

# THE REVOLUTIONARY JACKING SYSTEM

**MAMMOET  
MEGA JACK 800**



 **MAMMOET**

**SMARTER, SAFER, STRONGER**

# OVERVIEW

Mammoet has always been distinguished by its engineering capabilities. We're recognised as a world leader in equipment and solution development, and from the opening of our Research and Development (R&D) facility, our innovative product design has dominated industry news and redefined the boundaries of heavylifting capability in a global market.





Our world-beating R&D facility works with teams around the world to find a solution for existing challenges and future issues before it's needed. The fleet of innovations are designed with state-of-the art technologies using industry experts and includes the Mega Jack 800, a jacking system with 800t jacking capacity per tower.

**DESIGN**

The heavylift industry has been accustomed to using jacking systems including modular frame systems and climbing jacks in recent years, particularly within the European offshore and civil markets. These current jacking systems have a number of restrictions such as being limited in height and capacity.

Mammoet identified a number of projects requiring increased jacking heights and weights becoming more frequent and wanted to develop a more efficient and stable jacking system to cater for this demand in the market.

**MAMMOET WANTED TO CREATE A JACKING SYSTEM THAT:**

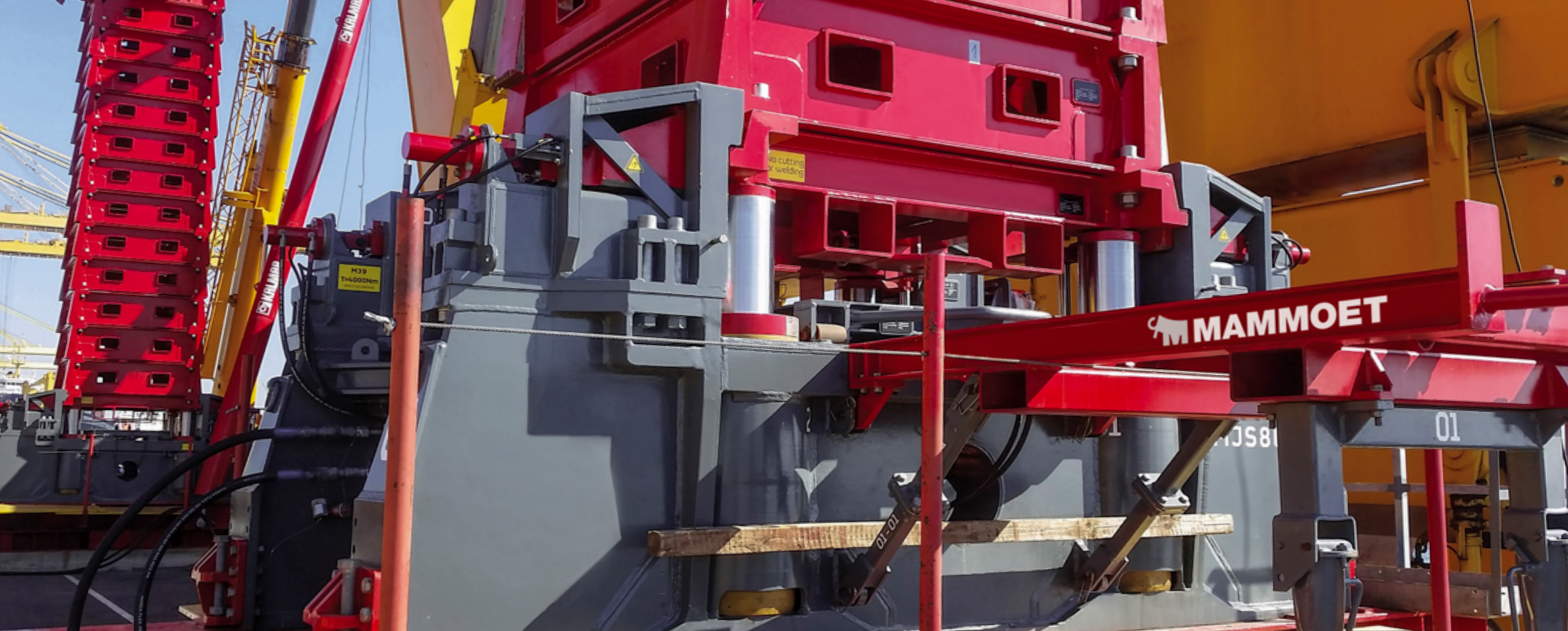
- Offered greater capacity than climbing jacks
- Would be scalable and versatile to accommodate a wide variety of weights and structures across industry sectors
- Reduced the manpower required
- Increased safety in its operation
- Did not compromise on time efficiency
- Has a low assembly height for installation to maximise the amount of structures it can be used to jack-up
- The design accommodated for the lack of space on worksites
- Could be integrated with current services for a complete solution on projects
- Could be containerised in every aspect of the design

