



IHC Hydrohammer[®]

Offshore Wind Supporting Structures:
Driving and Handling Ultra Large Pile Diameters

Tim van Erkel - Area Manager Sales



The technology innovator.

IHC Merwede – Divisions/Business Units



IHC Offshore Wind



IHC Handling Systems



IHC Hydrohammer



IHC Engineering Business



IHC Sea Steel



IHC Offshore & Marine



**Vuyk Engineering
Rotterdam**

IHC Handling Systems

Pile handling equipment for the Offshore Wind Market



Mono-pile plugs



Mono-pile upending tool



IHC Hydrohammer Pile Driving Equipment for the Offshore Wind Market

IHC Hydrohammer designs, manufactures and supplies hydraulic pile driving equipment, for on- and offshore use and is known throughout the world for its innovative approach.



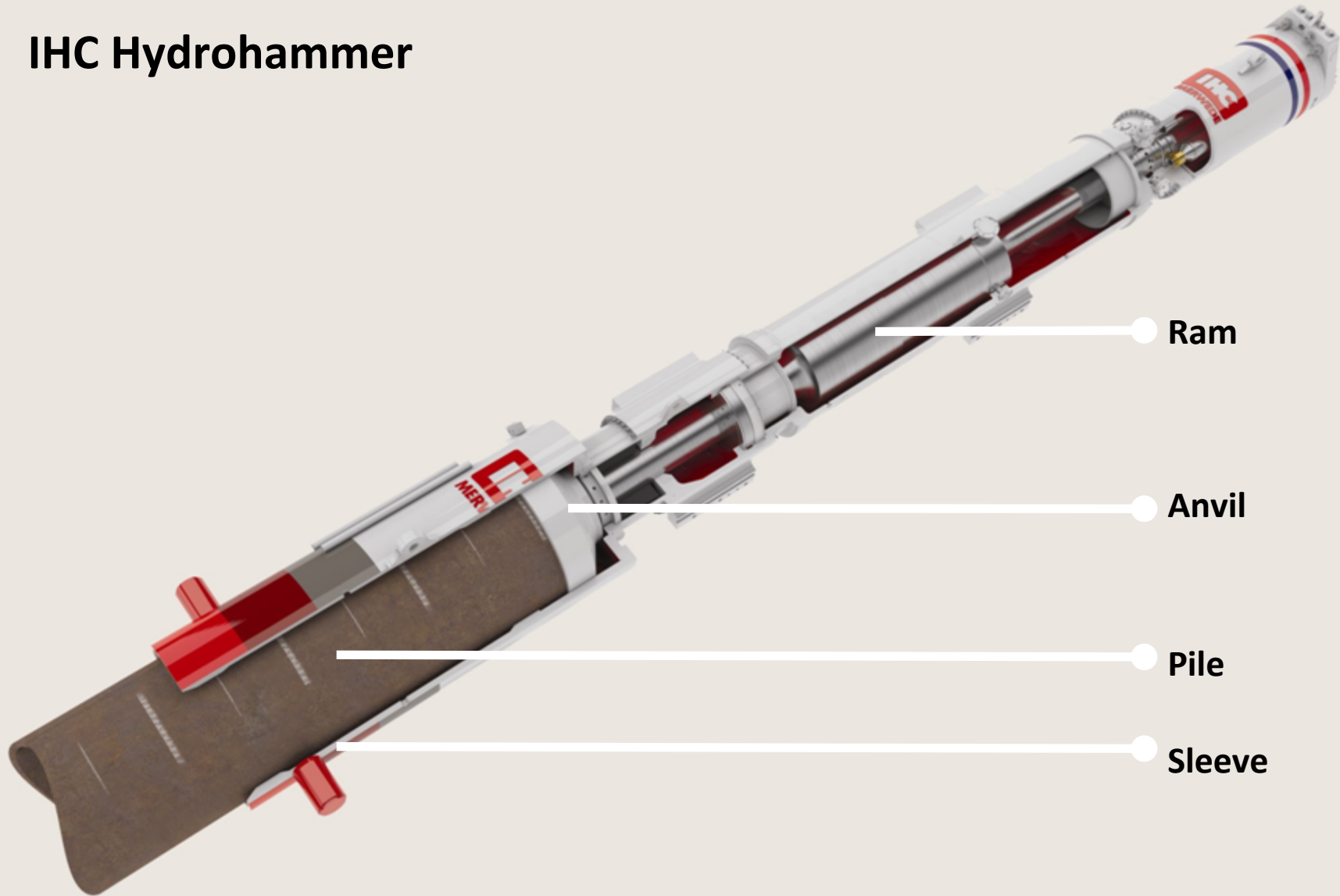
Offshore Wind Turbines are getting bigger and will be installed at great water depths.

