

ROOST @ 30 WIND = 1100000 ft/m

TRANSFORMERS  
- Ground level

BRIDGE

# FROM **BRAIN WAVE** TO HEAVY LIFT TERMINAL IN ONE YEAR

# MTC-15: transforming any port into a heavy lift terminal

Last year, Elecnor, a Spanish construction company in the energy sector, started the construction of a new power plant in Juan Manuel Valdez for Venezuela's National Oil Company, PDVSA. It had contracted Mammoet to deliver four turbines, four generators and general cargo, measuring about 40,000 freight tons altogether, from factories in Europe and the United States to the site in Güiria, Venezuela.

All the materials were shipped on one cargo-bearing vessel. However, the port closest to the construction site, Güiria, only 20 kilometers away did not have the heavy-lift facilities required to offload the materials from the vessel. That meant the vessel had to sail to the nearest existing heavy-lift facilities 300 kilometers

further away, in Trinidad. From there the shipments would need to be loaded onto several, smaller barges and transported to the construction site, a time-consuming and expensive detour.

Mammoet came up with an alternative that would solve this issue. It proposed using its brand-new

*MTC-15 on its maiden job in the small port of Güiria, Venezuela.*

Mammoet Terminal Crane, the MTC-15, to turn the small fisherman's port of Güiria into a temporary heavy-lift terminal. In doing so, the cargo-bearing vessel was able to sail straight through to Güiria and deliver the materials only 20 kilometers from the construction site, saving Elecnor and PDVSA a considerable amount of time and expense.

## Brainchild of Mammoet's Think Tank

This was the first time the MTC-15 was put through its paces. The Mammoet Terminal Crane is the brainchild of Mammoet's Think Tank, a team set up to monitor



## Paloma Frutos, Logistics manager Güiria Project, ELECNOR:

"The opportunity to convert a small and unsuitable terminal into a heavy lift terminal with Mammoet's MTC-15, saved us a lot of time and money, and made the transport route easier from port to site.

The two alternative routes from the commercial port or a beach landing were both less effective, more costly and would have presented more risks. We are very happy with our equipment installed ahead of schedule."





Assembly main boom.



Assembly back mast, ballast containers and pendants. Installation winches.

market developments, anticipate new customer demands and develop innovative concepts and solutions. The members of the Think Tank saw an increase in demand for engineered heavy lifting and transport in remote areas and locations with limited infrastructure, leading to a growing need for equipment that combines easy mobilization, low ground bearing pressure and high capacity.

For example, in developing countries with a lack of infrastructure, the first order of business is to build power stations that will support initiatives to industrialize. The biggest single piece of equipment

in a standard power plant weighs about 500 tons. That means there is a demand for heavy lifting capacity. However, quays are often small and situated in remote areas. Their ground generally is not capable of carrying objects with a high ground bearing pressure like heavy lift cranes and their loads.

These insights prompted the Think Tank to come up with the idea to create a new terminal crane for heavy cargo handling that would be able to convert any small port, quay or riverbank into a heavy lift terminal. They sketched out what would be

needed for a crane that would help Mammoet's customers shorten, lighten, or otherwise improve their logistics chains.

Overall, the team was after a crane that could prove its worth, not just through what it could do, but through what it would make possible for our customers—the alternatives it would open up for them. They wanted a crane that could be the lynchpin to define new logistics chains that are more efficient and cost-effective.

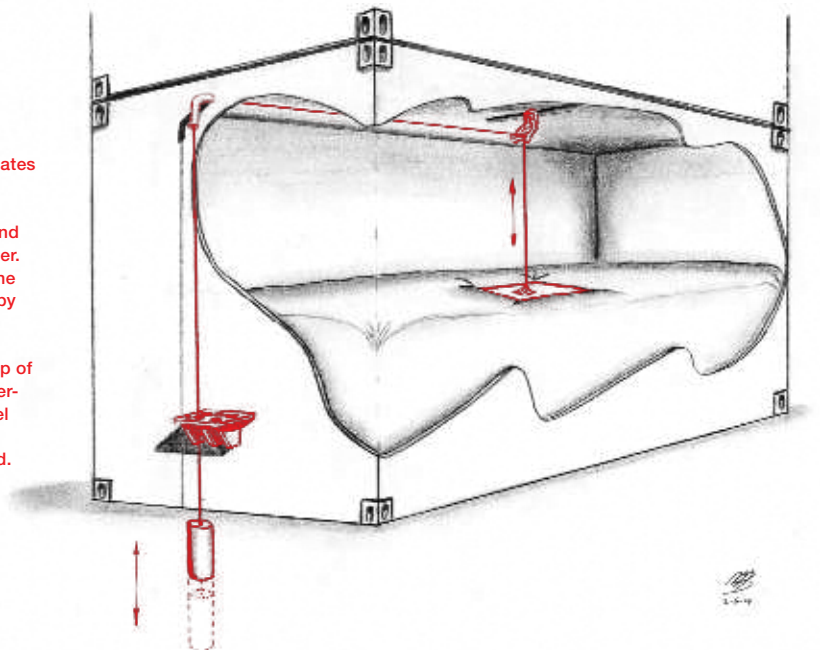
The team took their idea to the engineers at Mammoet's Solutions department to see whether