Through careful analysis of the current market and early engagement with clients to identify their needs, Mammoet first conceived the idea of a new jacking system in May 2013. The concept that Mammoet developed was the Mega Jack 800,

a jacking system designed to bridge the gap in jacking capacities of the conventional 60-500t capacity climbing jack systems and Mammoet's original Mega Jack system that has a capacity of 5,200t per tower.

**OVERVIEW OF KEY FEATURES**

- 800t capacity per tower
- Feed in from one side
- Extremely low build in height 1.2m
- Normal installation height of 2m
- No welded connection with the deck
- Strong connection between jacking cassettes and can have 25% uplift per sliding support
- Designed and built under Lloyds Supervision
- In-house design
- Central control system
- The system is fully containerised and can be shipped globally
- Ability to work within a restricted site space
- Entirely scalable and towers can be added or taken away as required to meet the needs of the project



# DESIGN BENEFITS

## **IN-HOUSE DESIGN**

Conventional jacking systems are designed by suppliers without the experience of using systems in the field. The Mega Jack 800 is designed by Mammoet engineers who know the practical needs of a jacking system.

## **OFFERS GREATER CAPACITY**

Conventional climbing jack systems have the capacity to jack 60-500t. However, Mammoet have designed the

Mega Jack 800 to have a jacking capacity of 800t per tower. Therefore, increasing the available solutions to clients. The system also has a strong connection between the jacking cassettes and the jacking base which gives the system enormous horizontal load capacity even without having a vertical load on the system.

## **SCALABLE AND VERSATILE TO ACCOMMODATE A WIDE VARIETY OF WEIGHTS AND STRUCTURES ACROSS INDUSTRY SECTORS**

Although each jacking tower has a capacity of 800t, another innovative element is that multiple towers can be used together to accommodate for a range of weights and sizes of structures.

