

3D MOTION COMPENSATED **PLATFORM**

BM-T700



BARGE MASTER

INCREASED SAFETY
AND WORKABILITY
WHILE REDUCING
COSTS OF OFFSHORE
OPERATIONS

GUARANTEED UPTIME



BARGE MASTER T700

The BM-T700 is a modular 3D motion compensated multi purpose platform with a payload capacity of 700 mT, for example able to accommodate for a crane or a drillrig. The platform compensates vessel motions up to a significant wave height of 2.5 meters. It consists of containerized units which can easily be transported and assembled. The platform can be placed on any barge or vessel and significantly increases the uptime of many offshore operations.

Barge Master currently has two BM-T700 motion compensation systems in operation. In this document we present a brief summary of some of our recent projects and possible applications. More information about these and other projects is available on request.

SAFER



QUICKER



LOW COST



**3D motion compensated
platform BM-T700**





Motion Compensated Crane for Drilling



Motion Compensated Large Diameter Drilling with the BM-T700

3D MOTION COMPENSATED SUBSEA DRILLING

OFFSHORE WIND PROJECT

"This operation is a perfect example of the maturity that our motion compensation technology has reached. Our systems can operate 24/7 non-stop without a single hitch"

Martijn Koppert - CEO of Barge Master

Barge Master provided a new solution for subsea drilling from a floating barge. Something that has never been done before and not been possible without Barge Masters 3D motion compensation platform. The new 3D compensated drill rig has been used recently for WTG foundation installation by Boskalis.

Large water depths, challenging soil conditions and an environmentally sensitive seabed made a floating solution the preferred option for the drilling operation. A team of engineers from Boskalis, DDC and Barge Master developed a modular set up for this delicate subsea drilling job. The modular solution consists of a standard barge outfitted with a Barge Masters T700 motion compensation platform. The stabilized platform accommodates a drill rig, extended over the aft of the barge, and a crawler crane. The entire setup was rapidly mobilized within 2 weeks, including project engineering and project specific steel construction.

By compensating the 3D motions of the barge the drill rig operations could continue throughout the winter irrespective of waves and swell. The 70mT weighing drill bit was precisely lowered and positioned by the 3D compensated crawler crane, swing of the drill and drill pipe were completely eliminated. Consequently, 70 meter of drill string was lifted on and off the barge's deck using the onboard lifting mode. Once the drilling starts the rig is kept perfectly steady at all times, as any motion can result in damage to the drilling equipment or, even worse, the foundation pile.

The motion compensated drilling platform and sub sea drill made this 24/7 non-stop drilling operation very cost efficient and above all safe!

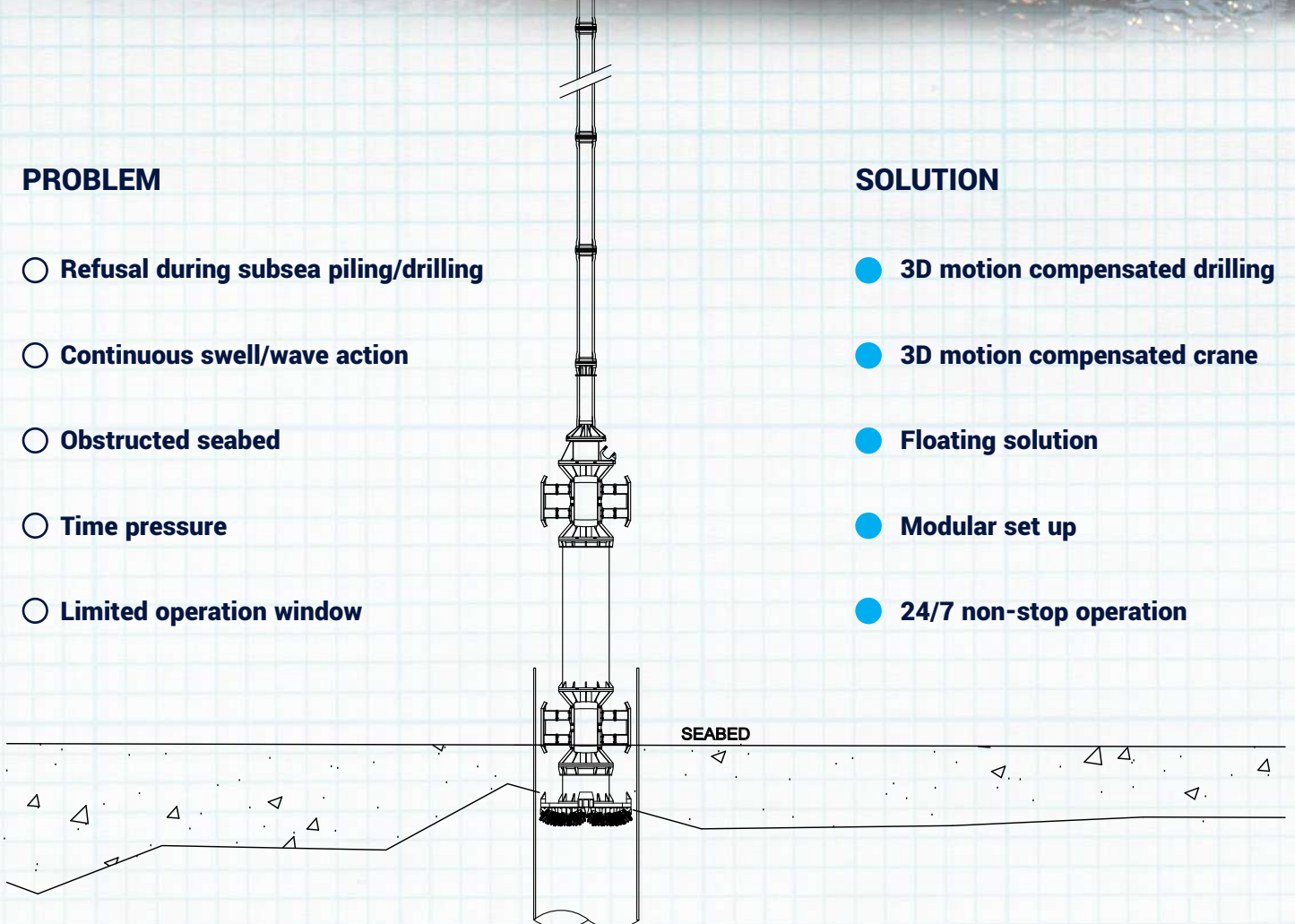


PROBLEM

- Refusal during subsea piling/drilling
- Continuous swell/wave action
- Obstructed seabed
- Time pressure
- Limited operation window

