
D-HHM

Maximising efficiency and minimising downtime with helicopters

In the dynamic field of renewable energy, particularly wind power, maintaining operational efficiency is critical. Wind turbines, the backbone of this green energy revolution, require regular maintenance and prompt repairs to prevent costly downtime. The use of helicopters in wind turbine maintenance offers numerous advantages that enhance operational efficiency, minimize downtime, and significantly reduce costs. This article explores the myriad benefits of deploying helicopters for wind turbine maintenance, focusing on the urgency of addressing turbine standstills, reducing repair times, and maximising technician time on turbines.

Urgency in addressing turbine standstills

Wind turbines are complex machines that can face numerous issues leading to operational standstills. These can stem from mechanical failures, electrical issues, or environmental factors. Each moment a turbine remains inactive translates to lost revenue and increased operational costs. Hence, the urgency of addressing these standstills cannot be overstated.

Economic impact of turbine downtime

When a wind turbine is faced with an unplanned failure, the economic impact is immediate and severe. The loss of electricity generation not only affects the energy supply but also incurs financial penalties. For wind farm operators, downtime can lead to significant revenue losses. A single wind turbine can generate between $2,000 to $3,000 worth of electricity per hour, depending on its capacity and the prevailing wind conditions.

The unplanned downtime problem is exacerbated when multiple turbines are idle for a number of days. Extended downtime can lead to losses running into tens of thousands of dollars.

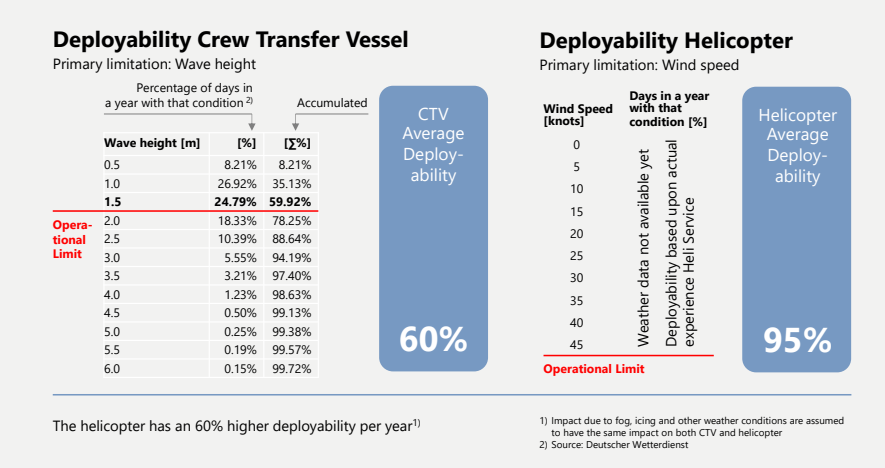
Speed of response

Helicopters offer a rapid response solution for troubleshooting the inevitable, unplanned turbine failures in a modern offshore wind farm unlike vessel transportation, which can be hindered by sea states as low as 1.5 meters and seasonal 10 kt speed restrictions, helicopters can swiftly transport technicians and equipment directly to the turbine nacelle. This speed in response is a crucial asset in the fight against downtime and lost revenue.

reported across the global offshore wind market. The journey to offshore or remote turbines can be arduous, involving long hours at sea and potentially hazardous climbs. Helicopters provide a smoother, quicker, and safer journey, ensuring that technicians arrive at the site ready to work, not fatigued or seasick from the transfer.

Maximising technician time on turbines

One of the most significant advantages of using helicopters for wind turbine maintenance is the ability to maximise the time technicians can spend working on the turbines. This increased efficiency can lead to higher productivity and quicker turnaround times for repairs and maintenance tasks.



Helicopters have a 60% higher deployability compared to vessels

Reducing repair times

The speed and efficiency of helicopters drastically reduces the time and personnel required to complete preventative or unplanned troubleshooting campaigns. While traditional access methods may offer more space or carrying capacity, the valuable time they consume in transit renders them an insufficient means of response when power generation is critical to the operation.

Efficiency in transport

Helicopters can bypass the logistical hurdles that vessel transportation faces. For offshore wind farms, accessing turbines typically involves a combination of crew transfer vessels (CTV) travel, climbing a series of ladders, and accessing an electric lift, which is time-consuming and physically demanding for technicians. Helicopters eliminate these steps, allowing for a direct drop-off at the turbine platform. This transport efficiency reduces the overall time from the identification of the turbine fault to its resolution.

Comfort and safety

In addition to speed, helicopters offer a more comfortable and safer mode of transport for technicians. This is supported by G+ data

Direct access and multiple turbines in a day

Helicopters can facilitate direct access to multiple turbines within a single day. In a large wind farm, it is not uncommon for multiple turbines to require attention simultaneously. If the turbine issues aren't addressed efficiently, multiple failures begin to cascade and the lost revenue and penalties to the operator can be significant.

Traditional vessel -based methods limit the number of turbines a technician can service in a day due to travel time constraints. Helicopters, however, can quickly transport technicians from one turbine to another, allowing multiple turbines to be serviced in a single operational window.