The driven mono-pile is currently the most often used foundation type for Offshore Wind Turbines:

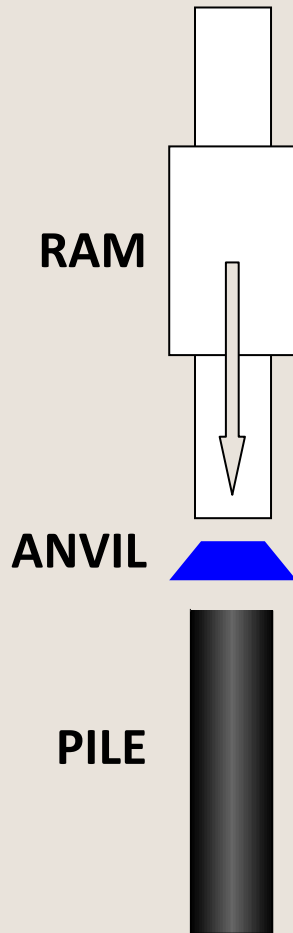
- Most cost effective**
- Proven technology**
- Logistics/mass production**

Can we extend the mono-pile concept in relation to Handling and Pile Driving Equipment for bigger turbines and greater water depths?

IHC Hydrohammer

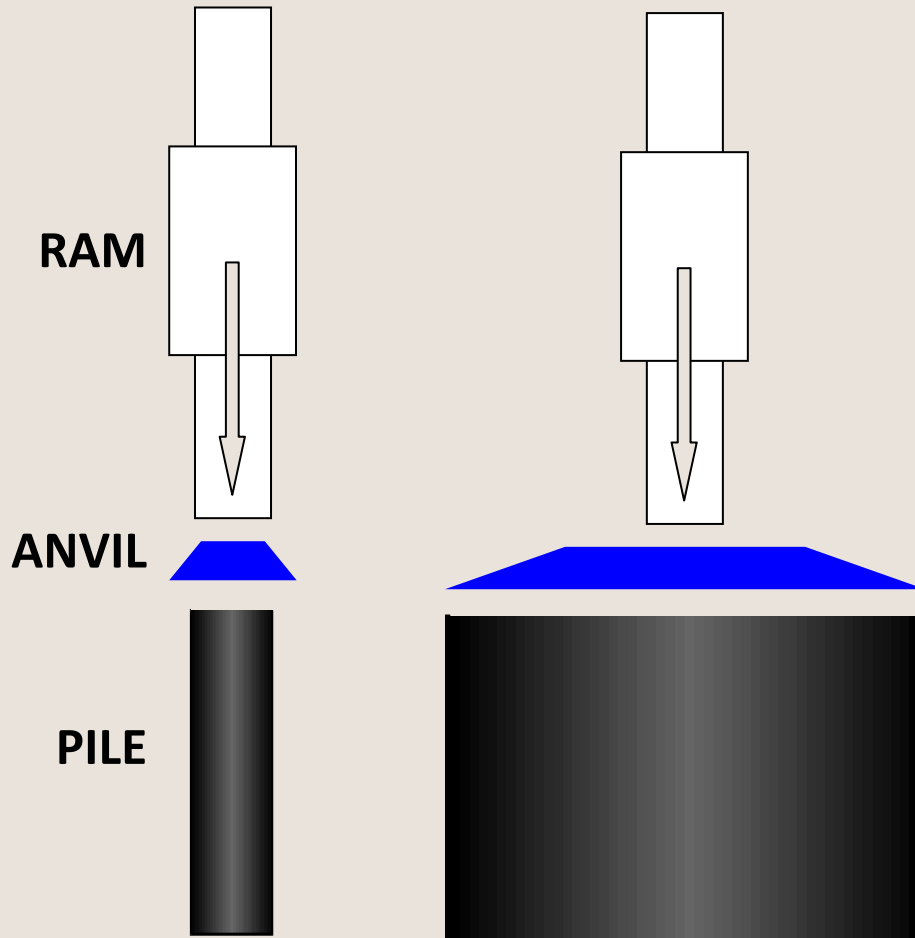


IHC Hydrohammer - Working principle pile driving

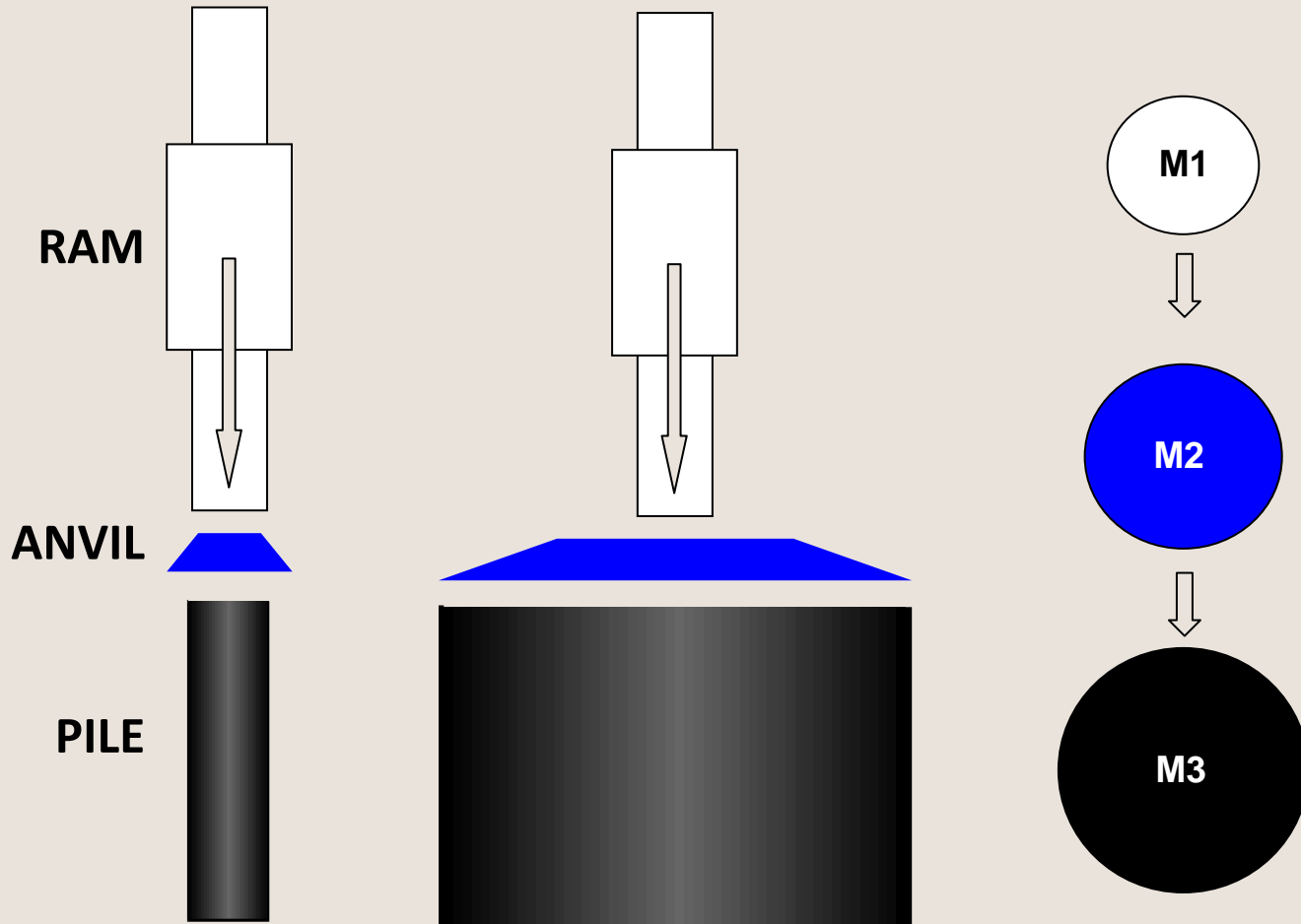


S-1200 Hydrohammer driving 5.100mm piles at Greater Gabbard.