SOLUTION

- 3D motion compensated drilling
- 3D motion compensated crane
- Floating solution
- Modular set up
- 24/7 non-stop operation





PROBLEM

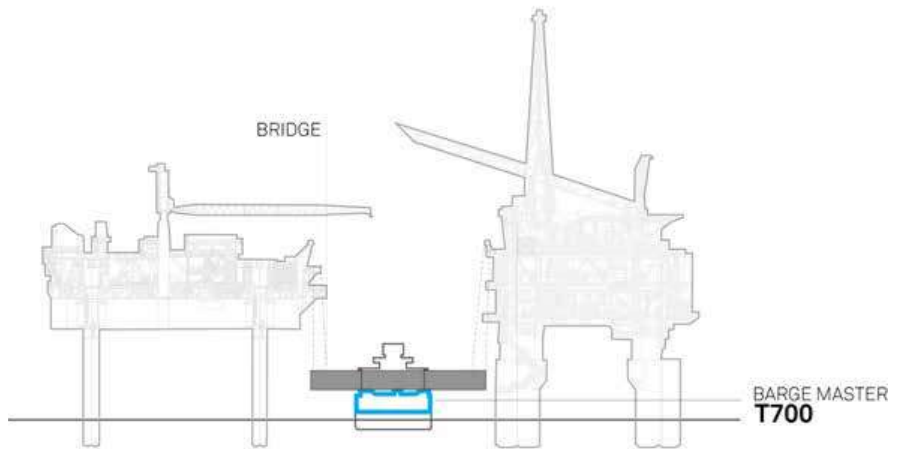
- Live LNG platform
- Short operation/shutdown window
- Obstructed seabed
- Continuous wave and swell
- Expensive heavy lift vessels

SOLUTION

- 3D motion compensated platform
- Guaranteed uptime
- Floating setup
- Contractors own vessel
- Low cost

PIPING BRIDGE INSTALLATION

MALAMPAYA GAS FIELD



For a safe and controlled lifting operation of a 300mT piping bridge between a gas platform and a depletion compression platform of Shell Philippines Exploration B.V., Boskalis used the BM-T700 in their Malampaya project in the first half of 2015.

Positioned at the aft of their multi-purpose vessel *Ndeavor*, the BM-T700 compensated for the sea induced motions, enabling the safe connection of the lifting arrangement from the platforms to the piping bridge. The Barge Master kept the piping bridge steady which enabled gently lifting of the piping bridge, with minimal shut down period of the Malampaya gas field.

Installation without the Barge Master at this location would be extremely difficult and uncertain due to the wave conditions and the seabed conditions.



GUARANTEED UPTIME

Figures: BM-T700 installed on the aft of the Boskalis' vessel 'Ndeavor', ready for the installation of a permanent 300mT piping bridge to be installed in between two Shell gas platforms in the Malampaya field (Republic of the Philippines). The permanent bridge was loaded onto the Barge Master platform in the Philippines and sailed out to the project location. Once on site, the bridge was stabilized by the Barge Master in order to be lifted off safely by temporarily installed lifting arrangements.



APPLICATIONS

Guaranteed uptime is provided with the 3D motion compensated platform T700. The modular system can be mobilized on any kind of vessel or barge. It can be used for a numerous amount of applications, offering a stable, floating platform which can operate independent from swell/wave action. The BM-T700 is efficiently transported around the globe in a containerized way.