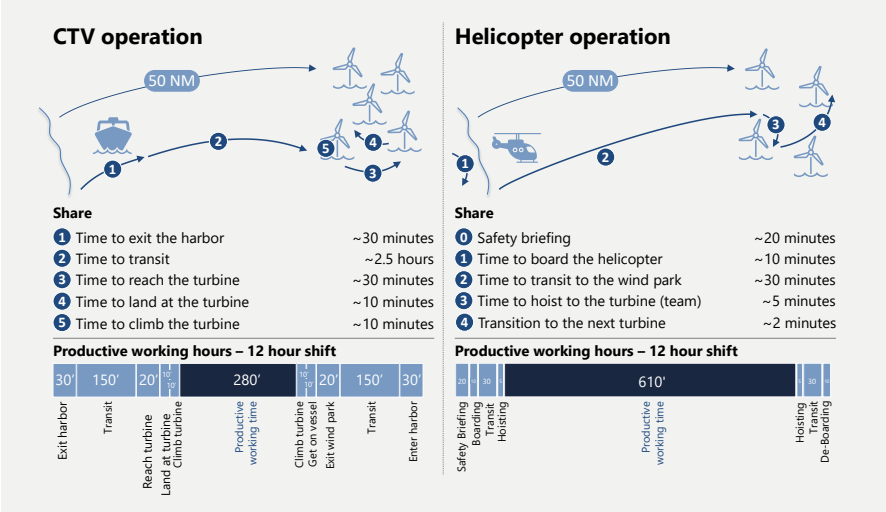
When operators augment wind farms with enhancements such as helidecks and aviation fuel on the offshore substation, the capabilities of helicopters become even greater. It allows the aircraft to rapidly deploy multiple teams across the park throughout the day, maximising maintenance productivity. Another notable strategy being used in helicopter operations in the US, is the use of a remote hoist hook. The remote hook allows the helicopter to pre-position kits on turbine decks without technicians present to uncouple the load. This enables the aircraft to use its full payload to deploy personnel to the designated turbines where their tools/parts await their arrival for work.

Enhanced technician morale and performance

The comfort and efficiency of helicopter transport can also enhance technician morale and performance. Technicians who arrive at their work site quickly and comfortably are likely to perform their tasks more effectively and with greater attention to detail. This improved performance can lead to higher-quality maintenance and fewer repeat visits for unresolved issues.

Case studies and real-world applications

It can be advantageous for developers to work in partnership with a qualified offshore helicopter operator to review the granular details of their project in advance of construction. Some will perform a detailed case study on how helicopters can enhance their logistics approach and compare them to other means of transportation to find the most logical model to meet their overall goals.



By using offshore helicopters the productive working time can be significantly increased

Several wind farms around the world have successfully integrated helicopter services into their maintenance operations, demonstrating the practical benefits of this approach.

Offshore wind farms in Europe

In Europe, where offshore wind farms are prevalent, the use of helicopters for maintenance has become a standard practice. For example, the Hornsea Wind Farm in the UK, one of the largest offshore wind farms globally, uses helicopters to ensure rapid response to turbine issues. This practice has significantly reduced downtime and maintenance costs, contributing to the overall efficiency and profitability of the wind farm.

Environmental and operational considerations

While the use of helicopters offers numerous operational advantages, it is also important to consider the environmental and operational impact. When compared to vessels, helicopters have a significantly lower carbon footprint. This is due to the rate of speed in which they accomplish their intended transport. Crew transfer vessels will emit roughly 3.66t CO2 / 54 NM per passenger, while the helicopter emits 0.55t CO2 / 54 NM per passenger. This will vary slightly when examining different vessels/aircraft.

Fuel efficiency and environmental impact

Modern helicopters are designed to be fuel-efficient and offer a more sustainable alternative to traditional transportation methods such as ships. By reducing travel times and providing direct access to wind turbines, helicopters help minimize CO2 emissions and maximise operational efficiency. In many cases, the overall reduction in downtime and increased energy production can more than offset the environmental costs associated with helicopter fuel consumption.

Furthermore, the industry is exploring the use of biofuels and alternative energy sources to power helicopters, which could further mitigate environmental impacts. A promising development is the integration of Sustainable Aviation Fuel (SAF). Helicopters with Pratt & Whitney engines can already process up to 50% SAF, leading to significant CO2 savings. SAF is produced from sustainable sources and has the potential to substantially reduce the carbon footprint of aviation.

Conclusion

The use of helicopters in wind turbine maintenance offers significant advantages that can enhance operational efficiency, minimise downtime, and reduce costs. By providing rapid response to turbine standstills, reducing scheduled maintenance duration, and maximising technician time on-site, helicopters play a crucial role in maintaining the reliability and profitability of wind farms.

As the renewable energy sector continues to grow, the integration of innovative solutions like helicopter services will be essential to meeting the increasing demand for efficient and sustainable energy production. Wind farm operators who leverage the benefits of helicopter transport can ensure that their turbines remain operational, and their energy output remains consistent, ultimately contributing to a greener and more sustainable future.

Incorporating helicopters into maintenance strategies not only addresses immediate operational needs but also sets the stage for long-term success in the renewable energy industry. The advantages of speed, efficiency, and enhanced technician productivity provided by helicopters make them an indispensable tool for modern wind farm management.

By adopting these advanced maintenance solutions, wind farm operators can significantly improve their operational capabilities, reduce costs, and support the ongoing transition to a more sustainable energy future.

www.heliservice.com