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PROFILE

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ELEVATING HUB HEIGHTS OF OFFSHORE WTGS WITHOUT ELEVATING COST

The new advanced direct drive wind turbine generators require strong winds to turn their large blades.

AUTOMATING WIND-TURBINE LUBRICATION FOR SUSTAINABILITY

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Consistent and continuous medical training keeps offshore workers safe, healthy, and working.

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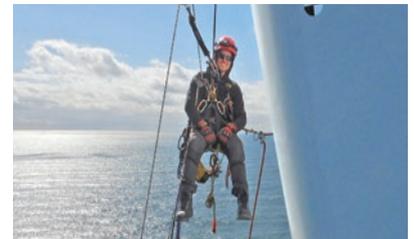


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Take precautions in the heat

One of the inevitabilities of working on a wind farm is that — no matter the weather — you're probably going to be outside most of the time.

And during the summer months, the weather around many wind turbines is going to range from hot to really hot.

The American Clean Power Association recently compiled some useful information on how to deal with a hot work environment.

According to OSHA, many people are exposed to heat on the job, in both indoor and outdoor heat environments. Operations involving high air temperatures, radiant heat sources (e.g., sunlight, hot exhaust), high humidity, direct physical contact with hot objects, or strenuous physical activities have a high potential for causing heat-related illness.

Heavy sweating, dizziness, thirst, and muscle spasms are just a few of the warning signs that you are experiencing a heat-related illness. When working in hot temperatures, it's important to focus on prevention strategies:

▀ Do start your workday hydrated. Start your hydration the night before.

▀ Do use the buddy system. Act quickly if a co-worker shows signs of illness.

▀ Don't ignore the warning signs.

▀ Don't think heat-related illness won't happen to you.

ACP has heat-awareness material on its website. Check it out at engage.cleanpower.org.

And also, please check out all the useful information in our August issue where we explore topics that include foundations, lubrication and filtration, and wind-farm safety.

Once you've read all of that, be sure and stick around and familiarize yourself with V&SH Offshore Solutions in this month's company profile.

After that, find out how DNV is playing an important role in China's energy transition in a conversation with Kim Sandgaard-Mørk, executive vice president for Renewables Certification with DNV.

You'll find that and much more, so I hope you enjoy the issue, and take care of yourself in the heat.

Thanks for reading!



Kenneth Carter, editor

Wind Systems magazine
editor@windssystemsmag.com
(800) 366-2185, ext. 204

David C. Cooper
Publisher

EDITORIAL

Kenneth Carter
Editor

Jennifer Jacobson
Associate Editor

Joe Crowe
Associate Editor | Social Media

SALES

David Gomez
National Sales Manager

Ben Keaten
Regional Sales Manager

CIRCULATION

Teresa Cooper
Manager

Jamie Willett
Assistant

DESIGN

Rick Frennea
Creative Director

Michele Hall
Graphic Designer

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P.O. Box 1987 • Pelham, AL 35124
(800) 366-2185 • (205) 380-1580 fax
info@msimktg.com

David C. Cooper
President

Teresa Cooper
Operations Director

American Clean Power Association, U.S. Energy Storage Association to merge

From ACP

The boards of directors of the American Clean Power Association (ACP) and the U.S. Energy Storage Association (ESA) will merge the two trade associations to combine their staff, programs, and members.

The merger will bring together the diverse membership and talented team members of ESA with the resources and reach of ACP. Additionally, it will enhance the American Clean Power Association's efforts to advocate for the economic and environmental advantages of the clean power economy and further position the renewable energy and storage industries for success as they move into a decade of transformative growth.

"Energy storage is foundational to a cleaner energy future for the country," said Jim Murphy, president of Invenergy and the chairman of the board for ACP. "Joining together with ESA strengthens the unified voice of the clean power industry."

Launched at the start of 2021, the American Clean Power Association is a new trade association unifying the wind, solar, storage, and transmission companies driving jobs and investment in the U.S. economy and providing solutions to the climate crisis. The merger with ESA will be the second for ACP, following its merger with the American Wind Energy Association (AWEA) in January 2021.

"Our board sees the merger with ACP as a powerful new chapter for our industry and a pathway to achieving 100 GW of new energy storage by 2030," said Kiran Kumaraswamy, vice president of Market Applications at Fluence and the chairman of the board for ESA. "The ESA board of directors is confident that a merger will elevate advocacy, research, and educational efforts on behalf of the energy storage industry."

The merger will take effect January 1, 2022, subject to final approval from ESA's members.