IHC Hydrohammer - Working principle pile driving



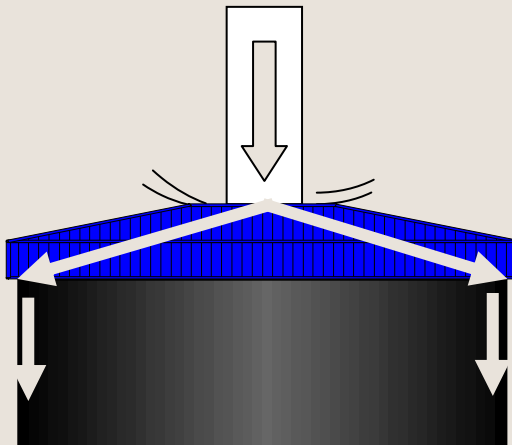
IHC Hydrohammer - Working principle pile driving



Single Solid Anvil



“UFO” Design to reduce weight
High energy transfer efficiency



- Limited height
- Reliable

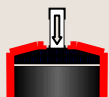
**Pile diameter:
<4300m**



**Hydrohammer:
S-800 / S-1400**



**Sleeve:
Anvil 4300**



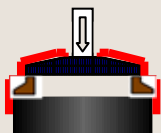
**Pile diameter:
Up to 5200mm**



**Hydrohammer:
S-800 / S-2000**



**Sleeve:
Anvil 4300
+ Anvil Ring**



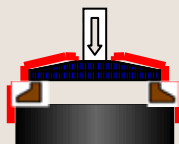
**Pile diameter:
Up to 6500mm**



**Hydrohammer:
S-1400 / S-2000**



**Sleeve:
Anvil 5500
