

Personnel transfers on the high seas

Later this year, the blades on the world's first full-scale floating wind farm will start to turn, harnessing the winds that hurtle from the continental shelf. Hywind Scotland will literally sit on the North Sea, 26 kilometres to the East of Aberdeen.

But while big winds make it a perfect site for energy generation, they will often be accompanied by big seas. In the Buchan-Deep, waves of over 1.5 metres Significant Height will prevail for up to half of the year and ensuring that turbines are productive in these environments will require new solutions to getting maintenance technicians safely and cost-effectively onto and off turbines in high seas.

With this access challenge in mind,

Edinburgh based Limpet Technology is embarking on the development of a new access system that will allow technicians and loads to transfer between vessels and offshore wind turbines more safely and in higher sea states.

Supported by an innovation grant from Scottish Enterprise, Limpet Technology is developing a new, high speed, motion compensated personnel lifting and fall arrest system. The overarching technical objective

of the project is to deliver a solution that will allow safe and reliable access to offshore turbines in waves of up to and beyond 2.5 metres Significant Height (Hs).

Limpet Technology's CEO, Stephen Cornwallis commented. "To make operations and maintenance activities as efficient and cost effective as possible, offshore wind operators are going to need a suite of solutions that they can call on to allow technicians to access turbines all year around. Our system will allow access from smaller crew transfer vessels and safe transfer boats, rather than just large, gangway equipped service operation ships. These smaller vessels may be coming from shore, or they may come from an accommodation vessel. Maximising flexibility will be critical."



Courtesy of Statoil

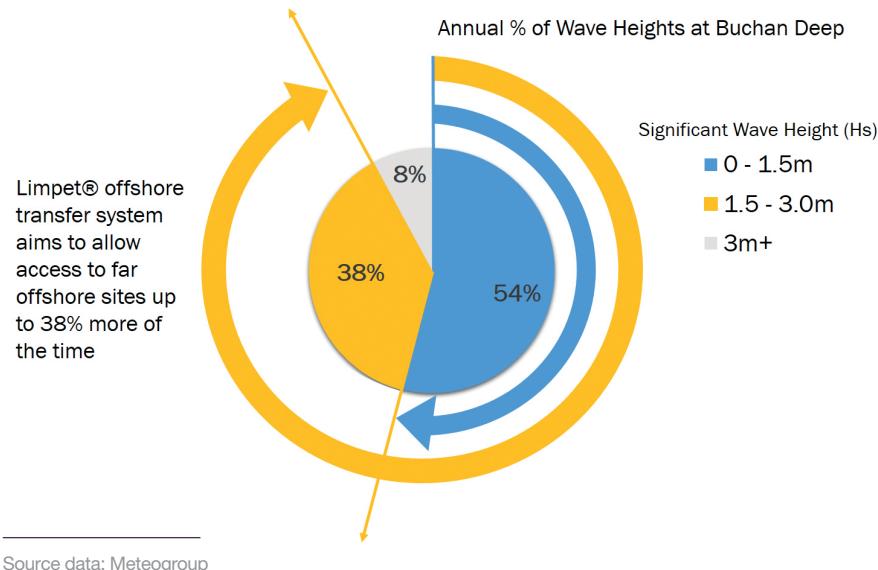
Moving from 50% to 80% Accessibility at Far Offshore Wind Farms

The Limpet Technology project builds from the Company's legacy of multifunctional safety products and integrates motion compensated, remote-controlled hoisting with fall prevention and automatic deck-avoidance safety features. At the heart of the system is a laser controlled, servo-motor, capable of lifting and lowering 170kg loads at speeds of more than three metres per second.

Limpet Technology's head of engineering, Dr Alastair Kilgour commented "In order to test the speed of hoist and motion control of our first prototype, a test system was designed that would replicate the deck of a crew transfer vessel being acted upon by large waves. The test rig consists of a platform that moves up and down a four-metre long vertical track and is capable of speeds of up to three metres per second. It can be programmed with actual wave data to accurately represent the motion that a technician will experience if they were standing on the deck of a twenty-one metre catamaran being acted on by North Sea waves of two to three metres significant height."

He went on, "When transferring personnel, the Limpet system uses lasers positioned on either side of the hoist, to track the motion of the deck relative to the end of the line. This allows a technician to stay clipped into the line as the deck moves up and down on the waves. They can call the line down from the Limpet unit using the remote control and can clip into it at leisure, since the line will retain its position relative to the deck and move up and down at the same speed as the technician. Once clipped into the line, the technician can then transfer and, in an ideal scenario, they, or a deck hand, will initiate a hoist when the vessel is at the crest of a wave. This takes them as quickly as possible out of the vessel's risk zone and onto the landing ladder."