OFFSHORE WIND



OIL & GAS

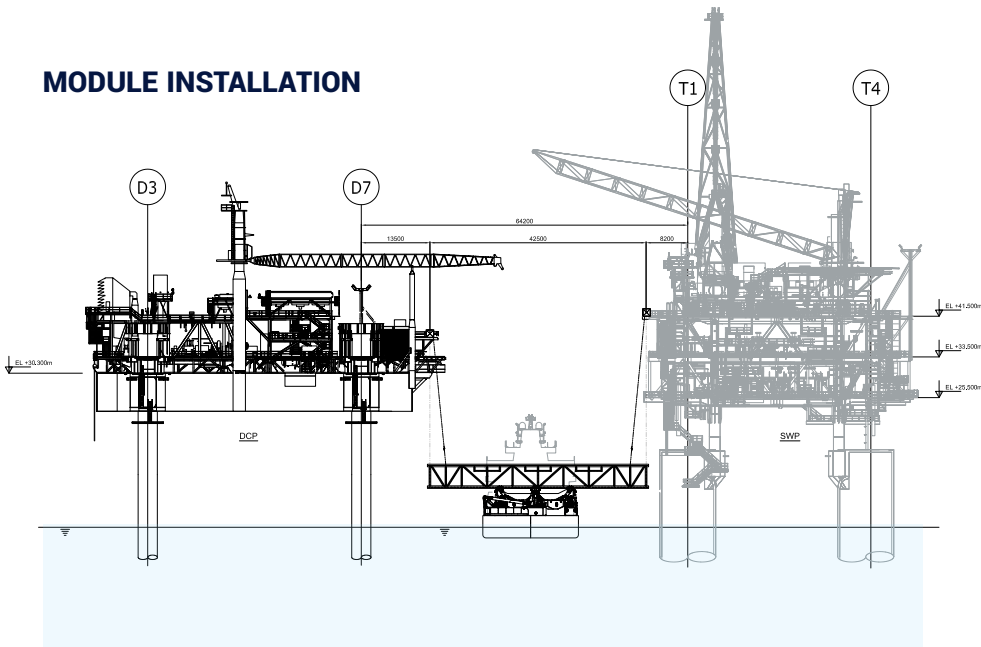


MARINE SALVAGE

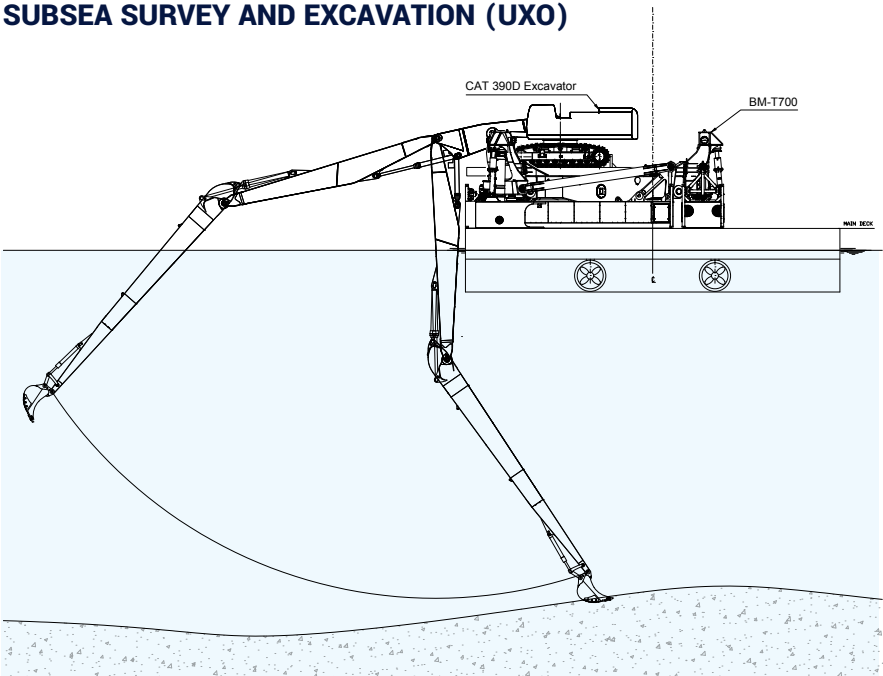


HEAVY CIVIL

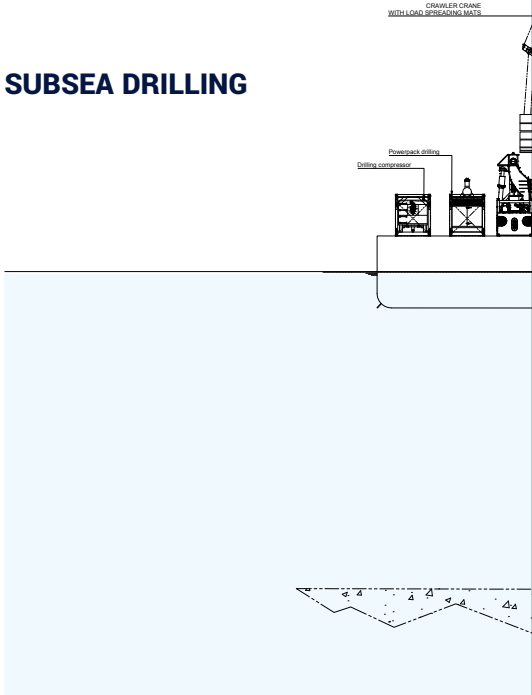
MODULE INSTALLATION



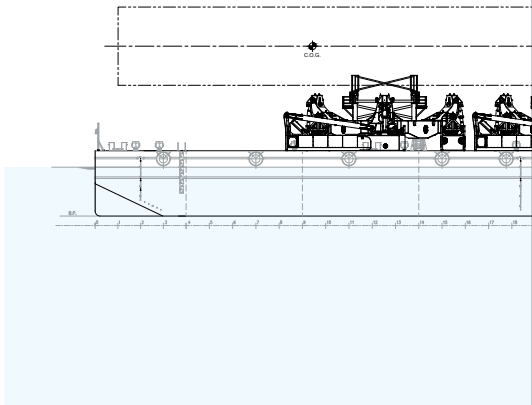
SUBSEA SURVEY AND EXCAVATION (UXO)