+ Anvil Ring**



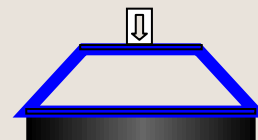
**Pile diameter:
6500-7500mm**



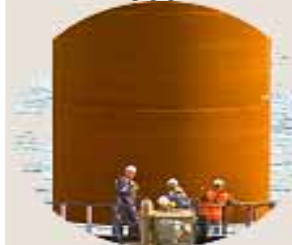
**Hydrohammer:
S-2000 or biager**



**Sleeve:
Anvil 5500 +
Bell shaped follower**



**Pile diameter:
>7500mm**



**Hydrohammer:
S-2000 or bigger**



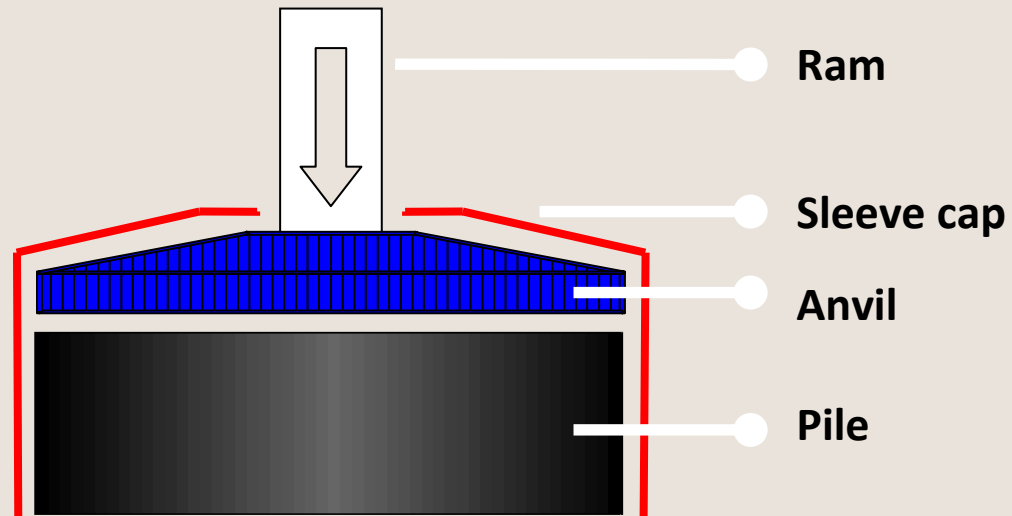
**Sleeve:
Synchronical
pile driving**



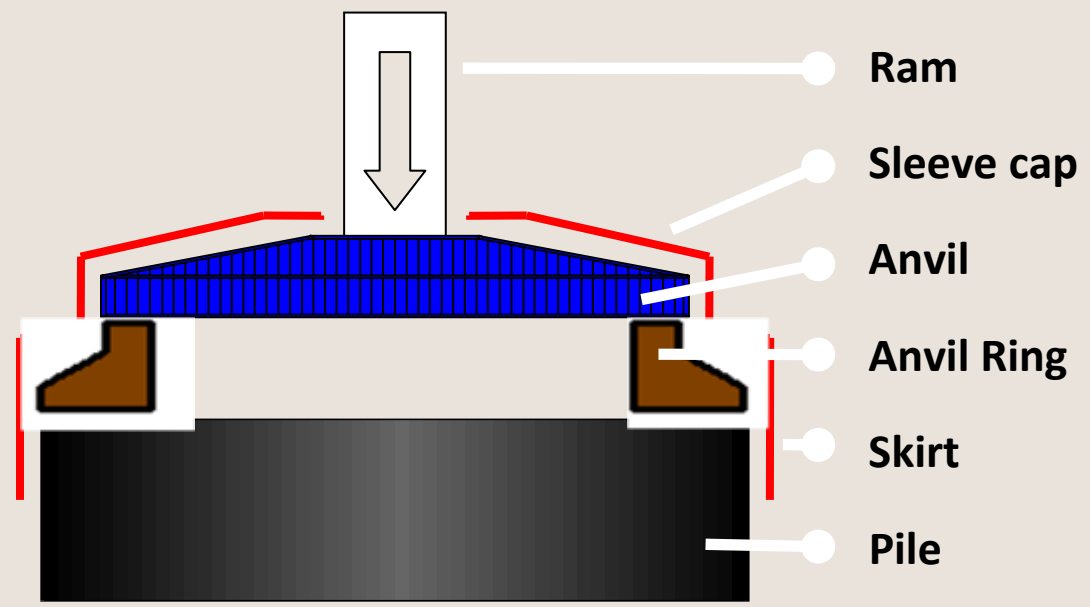
Pile Diameter: < 4,300 mm

Hydrohammer: S-800 / S-1400

Sleeve: Anvil 4,300



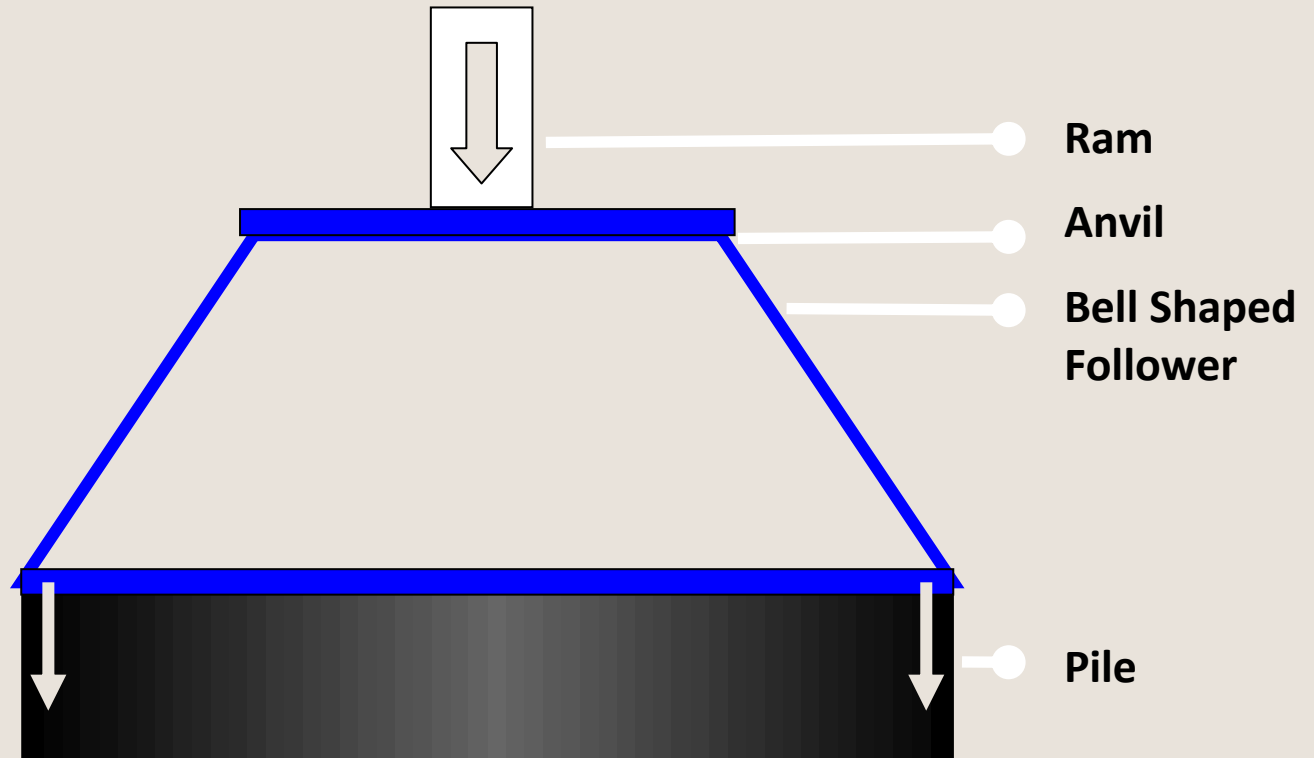
Pile Diameter:	up to 5,200 mm	up to 6,500 mm
Hydrohammer:	S-800 / S-1400	S-1400 / S-2000
Sleeve:	Anvil 4,300 + Anvil Ring	Anvil 5,500 + Anvil Ring



