

# MOTION COMPENSATED PILE GRIPPER



## THE INNOVATION



The offshore wind market is developing at a high pace. Turbines are placed further offshore and their energy output becomes ever higher. The monopile foundations follow these trends and gradually become longer and heavier.

Currently the majority of foundations are installed by jack-up barges. However, most existing jack-up barges do not have sufficient jacking and crane capacities to efficiently install the XL-monopiles of future wind farms.

Floating installation vessels allow higher pay-loads and crane capacities than jack-up barges. However, due to wave-induced vessel motions and strict monopile verticality tolerances, current floating solutions offer limited workability and are therefore time consuming and expensive.

Being able to install XL monopiles with a floating vessel, without giving in on workability, reduces the cost of monopile installations up to 40%. The Motion Compensated Pile Gripper, as developed by TWD and Barge Master, opens the door to these significant savings and further secures the promising future of offshore wind.

## ADVANTAGES

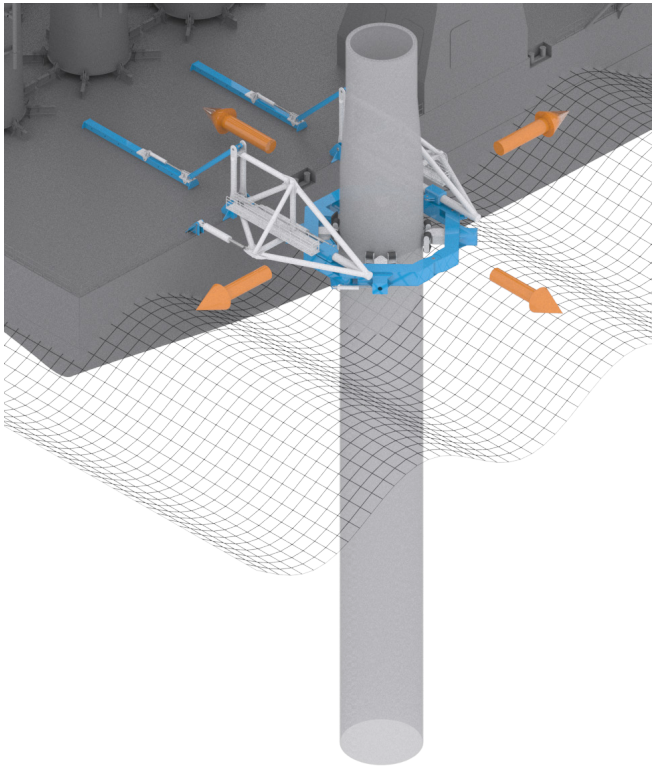


### FLOATING INSTALLATION OFFERS:

- **FASTER INSTALLATION** WITHOUT JACKING
- **INCREASED DECK SPACE** COMPARED TO JACK-UPS
- **INCREASED PAY-LOAD** COMPARED TO JACK-UPS
- **LOWER DAY-RATES** COMPARED TO JACK-UPS
- **INDEPENDENCY OF WATER DEPTH AND SOIL CONDITIONS**

### FURTHERMORE, THE MOTION COMPENSATED PILE GRIPPER OFFERS:

- **AN INCREASED WORKABILITY** COMPARED TO OTHER FLOATING SOLUTIONS
- A SOLUTION APPLICABLE TO BOTH **MOORED AND DP VESSELS**
- A SOLUTION APPLICABLE TO **EXISTING HEAVY LIFT VESSELS**



## SPECIFICATIONS



### GENERAL

- TAILOR MADE, INTEGRAL SOLUTION FOR PILE UPENDING, LOWERING AND PILING
- ADJUSTS PILE ORIENTATION
- COMPLETELY INBOARD DURING TRANSIT
- APPLICABLE TO EXISTING OR NEWLY BUILT HEAVY LIFT VESSELS

### COMPENSATION

- SIGNIFICANT WAVE HEIGHT      HS 0 TO 2.5 m
- MOTION ENVELOPE (HORIZONTAL PLANE)      +/- 3.5 m
- SURGE & SWAY MOTION COMPENSATION      95%
- PILE VERTICALITY      < 0.2°

### PILE DIMENSIONS

- PILE WEIGHT      2.000 t
- PILE LENGTH      100 m
- PILE DIAMETER      7 - 10 m

## THE METHOD

The motion compensated gripper is used during different stages of the piling operation. While lowering the pile, the gripper is used to control possible monopile oscillations.

Subsequently, during pile driving, the gripper is used to hold the pile vertical. At this stage, the pile inclination and vessel movements are continuously measured. These signals are used as input to control four hydraulic actuators: two rotating the gripper arms and two sliding the gripper ring in and out. This allows the gripper to efficiently compensate the disturbing vessel motions in surge and sway direction and hold the monopile perfectly straight.

## GET IN TOUCH

### TEMPORARY WORKS DESIGN

T +31 10 2940 374  
 W [www.twd.nl](http://www.twd.nl)  
 E [info@twd.nl](mailto:info@twd.nl)

Rotterdam Science Tower - Marconistraat 16  
 3029 AK Rotterdam  
 The Netherlands