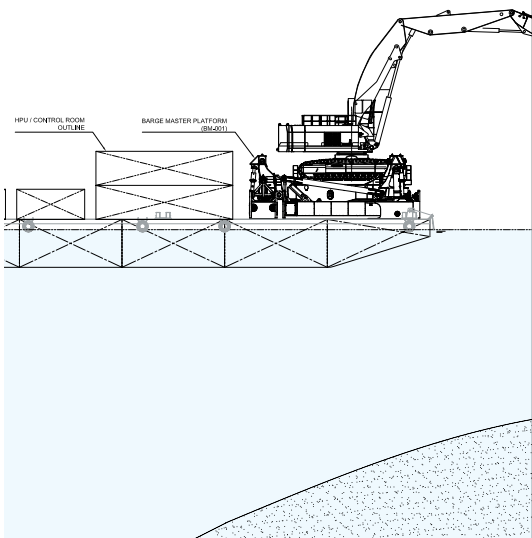
SUBSEA DRILLING

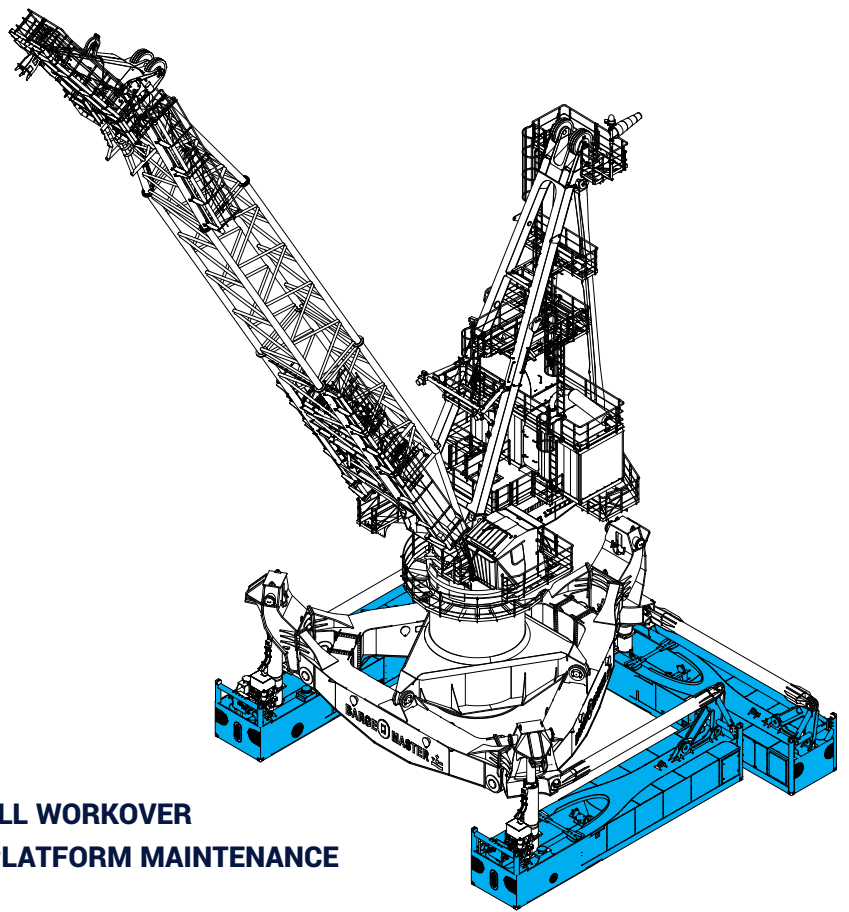
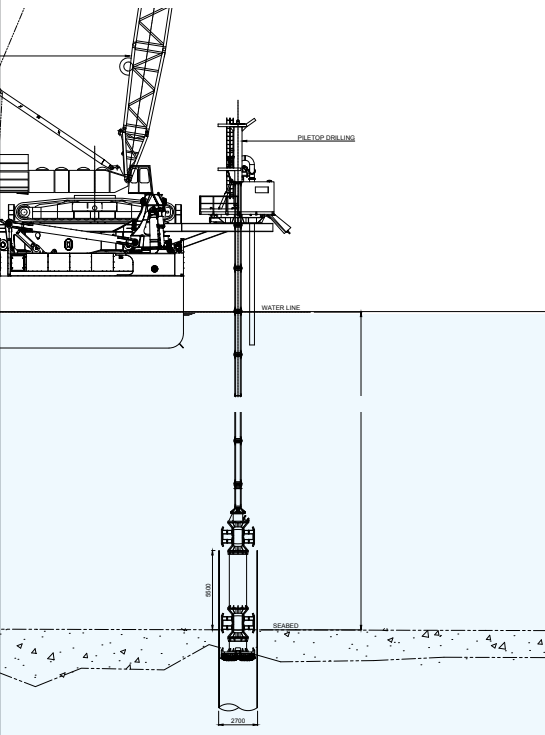


WIND FARM FEEDER

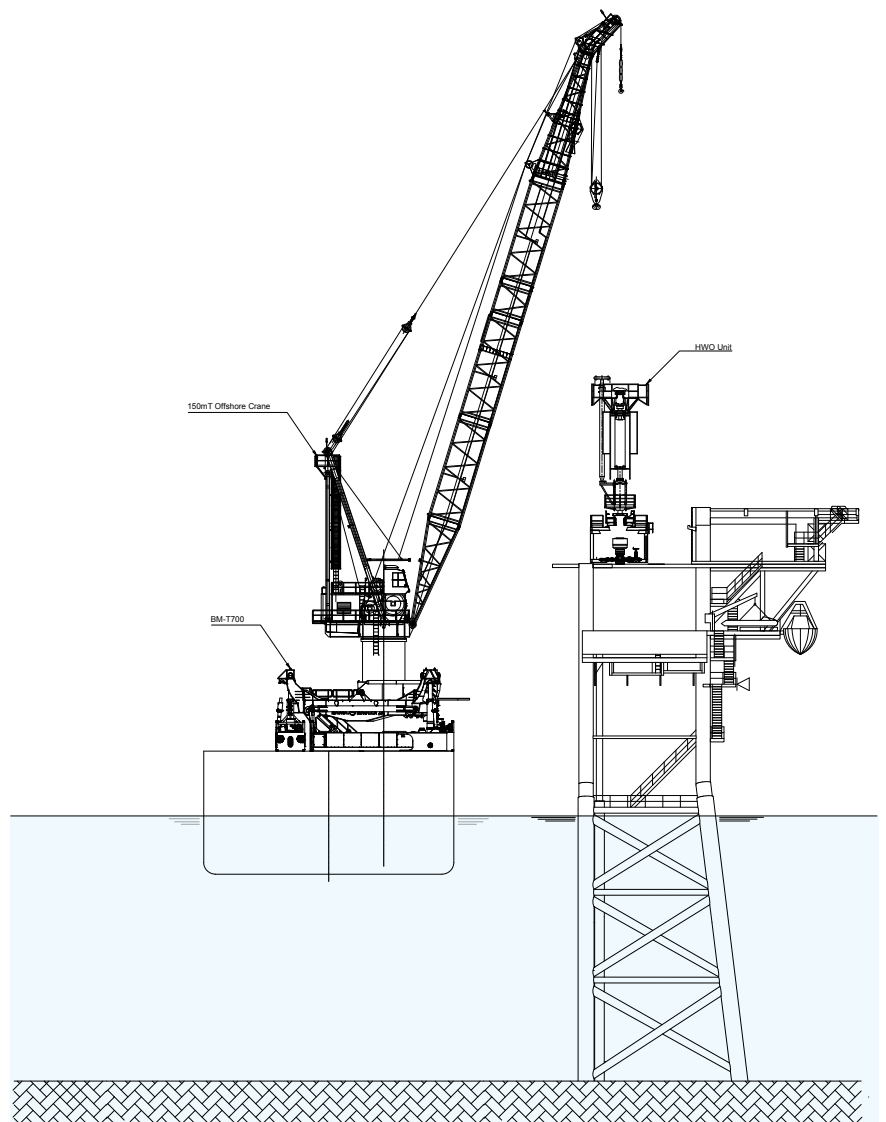
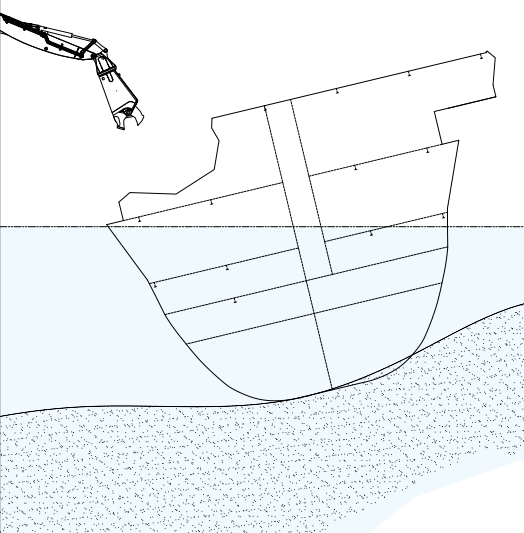
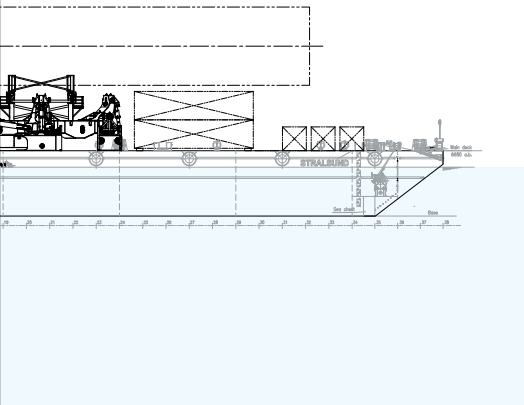