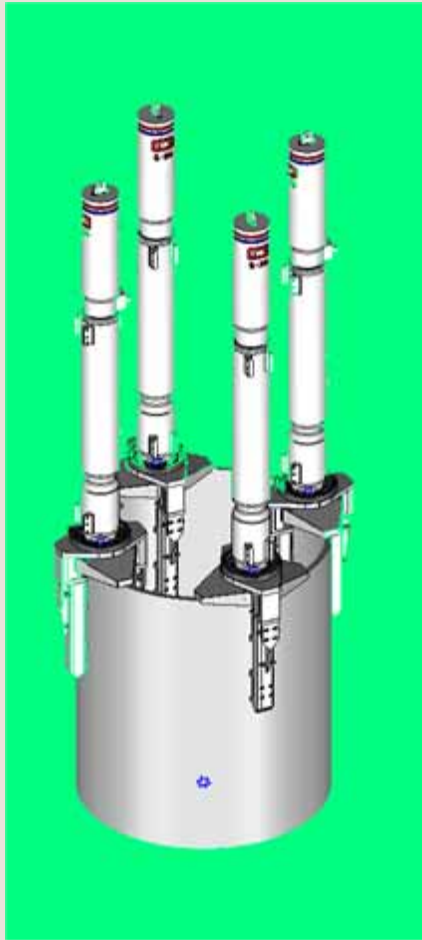
Pile Diameter: 6,700 - 7,500 mm

Hydrohammer: S-2000 or bigger

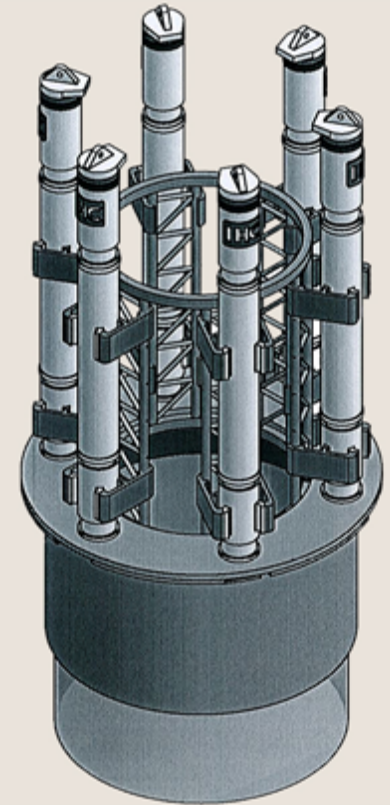
Sleeve: Anvil 5,500 + Bell Shaped Follower