Senior Engineer, Eddie McLaren added, "Once the technician is on the ladder, tension comes off the line and the Limpet system switches automatically into ladder climbing mode. As the technician climbs up and down the ladder the line will be taken in and out at the same speed so that no slack builds up and, if they slip, then the system immediately locks and prevents a fall".



Source data: Meteogroup



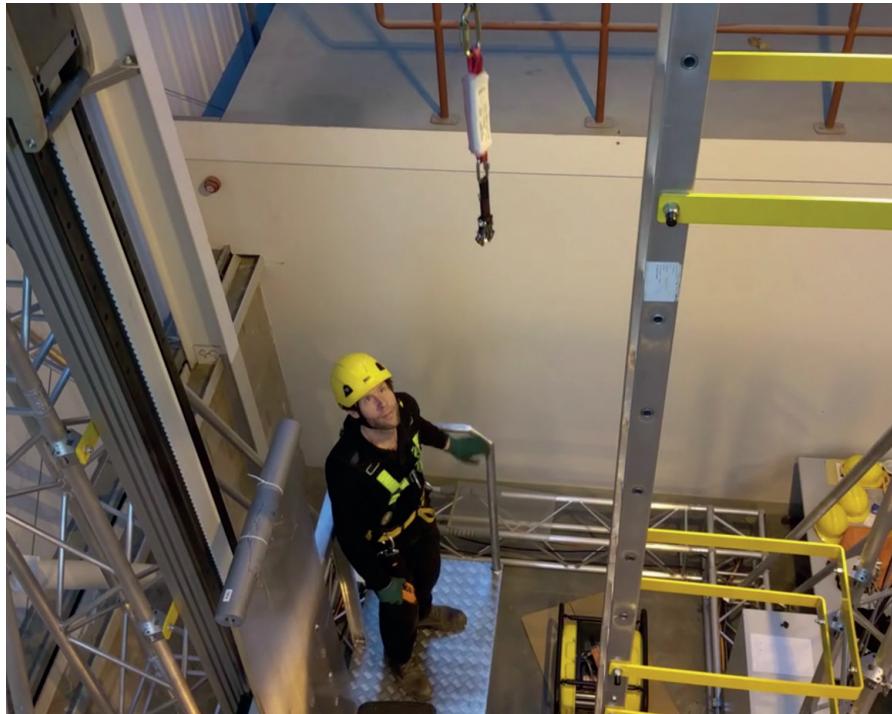
Limpet® prototype offshore transfer system

He went on, "Even if the technician mistimes hoisting onto or off the vessel, or if they have some kind of medical problem while on the line, the system has an impact avoidance feature that will prevent the deck from contacting them. Basically, the lasers detect the approach of the vessel and the Limpet system lifts the technician upwards at the same speed, maintaining a constant distance between the deck and the technician."

While the application is innovative, the Limpet team are keen to point out that all the components have years of use in safety critical industrial environments. Stephen

Cornwallis commented, "When we've shown people the prototype, the first reaction is usually 'Wow that is amazing', the second reaction is 'but will it work offshore, where you have spray, condensation, humidity, extremes of temperature, salt water immersion and blasting by incredibly strong winds?' All we can say right now is that we know how tough the conditions are and are designing the system accordingly."

To start testing these environmental factors and to help bring the system more quickly to market, Limpet Technology has partnered with the Offshore Renewable Energy



Limpet engineers on the wave compensation test rig

Catapult to trial the system on its 7MW offshore demonstrator turbine at Levenmouth in Fife as the first step towards full sea trials later in 2017. The system is expected to be installed onto the ladder that can be seen in the pictures below during mid-May with testing and demonstrations following shortly afterwards.

Alastair Kilgour commented. "The feedback from the offshore wind industry has been great so far. We now have to prove the concept in the field, but if we get this right it should help to improve O&M efficiency and increase turbine availability and energy production which will further reinforce the competitiveness of offshore wind within the energy mix."

You can see a video of the first prototype being used with the test rig here, www.limpettechnology.com/offshore-personnel-transfer.html

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The ORE Catapult's 7MW Offshore Wind Demonstration Turbine at Levenmouth