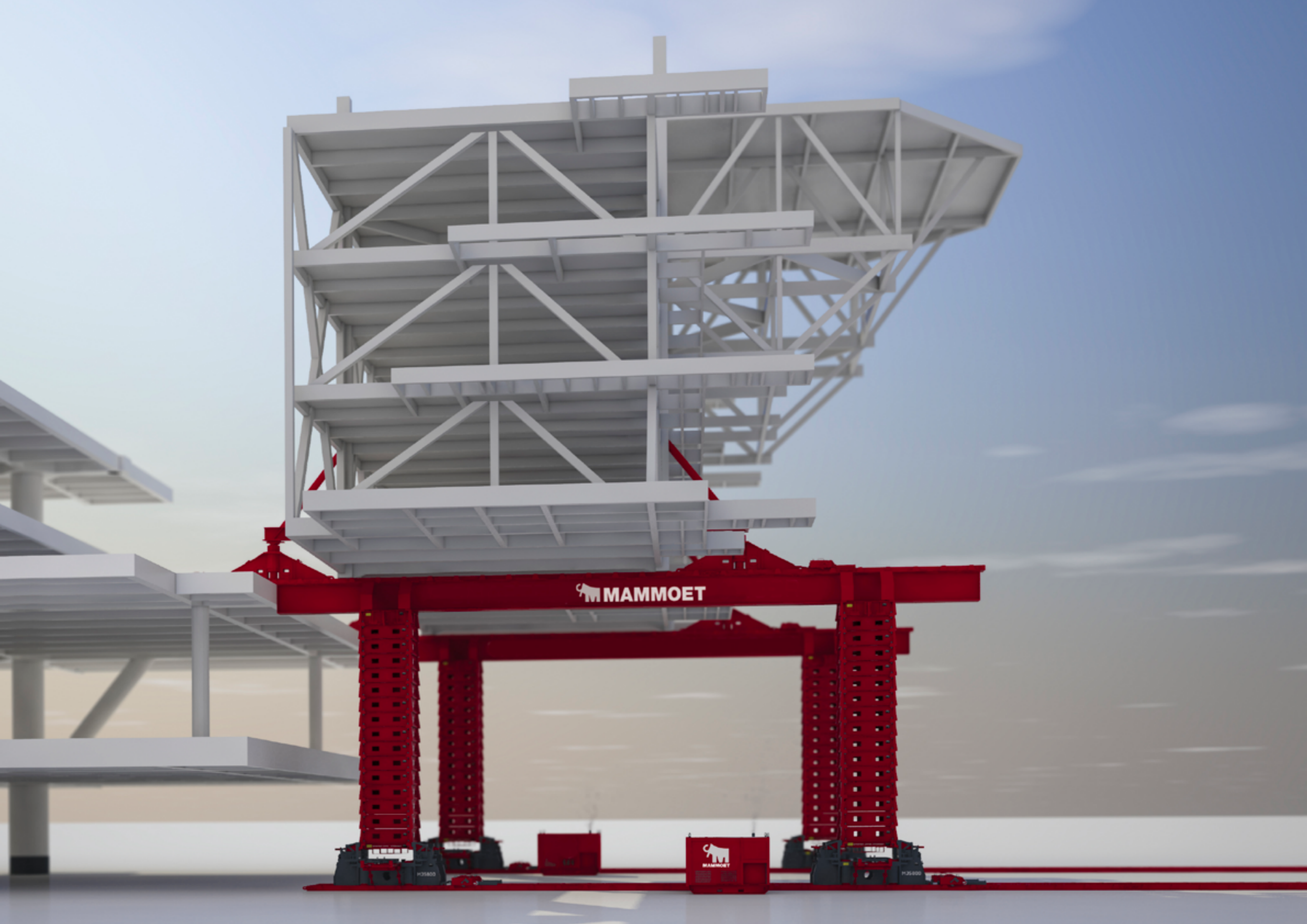
## **NO FIXED CONNECTION TO THE TOPSIDE**

Because of the stroke controlled system in the Mega Jack 800, stability is added from the base. This means that no fixed or welded connection to the topside is required.

## **THE DESIGN ACCOMMODATES FOR THE LACK OF SPACE ON WORKSITES**

The unique design has created a high capacity, more versatile system that also has a smaller footprint.

This reduces the amount of space required on-site when completing the jack-up and therefore, reduces the impact on the work that continues to operate on the site.



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H35400

H35400



# OPERATIONAL BENEFITS

## REDUCED MANPOWER REQUIRED AND INCREASED SAFETY IN ITS OPERATION

The Mega Jack 800 is a computer controlled system operated from a central control room. The remote control significantly reduces the interaction required between people and machinery. As a result, this dramatically reduces the potential safety implications

and the manpower required. Radio contact is maintained throughout and tower supervisors are appointed. All local workers are trained by Mammoet.

## REDUCED OPERATIONAL TIME

The Mega Jack 800 does not compromise on time efficiency. In fact, the Mega Jack 800 system has proven to be up to

50% quicker than previous jacking equipment. Mobilisation and demobilisation time is also reduced as it can be built from ground level and does not need a crane.

## LOW ASSEMBLY HEIGHT

The Mega Jack 800 has a low assembly height for installation to maximise the amount of structures it can be used to jack-up. Due to the limited height of some structures, such as bridges, previous jacking solutions could not always be installed underneath the piece. However, the low assembly height of the Mega Jack 800 eliminates this challenge and can be built with minimal overhead space required.