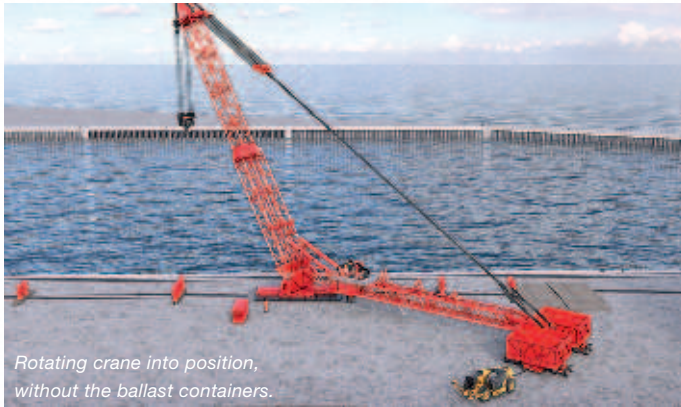
## Simple sophistication

Down to the smallest detail, the design accommodates working at remote locations.

The crane's ballast containers are fitted with the kind of bag used to ship wine in bulk and filled with water. Instead of using complicated gauges to measure the water level in the ballast container, it is controlled by a simple, yet effective mechanism.

Inside the container, a small weight is placed on top of the water bag. The weight is connected to a counterweight outside the container. Should the water level inside the container drop, the counterweight will rise—signaling that the ballast needs to be checked.





Rotating crane into position, without the ballast containers.

**“The MTC-15 is fully booked and we are now building an additional crane.”**

it could be built. The requirements were clear: “We want to design a crane that is easy and quick to mobilize and assemble and that will have a low ground-bearing pressure; a crane that any port will be able to accommodate without having to be reinforced”. Sustainability was also an important factor; the team wished to recycle components from Mammoet cranes that are no longer in use.

As one of the requirements was simplicity, Mammoet also came up with an innovation for the ballast system. Sand was one possibility, but not universally available. But there was another option that’s to be found at any port: water. The team decided to fit the ballast containers with the kind of bag used to ship wine in bulk.

### One year from sketch to reality

For five months, a total of twelve engineers worked on the detailed engineering. It took one year from initial sketch to having the crane tested and ready for use.

The result is a crane that provides ports throughout the world with 600 tons off-loading capacity on a temporary basis. With a lifting capacity of 600 tons at 25 meters and a load moment of 15,000 metric tons, the MTC-15 is comparable to a 1,200 metric ton crawler crane.

### Remote locations upriver

Not only can the MTC-15 prove its value in sea ports, it can also

be used at remote locations upriver. Depending on the river system, river heights can vary significantly. Most types of barge can fit under bridges only when the rivers are not swollen-but with a hopper barge that is less of a constraint. As the total height including cargo is less, it is more suitable for upriver transport, provided that a crane with heavy lift capacity is available for unloading. The design of the MTC-15 makes it possible to unload from hopper barges without the need for a heavy lift crane.

That effectively lengthens the periods when the MTC-15 can do

its work upriver. And for locations far upriver, it means in turn that the customer doesn’t have to think about lugging hundreds of tons of equipment over poor roads, applying for road permits, building bridges or realizing other infrastructural improvements like road reinforcements.

The crane is booked solid up to 2015, and a second one is now being built. Its maiden job in Güiria passed off really well, and helped make PVDSA’s task much more efficient and cost-effective than it would otherwise have been. ■

## MTC-15 features

The MTC-15 provides ports throughout the world with 600 ton off-loading capacity on a temporary basis.

This minimizes the need for self-gear cargo vessels and eliminates the use of expensive floating cranes. With a lifting capacity of 600 tons at 25 meters and a load moment of 15,000 metric tons, the MTC-15 is comparable to a 1,200 metric ton crawler crane.

Quick lifting and boom movements are possible with a lifting speed of up to 1.5 m/min and four 22 ton winches.

The MTC-15 can be positioned close to the quay edge without the need for additional works, as the ground bearing pressure can be reduced to as little as 10 Te/m<sup>2</sup>.

### Several factors contribute to the fast and economical mobilization of the MTC-15

- The crane is fully containerized, meaning it can be transported in only twenty-five standard 20 ft containers.
- The use of water for ballasting.
- Assembly time between seven and ten days.
- The MTC is assembled and erected with the use of one 80 ton crane.

### Technical Specifications

- Max. capacity: 600 ton.
- Outreach @ 600 ton: 7–25 m.
- Max. lifting speed: 1.5 m/min.
- Max. boom up/down speed: 20 m/min.
- Ground bearing pressure (standard arrangement):
  - 10 Te/m<sup>2</sup> @ counterweight arrangement.
  - 17 Te/m<sup>2</sup> @ base frame arrangement.
- The ground bearing pressure can be further reduced with additional load spreaders.
- No. of ballast containers: 20.
- Max. weight of ballast containers: 520 ton.
- Counterweight material: water (in water bags) or sand.
- Crane to assemble the MTC-15: 80 ton mobile crane.