American Clean Power is the voice of companies from across the clean-power sector that are powering America's future. For more information, go to www.cleanpower.org

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DIRECTION

THE FUTURE OF WIND



Avangrid has gotten 18 letters of intent or support for Excelsior Connect. (Courtesy: Avangrid)

Avangrid gains support for clean-energy superhighway proposal

Avangrid Inc. recently received 18 letters of intent or support for its clean energy superhighway proposal, Excelsior Connect.

The proposed project is an underground transmission method in response to a call for proposals from New York State's Energy Research and Development Authority.

"The Excelsior Connect project was developed alongside the communities that will surround it. This community-first approach is reflected in the diversity of support we have received—from labor and economic development groups to leading environmental justice organizations," said Catherine Stempien, Avangrid Networks' president and CEO.

The 18 letters of support came from community groups including A.L. Consulting, The 400 Foundation, and Center for NuLeadership on Human Justice and Healing. Community colleges that sent letters include Bronx Community College, SUNY Ulster, and Sustainable CUNY, and energy generators Baron Winds LLC and Northland Power Inc.

The project will use Avangrid's global expertise to transmit 1,200 MW of solar energy and renewable wind power that is generated in upstate New York to New York City using High-Voltage Direct Current (HVDC) line. The line would provide clean, renewable energy generation to Queens, which would improve air quality and help to retire higher-emitting generation.

Other supporters that sent letters are environmental groups Trust for Public Land, West Harlem Environmental Action, and One Tree Planted. Labor organizations also signed on including New York State's Building and Construction Trades Council and International Brotherhood of Electrical Workers locals 3 and 1249.

"Greening our cities with mini-forests will help make summer days less hot and can help lower air conditioning," said Carter Strickland, New York's state director for The Trust for

Public Land.

"This new collaboration will bring a variety of benefits to increase access and possibilities for disadvantaged students by providing new skills, pre-apprenticeship opportunities and ongoing green jobs training," said Alan P. Roberts, Ulster County Community College president.

"The partnership will focus on planting trees for environmental impact," said One Tree Planted founder Matt Hill.

Christopher Erikson, IBEW Local 3's business manager, said that Avangrid recognizes the Local's commitment to making sure that renewable energy jobs are also well-paying union jobs.

MORE INFO www.avangrid.com

SPE Offshore Europe 2021 to showcase energy transition

Energy transition will be the focus of the Society for Petroleum Engineers'

SPE Offshore Europe 2021, a virtual conference that takes place from September 7 to September 10, 2021.

Ten keynote sessions and 14 technical sessions will be on the program, incorporating more than 50 technical papers. Energy transition will be the subject of seven out of 10 keynotes and 50 percent of the technical program.

The opening plenary will include a panel discussion with the theme "Oil and Gas: Working Together for a Net Zero Future." Panelists will include Chris Stark, CEO of the Committee on Climate Change; Gordon Birrell, BP executive vice president, production and operations; Al Cook, Equinor's vice-president of development and production international; and Phil Kirk, Harbour Energy CEO.

Keynote sessions include topics such as delivering carbon capture, utilization, and storage; CCUs and hydrogen at scale; energy islands; facilities of the future, breaking the silo paralysis, ramping up digital to enable a low-carbon industry, and roadmaps to net zero.

Because of the coronavirus pan-



SPE Offshore Europe CONFERENCE & EXHIBITION

Energy transition is the focus of SPE Offshore Europe 2021.



The Generation Storage Consumption Supply Energy Centre represents a step-change in the decentralized distribution of low carbon and renewable energy. (Courtesy: Infinite Renewables Group)

demographic, the conference and the exhibition have been divided: An in-person exhibition will happen from February 1 to 4, 2022, and will include new keynote content that will be developed after COP26, The United Nations Climate Change Conference in Glasgow in November 2021.

“The conference program at SPE Offshore Europe has always been a ‘must-attend’ event for those wanting to keep in touch with industry-leading thinking strategically and at a technical level. The industry’s path to decarbonization and role in supporting net zero is top of the agenda this year, and with COP26 just seven weeks later, the program promises to be a real curtain-opener,” said Neil Saunders, SPE Offshore Europe 2021’s conference chair.

“The future of oil and gas in the energy mix is in our hands and SPE Offshore Europe gives us the chance to work together, before and after COP26, to secure our place in a net zero future,” Saunders added.