## TURNKEY SOLUTIONS

The Mega Jack 800 can be integrated with current services for a complete solution on projects. By design, the Mega Jack 800 also allows for multi-application systems to create a fully integrated solution using the jacking function alongside skidding and launching systems. This means that Mammoet can offer additional techniques and services, such as bridge launching, with the same piece of equipment.

## CONTAINERISED

The Mega Jack 800 is containerised in every aspect of the design. All components have been designed and built to fit into standard ISO shipping containers to ensure that the shipment of the system is as time and cost effective as possible for the client. This also means that the system can be available globally.

## SAFETY FEATURES & THE FUTURE

### SAFETY FEATURES

The Mega Jack 800 has been designed in accordance with the most stringent safety regulations. To gain third party approvals, every stage was checked, witnessed and approved by globally recognised independent surveyors. Using these strict criteria ensures the very highest standards of design and fabrication.

The Mega Jack 800 was designed with safety in mind and also provides the benefit of reducing the need to work at height, as the structures can be jacked-up from a low assembly height and the jacking process

is controlled and monitored by a computer system where weights, centre of gravity, height and jacking levels can be monitored.

#### **BACKUP OPERATING SYSTEMS**

Mammoet engineers have equipped the Mega Jack 800 with primary, secondary and emergency backup systems in critical areas. The central control room provides crucial monitoring systems during the project execution to oversee and ensure precision and accuracy.

#### **THE FUTURE**

Mammoet's R&D facility continues to focus on improving current equipment and creating new solutions for the industry. Having a dedicated development facility gives our highly skilled engineers a platform from which to push the boundaries of design. With this expertise and a close working relationship with our clients, we have gained a comprehensive understanding of the market to develop equipment to meet both current and future demand. Mammoet is committed to proactively meeting the needs of our clients. Our foundations are not built as an equipment rental company, we actively develop solutions to challenges faced by clients and solve them through innovation.

The Mega Jack 800 beams have the potential to be used for float-ins as well as skidding and bridge launching. In combination with our equipment in the Innovation Series system we will break further industry records. In this way, Mammoet is initiating and leading improvements across many industry sectors throughout the world.

#### **ENGINEERING AND FEED SUPPORT**

Our experience and pedigree in innovative engineering means we're well equipped to support the process of project development in early engineering and FEED. Mammoet has contributed to many high profile projects at the forefront of technological innovation. In the long term we will continue to meet the industry's ever-changing demands and improving safety standards. In the short term we are able to adapt as the scope of each project becomes more defined. We work closely with our clients from the very earliest stages, providing engineering advice to establish exactly what is required.

We believe that working through complex technical and logistical issues at the outset helps to eliminate expensive changes later.



# CASE STUDIES



**EXCHANGE OF THE LOENERSLOOTSE BRIDGE OVER THE AMSTERDAM-RIJN CANAL, THE NETHERLANDS**



**JACKING OF THREE STS CRANES, SPAIN**



**JACK-UP AND MATING OF MODULES, NORWAY**





# BRIDGE OVER THE AMSTERDAM-RIJN CANAL

## EXCHANGE OF THE LOENERSLOOTSE BRIDGE OVER THE AMSTERDAM-RIJN CANAL, THE NETHERLANDS

Mammoet has successfully completed the load-out, transportation and installation of the new 1,570t Loenersloote Bridge over the Amsterdam-Rijn canal in Nigtevecht, and the removal of the old bridge which weighed 1,630t. This achievement marked the first time that Mammoet utilised its latest design innovation, the Mega Jack 800. This project to exchange the Loenersloote Bridge was undertaken in a number of phases and involved the use of climbing jacks,

SPMT trailers, barges, the Mega Jack 800, strand jacks, a heavy skid system, and 700t/500t mobile cranes.

**PHASE 1** saw the load-out of the 1,050t, 124m long arch bridge onto a 66m x 19m barge, using 44 axle lines of SPMT.

**PHASE 2** involved the site move and connection of two 20m approach spans to the arch bridge. LTM1500 and AC700 cranes were used to install the approach spans which extended the bridge to a length of 144.6m and increased its weight to 1,250t.