Pile Diameter: > 7,500 mm



**Simultaneous Pile Driving
(patented)**

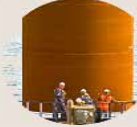


**Leader Guided Driving
(patented)**

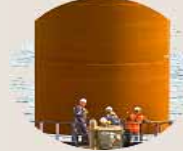
**Pile diameter:
<4300mm**



**Pile diameter:
Up to 5200mm**



**Pile diameter:
Up to 6500mm**



**Pile diameter:
6500-7500mm**



**Pile diameter:
>7500mm**



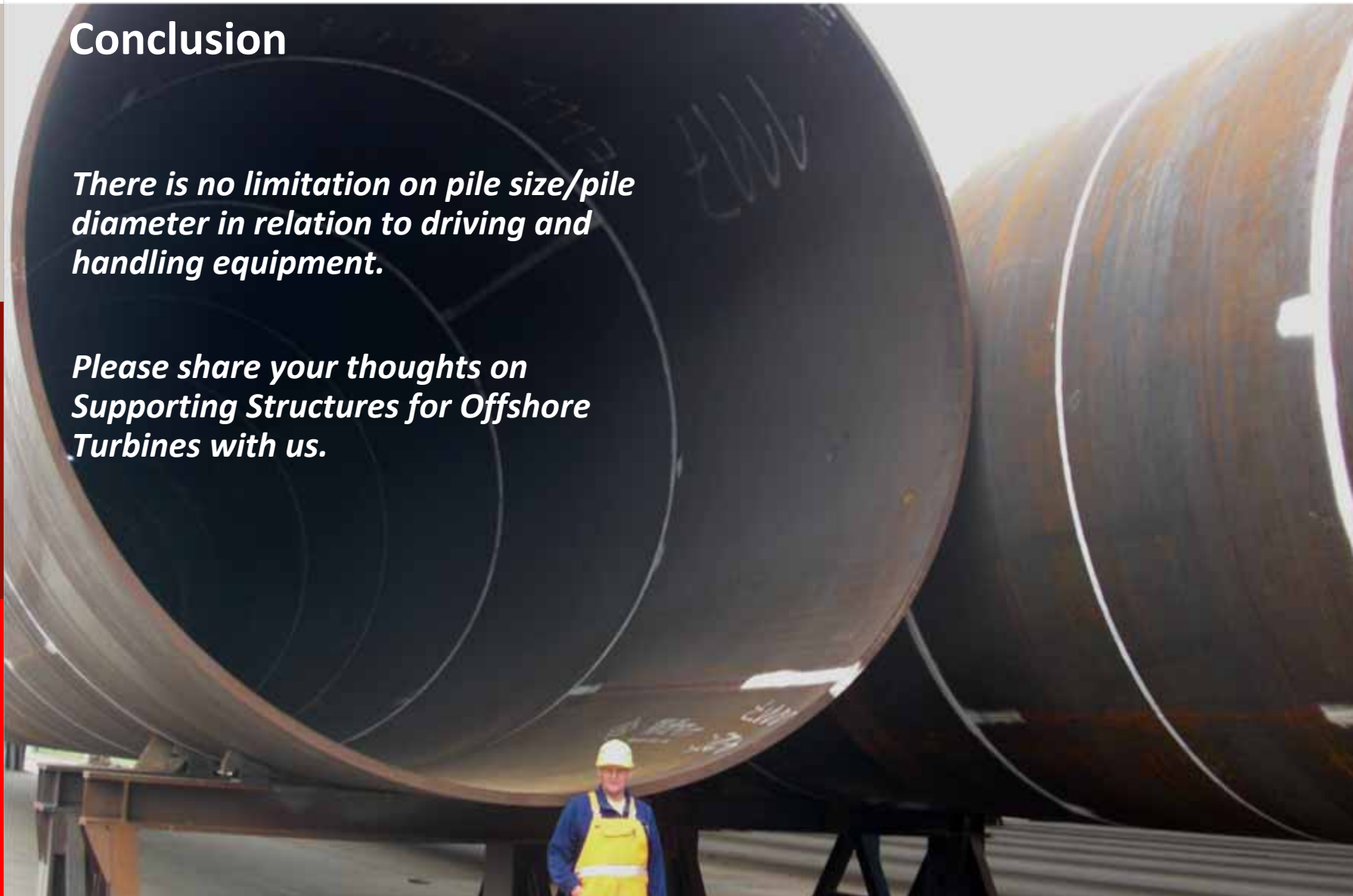
Plugs and upending tools can be up scaled for increasing pile diameters



Conclusion

There is no limitation on pile size/pile diameter in relation to driving and handling equipment.

Please share your thoughts on Supporting Structures for Offshore Turbines with us.





Offshore windenergy

Lots of reasons why

The technology innovator.



Contact details

IHC Hydrohammer B.V.

