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MENCK

Photo: courtesy of DOTI 2009

alpha ventus Wind Farm

Launching the German offshore wind industry is alpha ventus a test bed for several new technologies, such as new 5 MW turbines, new foundation types for wind, such as tripods and jackets and underwater pile driving noise mitigation.

MENCK was trusted to drive the foundations for the complete project: 6 tripod foundations and 6 jacket foundations in 30 m water depth in the North Sea. High winds and strong currents created a challenge to install the piles which was solved by shortening the pile sleeve.

On the last tripod, MENCK successfully tested the underwater noise mitigation concept "little bubble curtain" where an air bubble curtain surrounded the pile. An installation and design concept from the Oil and Gas industry called "preinstalled piles" was adapted for use on jacket foundations of the 5 MW REpower turbines. Here a template was lowered into position and affixed to the seabed. All four foundation piles are driven and the template removed. The jacket is then lowered onto the "preinstalled piles" and grouted, simplifying installation procedures and structure design.

Project name	alpha ventus – tripod	alpha ventus – jacket
End customer	DOTI – EWE AG, E.ON Climate & Renewables GmbH, Vattenfall Europe Windkraft GmbH	
Contractor	Multibrud Areva	NorWind AS
Location	45 km north of Borkum, Germany	45 km north of Borkum, Germany
Turbines	6 x 5 MW – M5000-Multibrud	6 x 5 MW – 5M-REpower
Water depth	30 m	30 m
Installation vessel	Odin	Buzzard & JB115
Structure	tripod	jacket
Quantity of piles	18	24
Pile diameter	OD 2,48 m	OD 72"
Penetration of piles	35 m	30–42 m
Number of blows per pile	ca. 5,000	ca. 3,000–4,000
Hammer	MHU 500T with 3,20 m pile sleeve with integrated ballast (S500 – backup)	MHU 500T, 72", shortened pile sleeve and ballast (MHU 800S, 96" shortened pile sleeve and ballast – backup)
Power pack	HBG 400 + HBG 220-2	MHP 1100
Mobilisation/Demobilisation by	MENCK GmbH	MENCK GmbH
Mobilisation harbour	Bremerhaven, Germany	Eemshaven, The Netherlands
Demobilisation harbour	Eemshaven, The Netherlands	Eemshaven, The Netherlands
MENCK's scope	OD 2,48 m	shortened pile sleeve
MENCK engineering	underwater noise reduction system, "little bubble curtain"	shortened pile sleeve, follower not possible due to the strong currents and wave forces on the system



"littlebubblecurtain" surrounding pile



MHU 500T driving tripod piles



Jacket to be installed onto 4 piles



3 tripods, each with 3 anchor points

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