SALVAGE/DEMOLITION





WELL WORKOVER & PLATFORM MAINTENANCE

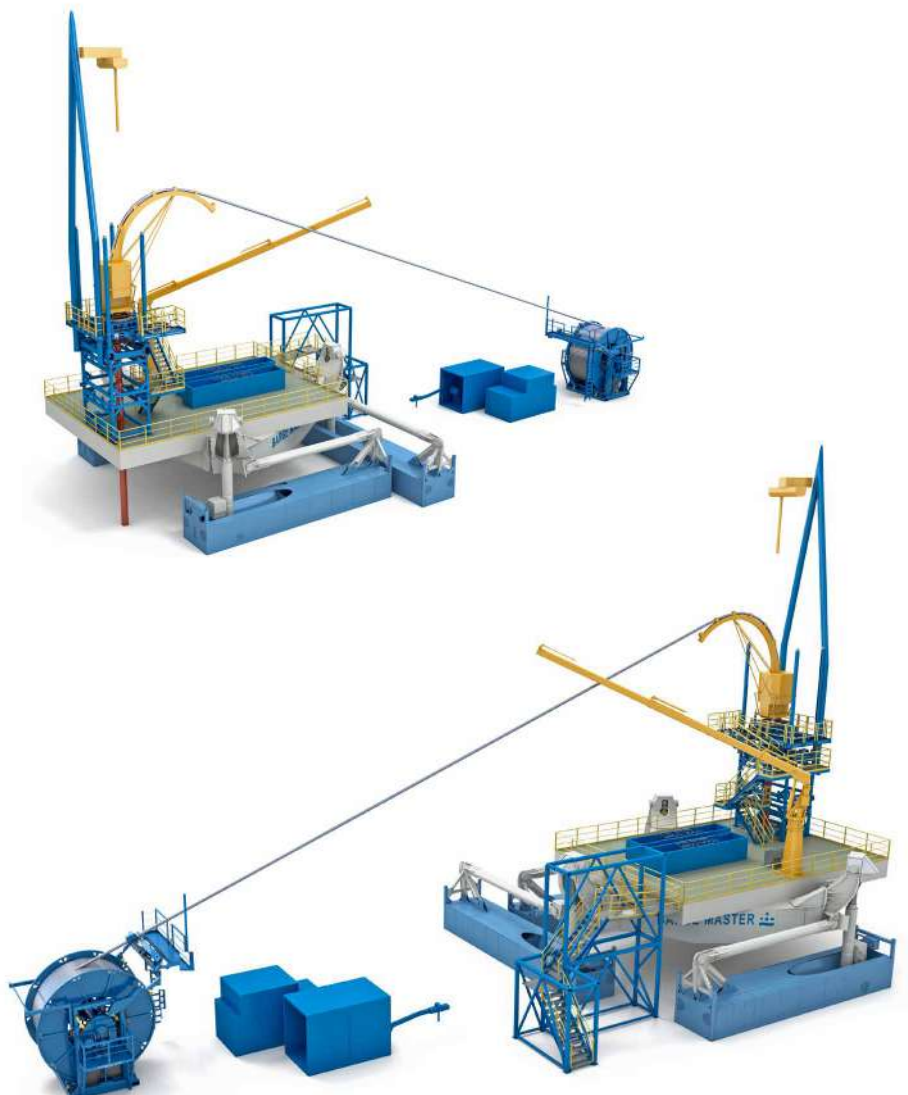




WELL WORKOVER

DEVELOPED WITH DWELLOP

Barge Master has realized how intelligent field development will change the well intervention market by enabling new methods on how coiled tubing, wire line and eline can be utilized across advanced fields. Motion Compensation Guarantees uptime and makes lead times predictable. The consequence is that the operations can be safely performed at a minimum total cost.



D/WELLOP



Conventional accommodation barge

Low workability: long crane boom causes swinging load

Fast mobilization, independent of water depth

Low day rate

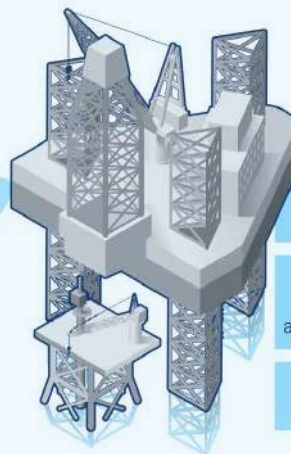


Jack-up rig

High mobilization and day rates

Limited by water depth, soil conditions and subsea obstructions

Often oversized for well intervention work

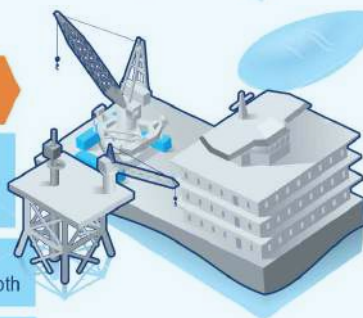


Barge with motion compensated crane

High workability: stabilised crane, hook and load

Fast mobilization, independent of water depth

Low day rate

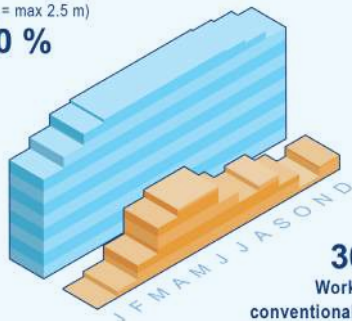


RIGLESS WELL INTERVENTION

CASE STUDY

Workability barge with BM-T700
($H_s = \max 2.5 \text{ m}$)

