The global offshore geoscience and geotechnical engineering consultancy

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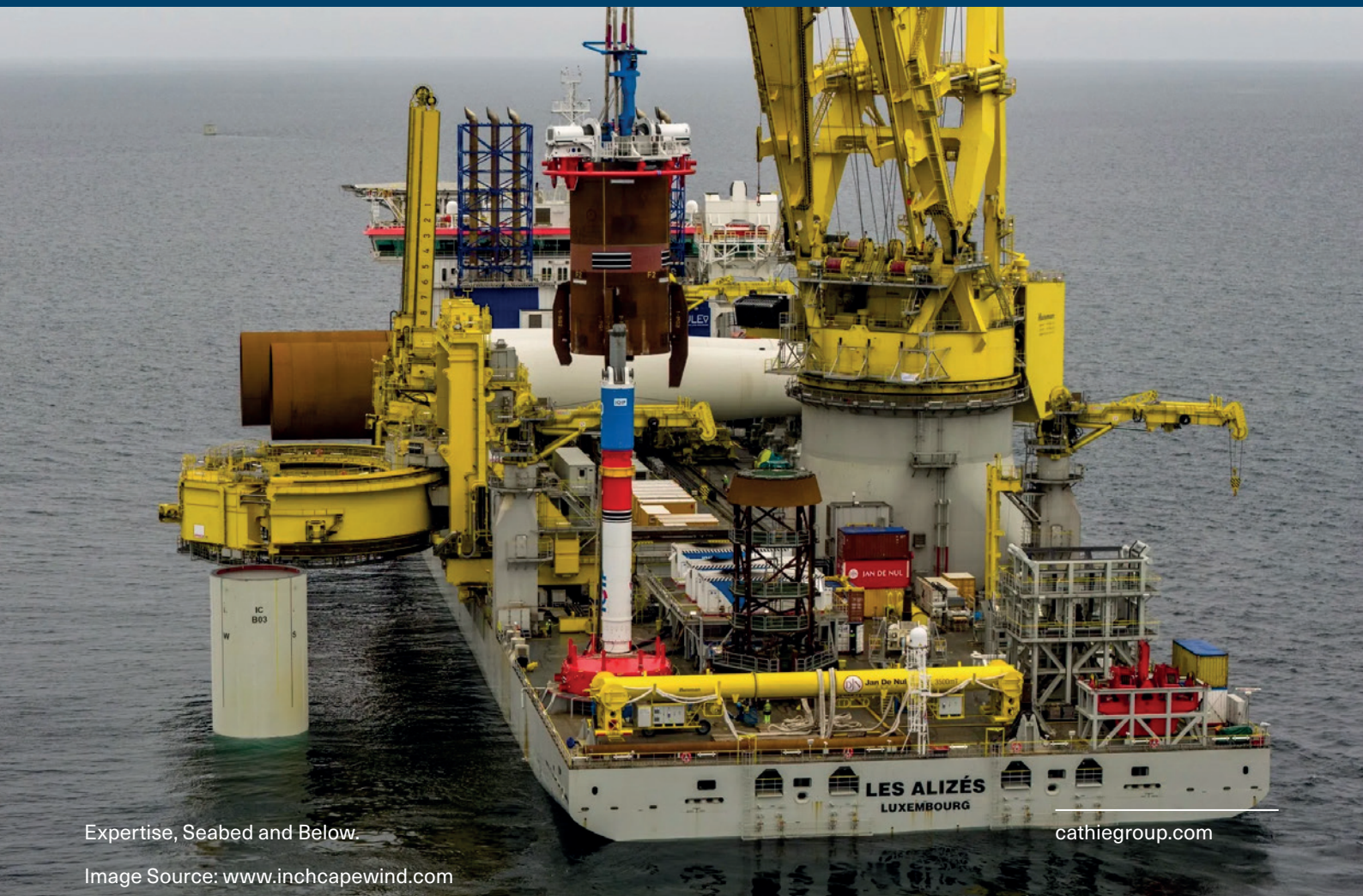
Case Study : Offshore Wind

Cathie supports the successful installation of XXL monopiles at Inch Cape Offshore Wind Farm



Expertise, Seabed and Below.

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Image Source: www.inchcapewind.com

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Inch Cape Offshore Wind Farm is a 1.1 GW offshore wind project located in the North Sea off the east coast of Scotland. Once operational, the project will comprise 72 Vestas 15 MW turbines supported by a combination of monopile and jacket foundations.

As offshore wind projects continue to grow in scale, foundation design and installation present increasingly complex engineering challenges. At Inch Cape, 54 XXL monopiles were selected for installation, with diameters of up to 11.5m, lengths of up to 102m and weights approaching 2,300 tonnes.

The Challenge

Installing foundations of this size requires a detailed understanding of seabed conditions and pile behaviour during installation. Variations in geology can affect drivability, installation efficiency and structural performance, increasing risk, cost and the potential for project delays.

The project required robust geotechnical analysis to support installation planning and help manage uncertainties associated with driving XXL monopiles through complex ground conditions.

Cathie's Role

Working alongside fellow specialists, Cathie provided geotechnical expertise and technical support to inform the installation engineering strategy.

Through detailed geotechnical analysis at all 54 monopile locations, Cathie helped reduce uncertainties related to pile behaviour during installation, particularly during the critical initial phase of pile self-weight penetration.

Back-analyses of installation data provided a deeper understanding of the behaviour of the installed foundations. In addition, installation prediction analyses were undertaken and continuously refined to forecast the most probable system response. This enabled the project team to mitigate key installation risks, most notably those associated with rapid self-weight penetration.

By doing so, our team helped the project team develop confidence in the installation approach for these exceptionally large monopiles.

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The Outcome

In June 2026, Inch Cape announced the successful installation of all 54 monopiles, marking a major milestone for the project.

Installed by Jan De Nul, the monopiles are among the largest ever deployed on an offshore wind farm. Their successful installation demonstrates the value of rigorous geotechnical assessment and collaborative engineering through the project lifecycle.

With monopile installation complete, Inch Cape remains on track for first power generation and continued progress towards full commercial operation.

By combining advanced geotechnical analysis with practical offshore experience, Cathie continues to help developers deliver complex offshore wind projects with confidence.

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