**PHASE 3** included the removal of the arch of the bridge with Mammoet undertaking the transportation of the bridge deck and arch to the assembly location. The bridge deck was transported approximately 120km to Nigtevecht on three connected barges, and the bridge arch was transported by an inland vessel.

**PHASE 4** saw the assembly of the bridge arch at Nigtevecht, a process which used LTM1400 and LTM1500 cranes to lift the arch off the vessel. This vessel was then removed and the bridge deck was positioned underneath the arch.

**PHASE 5** used the Mega Jack 800 to jack-up the 1,250t bridge to 9m from the barge deck. The Mega Jack 800 is made up of jacking towers, each with a capacity of 800t, and has been designed by Mammoet to be totally scalable to accommodate a wide variety of projects.

**PHASE 6** involved using a 10m high and 50m long gantry system over the rail track

to remove the old Loenerslootse Bridge approach span, which weighed 430t. On top of the gantry, a skidding frame was installed to support the four 200t strand jacks. The old bridge approach span was then transported using 20 axle lines of SPMT in phase 7 of the project.

The remaining phases 8, 9 and 10 saw the removal of the old bridge and the installation of the new one in a highly efficient operation which took just 7.55 hours. During this time there were 2 x 4 hour periods when the canal was closed for inland navigation. After the first 4 hours when the old bridge was removed, the canal was opened for 2 hours to allow passage for the ships that were waiting.

The transportation of the new 330t bridge approach span used 20 axle lines of SPMT. The jack-down of the old bridge to demolition height again made use of the versatile Mega Jack 800.



# JACKING OF THREE STS CRANES, SPAIN

**Mammoet has completed the jacking of three STS cranes by 6.3m each at the TCB terminal in the Port of Barcelona for the client, Kalmar. The cranes weighed 1,433t each. This was the first time Mammoet's award-winning Mega Jack 800, has been used in Spain.**

Each manoeuvre was carried out one at a time and was the same for all three cranes. The upper part of the cranes were jacked using the jacking points in the modular beams.

The cranes were jacked in 12 stages and at each stage were raised by 560mm. The crane reached a total height of 6.3m to allow for the 6m leg extensions to be installed.

The distance between the rails of the cranes were 30.480mm and the loads lifted in each leg ranged from 302t to 437t, which amounted to a combined total of 1,433t.

The Mega Jack 800 system was used alongside a gantry support measuring 20.5mm x 20.6mm x 16.5mm installed on four towers with four integrated hydraulic jacks each with 620mm stroke and 800t capacity per tower.



# JACK-UP AND MATING OF MODULES, NORWAY

**Mammoet has jacked-up a Living Quarter (LQ) module, weighing 1,000t, and mated it to a lower module, weighing 600t, in Norway.**

This is the first time the Mega Jack 800 has been used in Norway and in the oil and gas sector. The jack-up operation was prepared in several stages; firstly, the base units were positioned onto skates and manoeuvred into position before jacking down using hand jacks. Function tests were then carried out before the jack-up operation could begin.

In parallel to the preparation of the Mega Jack 800, 72 axle lines of SPMT were mobilised for transportation of the lower module.

The upper module was jacked-up using the Mega Jack 800 four cassettes high, then to 20 cassettes high at a rate of 4 cassettes per hour up to 13m – the highest – ever jack-up operation performed so far by the Mega Jack 800. The locking cassette was then inserted.

The lower modules were then transported from the manufacturing area outside to the load-out quay using the 72 axle lines of SPMT. The modules were then mated by driving the lower module under the upper module, aligning it with SPMT and jacking-down the upper module onto the lower module. The combined module, weighing 1,600t, was placed onto support stands using SPMT.

The Mega Jack 800 was then jacked-down empty and demobilised, along with the SPMTs.

The entire operation took ten days in total from mobilisation to demobilisation, with the jack-up operation taking only five hours.



**MAMMOET HAS OVER 140 OFFICES AND BRANCHES WORLDWIDE.**

Below are the Mammoet regional head offices on each continent. To contact an office near you, please visit [www.mammoet.com/contact](http://www.mammoet.com/contact) and select 'Find an office'.



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