90 %



30 %

Workability conventional barge
($H_s = \max 0.8 \text{ m}$)

Accelerate your project

Barge with BM-T700 ($H_s < 2.5 \text{ m}$)

100 day job 10% waiting on the weather

111 days actual rental period

Jack-up rig ($H_s < 2.5 \text{ m}$)

100 day job 10% waiting on the weather

111 days actual rental period

Conventional tender barge ($H_s < 0.8 \text{ m}$)

100 day job 70% waiting on the weather

333 days actual rental period



HWO

Hydraulic Workover Unit



CTU

Coiled Tubing Unit

	Barge with BM-T700	Jack-up rig	Conventional barge
Daily costs*	€ 100.000	€ 250.000	€ 90.000
Actual rental period	111 days	111 days	333 days
Total costs per job	€ 11.100.000	€ 27.750.000	€ 29.970.000
Savings with Barge Master		€ 16.650.000...	€ 18.870.000
Cost efficiency improvement		250 %	270 %

*) vessel + crew + equipment



Safety

- No swinging loads while lifting
- Low risk operations
- BM-T700 is man-riding certified



Efficiency

- No waiting on weather
- Use locally sourced vessel / barge with any type of crane
- Same setup can be used for platform maintenance



Reliability

- Fast and predicable offshore operations
- Controlled well shutdown period
- Workability of 300+ days a year on average worldwide

WIND FARM FEEDER



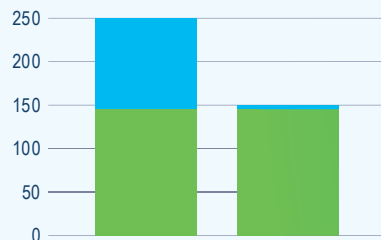
DEVELOPED WITH CFL

The learning curve for the installation of offshore turbines is quite steep; turbines are getting bigger and placed further offshore. In cooperation with CFL, Barge Master has developed the feeder concept for monopiles. The jack-up can do what it does best: installing monopiles and does NOT have to sail up and down to the pickup location, losing valuable time and money. Even further reductions are possible by directly feeding from the fabricator.

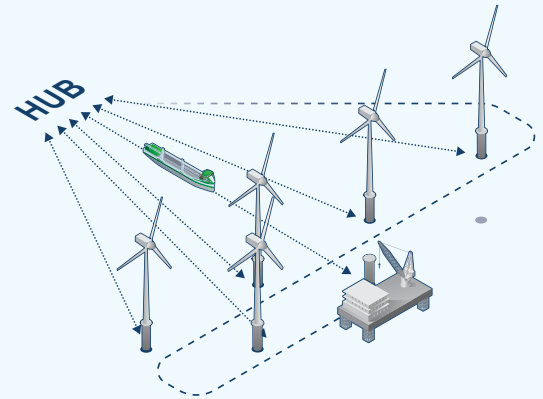
CASE STUDY

Installation of 150 offshore wind turbine foundations

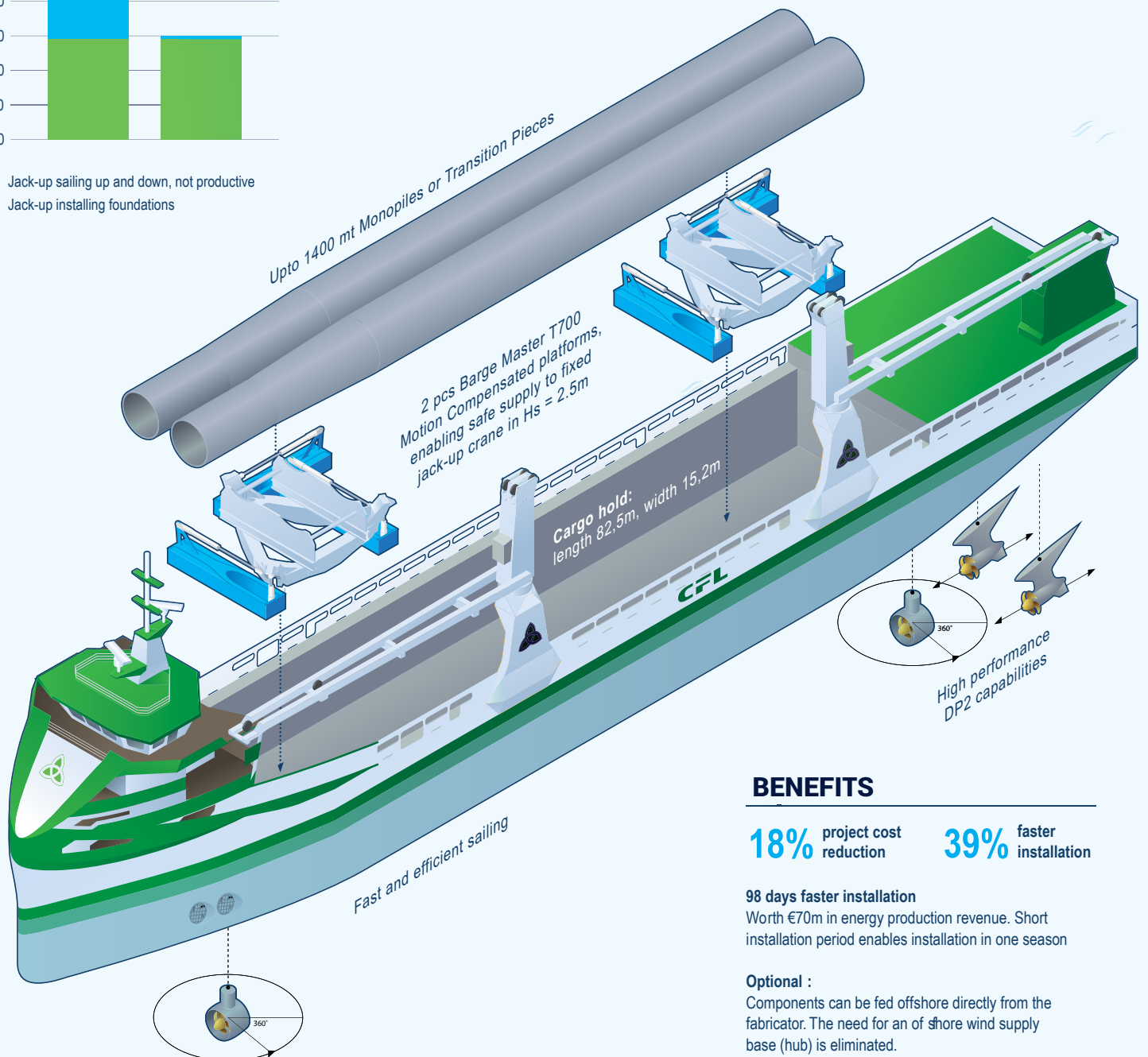
Required days for foundation installation



