bridges

MARINE HEAVY LIFT
- Derrick Crane – Mississippi River
- Barge Crane – Gulf Coast
- Barge Crane – Great Lakes
- Heavy Lift Terminal – Great Lakes
- Heavy Lift Crane – Houston

TELESCOPIC BOOM CRANES
- From 7 tons to 650 tons

LATTICE BOOM CRANES
- Crawlers from 100 to 1800 tons
- Truck cranes from 115 to 800 tons
- Ringer cranes from 360 to 1,800 tons

OPERATED CRANE SERVICE
- Over 450 cranes
- Lattice Boom to 1,760 Tons
- Telescopic Boom to 600 Tons
- Full turnaround services
- Nationwide Network of Crane Branches