P.O. Box 26, 2960 AA Kinderdijk
Smitweg 6, 2961 AW Kinderdijk
The Netherlands
T +31 78 691 03 02
F +31 78 691 03 04
www.ihc-hydrohammer.com

Mr. T. (Tim) van Erkel
Area Manager Sales
T direct +31 78 691 07 26
M +31 6 30 34 38 91
t.vanerkel@ihcmerwede.com

Mr. B. (Barry) Stolp
Marketing & Business Development
T direct +31 78 692 28 22
M +31 6 10 29 29 61
b.stolp@ihcmerwede.com

IHC Handling Systems V.O.F.

P.O. Box 493, 2600 AL Delft
Distributieweg 3, 2645 EG Delfgauw
The Netherlands
T +31 15 25 12 000
F +31 15 25 12 005
www.ihc-handlingsystems.com

Mr. R. (Remco) Löwenthal
Sales Engineer
T direct +31 15 25 11 985
M +31 6 12 60 45 37
rga.lowenthal@ihcmerwede.com

IHC Offshore Wind

P.O. Box 5, 3370 AA H'veld-G'dam
Rivierdijk 586, 3371 ED H'veld-G'dam
The Netherlands
T +31 184 67 76 21
F +31 184 67 73 01
www.ihcmerwede.com

Reference List

IHC Hydrohammer

Finished projects

Year	Wind Farm	Hammer	no. piles	Pile ø (mm)	Contractor	Country
2002	Horns Rev	S-500/S-600	80	4000	MT Højgaard a/s	DK
2003	Scroby Sands	S-1200	30	4200	Mammoet	UK
2003	Arklow Banks	S-1200	7	5100	GE Wind Energy	IE
2004	Kentish Flats	S-600	30	4300	MT Højgaard a/s	UK
2003	Measure pile Near Shore Windpark (NSW)	S-280	1	2750	Ballast Nedam	NL
2005	Barrow	S-1200	30	4750	MPI	UK
2005	Race Bank & Docking Shoal Meteo. Mast	S-500	1	3372	Mammoet Van Oord	UK
2005	Race Bank & Docking Shoal Meteo. Mast	S-500	1	1829	Mammoet Van Oord	UK
2005	OWEZ; Near Shore Windpark NSW	S-1200	36	4600	Bouwcombinatie Egmond (Ballast Nedam & Vestas)	NL
2006	Measure pile FINO II	S-500	1	2700	ARGE Fino II (F+Z & Per Aarsleff)	DE
2006	Beatrice	S-500	8	1800	Volker Staal & Funderingen	UK
2007	Robin Rigg	S-800	x of 62	4300	MT Højgaard a/s	IE
2007	Robin Rigg	S-1200	x of 62	4300	MT Højgaard a/s	IE
2007	Robin Rigg	S-1400	x of 62	4300	MT Højgaard a/s	IE
2008	Gunfleet Sands II	S-1200	48	4700	MT Højgaard a/s	UK
2008	Horns Rev II	S-1200	91	3900	ABJV - Bifinger Berger/Per Aarsleff joint venture	DK
2009	Thanet	S-1400	4	4110	Thanet Offshore Wind Limited	UK
			13	4300		
			34	4500		
			38	4700		
			8	4900		
2009	Belwind	S-1200	56	4072	Van Oord Dredging & Marine Contractors BV	BE

Projects under construction

Year	Wind Farm	Hammer	no. piles	Pile ø (mm)	Contractor	Country
2009	Greater Gabbard	S-1200	140	5100	Seaway Heavy Lifting	UK
2010	Sheringham Shoal	S-1400	90	4730	MT Højgaard a/s	UK
2010	Baltic I	S-1200	22	4300	Ballast Nedam Offshore	DE
2010	Walney, phase I	S-1400	50	4700	GeoSea nv	UK
2010	Ormonde	S-500	124	1820 (72")	GeoSea nv	UK

Awarded projects

Year	Wind Farm	Hammer	no. piles	Pile ø (mm)	Contractor	Country
2010	Jiangsu Rudong Long Yaun	S-800	75	5100	ZPMC, Shanghai Zhenua Heavy Industry	China
2011	London Array	S-800	x of 177	4700	AARSLEFF-BILFINGER BERGER J.V.	UK
2011	London Array	S-1400	x of 177	4700	AARSLEFF-BILFINGER BERGER J.V.	UK