■ Jack-up sailing up and down, not productive
■ Jack-up installing foundations



Efficient wind farm installation by continuous supply of components to installation jack-up



BENEFITS

18% project cost reduction

39% faster installation

98 days faster installation

Worth €70m in energy production revenue. Short installation period enables installation in one season

Optional :

Components can be fed offshore directly from the fabricator. The need for an of shore wind supply base (hub) is eliminated.



WELL INTERVENTION & ABANDONMENT

DEVELOPED WITH WELLGEAR



Together with Barge Master's 3D motion compensated crane the Hydraulic Workover Unit will arrive pre-assembled to your platform and lifted onto the platform as a single lift once the BOP's are installed. The HWU will be electrical/hydraulically driven with power supply from the vessel. This 200mT HWU has a 36" bore, power swivel and can be equipped with a pinning & cutting package for conductor removal. The fluid package such as pumps and tanks will be located on the vessel saving valuable deck space, time and costs.

This Barge Master application is the ideal solution for quick interventions on relatively small platforms where space, crane capacity and deck loading is critical.



WellGear



MOBILIZATION

The modular Barge Master T700 is fully containerized. Therefore costs of transportation and mobilization are kept to a minimum. The system can be transported worldwide, where it can be placed on a local vessel or barge and equipped with a local crane or other equipment.

The mobilization itself is very quick due to the modular setup.

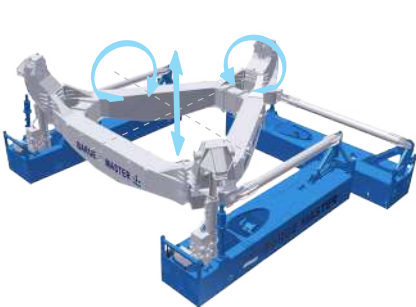




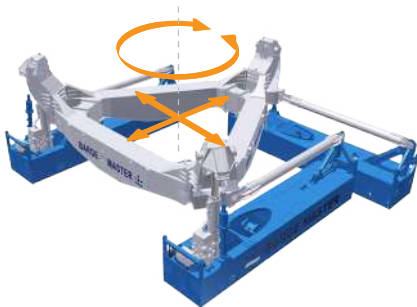
SPECIFICATIONS

TECHNOLOGY

The BM-T700 measures vessel motions and actively compensates roll, pitch and heave motions by means of three hydraulic cylinders. The surge, sway and yaw of the vessel can already be constrained by either dynamic positioning or traditional anchor systems.

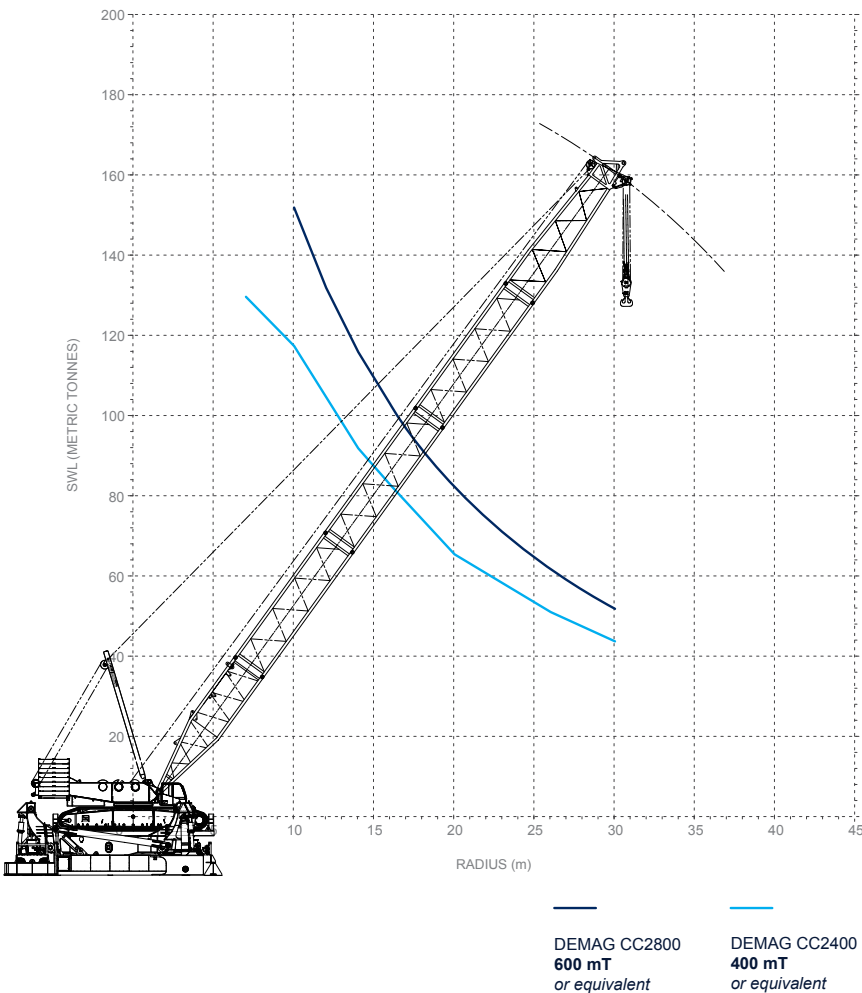


Compensated motions

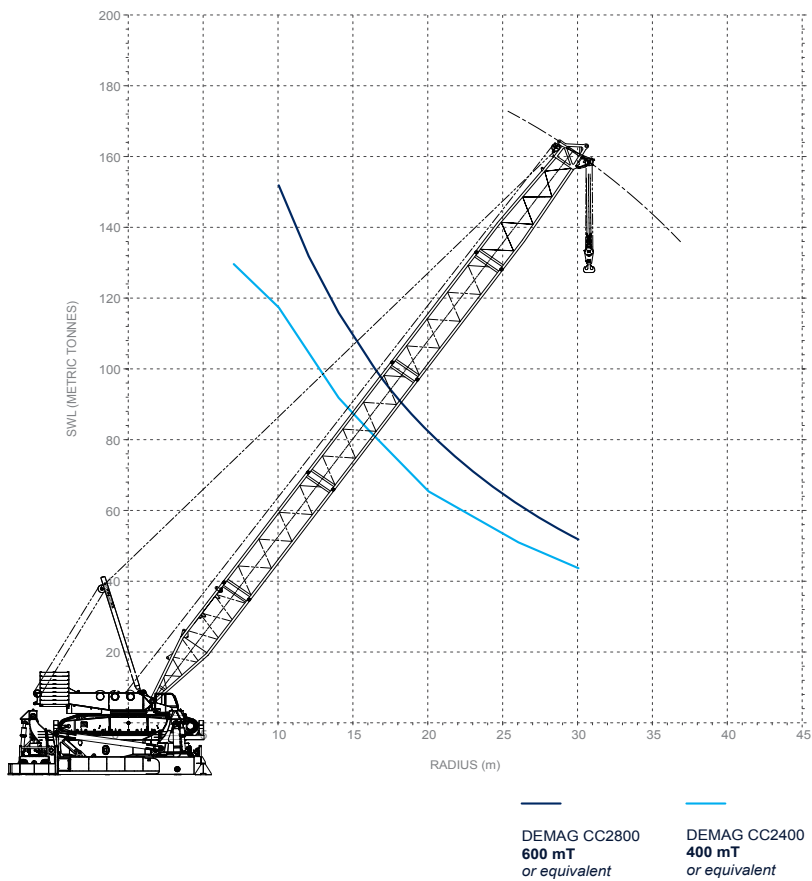


Constrained motions

LOAD CHART

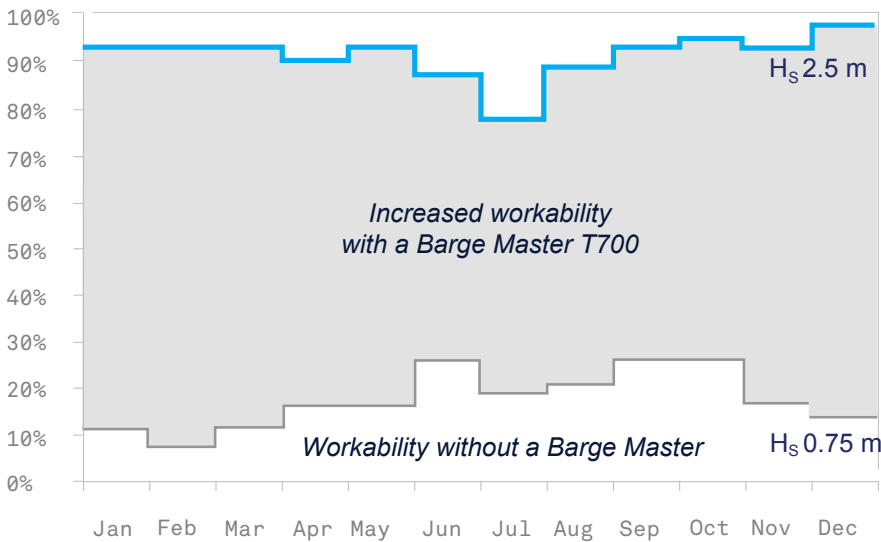


5 HOUR COMPENSATION EXAMPLE



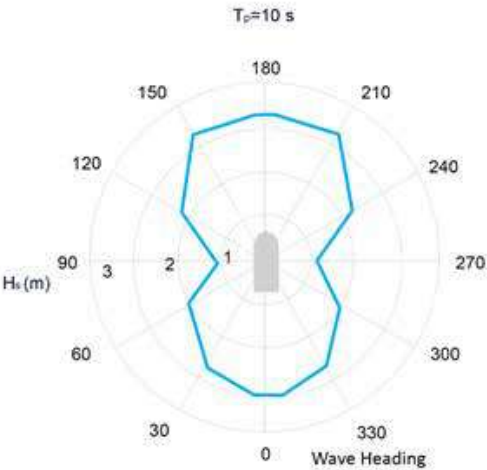
The BM-T700 provides a steady platform from which equipment can operate, or can be the stable,

INCREASED WORKABILITY



Typical workability increase for lifting operations with a Barge Master T700

OPERATIONAL ENVELOPE



GENERAL

Crane capacity	160 mT at 12 m
Platform payload capacity	700 mT

COMPENSATION

Wave height	$H_s\text{ } 0 - 2.5\text{ m}$
Wave period	4 - 18 s
Heave, roll and pitch motions	95%
Onboard lifting functionality	

FOOTPRINT DIMENSIONS

Foundation footprint	18.3 x 15.1 m
Control room and HPU	12 x 2.5 m
Platform working area	12 x 12 m

WEIGHT

Platform and foundation	270 mT
Control room and HPU	63 mT

CERTIFICATION



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GOLIATH

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