“The timing of the conference, prior to COP26, and content of the technical program are both opportune and

highly relevant as we experience an acceleration of the energy transition and the industry response,” said Kevin Gallagher, SPE Offshore Europe 2021’s technical committee chair. “We look forward to informative and inspiring technical sessions which prompt numerous important discussions at this pivotal time for our industry.”

MORE INFO www.offshore-europe.co.uk

Infinite launches Wales’ first multi-tech energy center

Infinite Renewables Group Ltd. is launching its first energy center at the Rassau industrial estate in south Wales. The center will include wind turbines, solar photovoltaics, and battery storage, which will provide reliable, cost-efficient, and greener power directly to customers.

“The GSCS (Generation Storage Consumption Supply) Energy Centre represents a step-change in the decentralized distribution of low carbon and renewable energy. The Rassau

scheme aims to share the benefits of multi-technology generation within the immediate community, providing discounted renewable power and reducing the CO2 emissions in the area,” said Andrew Crossman, Infinite’s director.

Shaun Gardner, the managing director of GS Yuasa Manufacturing UK Ltd., said the project will help the company’s Ebbw Vale factory as well as the rest of the Rassau estate.

“The unique combination of our lithium and lead-acid batteries, the latter of which are produced on site in South Wales, allows for the storage of greener energy, generated by either solar or wind, to be used at a later date,” Gardner said.

“Climate change is at the heart of our decision making and we are committed to accelerating the transition to a low carbon energy system in Wales,” said Julie James, Welsh government minister for climate change.

Albion Community Power’s investment director, Marco Yu, praised the project.

“We backed the Infinite team in the early stages of its growth and we are thrilled to be part of its latest pioneering, multi-technology projects that are leading the way in helping local businesses to decarbonize and reduce energy cost while alleviating the electricity load of the electricity grid network,” Yu said.

Work is ongoing on the energy center’s construction. The installation of a 1 MWh rooftop solar panel system is already finished, and approval has already been granted for a wind turbine to directly supply energy to the location.

MORE INFO www.infiniterenewables.com

WRISE launches Speakers Bureau to support diversity

Women of Renewable Industries and Sustainability (WRISE) recently launched its new Speakers Bureau. The Speakers Bureau is a public, searchable



WRISE's Speakers Bureau has more than 150 qualified individuals representing different technologies, markets, companies, and professional expertise and will be regularly updated with new speakers. (Courtesy: WRISE)

database of qualified speakers willing to speak, present, and engage on renewable-energy topics. The database will be an invaluable resource for conference and event organizers seeking to bring more diverse perspectives into the public discourse on renewable energy.

“For over a decade, WRISE has received requests for speaker recommendations,” said Kristen Graf, WRISE executive director. “Recently, conversations around conference diversity have picked up, and those requests have increased exponentially. In order to continue to innovate and evolve, it remains critical that we hear different ideas and perspectives. Renewable-energy conference organizers need to lead by example and showcase all of the amazing thinkers across our community. There are no excuses for having an all-male or all-white lineup — we know better and we can do better. Representation matters in every aspect of our industry, and I

hope the Speakers Bureau becomes a go-to resource for conference organizers looking for talented speakers to elevate their programs.”

The Speakers Bureau is launching with more than 150 qualified individuals representing different technologies, markets, companies, and professional expertise and will be regularly updated with new speakers. The database is searchable by expertise including technical and non-technical topics related to solar and wind energy, renewable-energy policy, and sustainability.

As part of this initiative, WRISE is expanding the pool of qualified speakers on renewable energy and sustainability topics through a speaker training program. Those who wish to advance and practice their public speaking skills can sign up through the Speakers Bureau platform. ✈

MORE INFO wrisenergy.org/programs/speakers-bureau

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ELEVATING HUB HEIGHTS OF OFFSHORE WTGS WITHOUT ELEVATING COST

A photograph of an offshore wind farm at sunset. The sky is a mix of blue and orange, with soft clouds. The wind turbines are silhouetted against the bright horizon, and their reflections are visible in the calm water. The overall mood is serene and futuristic.



The new advanced direct drive wind turbine generators require strong winds to turn their large blades. Larger, stronger towers are necessary to reach the higher elevations where the wind blows consistently.

By **ANDY FILAK**

Currently, the strength of a large direct drive wind turbine generator (DD/WTG) tower is achieved using various grades of steel that can affect the weight and cost of the structure. The lower the grade of steel, the lower the cost but the higher the weight. A higher grade of steel can reduce the weight of the tower but at a much higher cost. Offshore WTG tower codes call for thicker and stronger grades of steel that can bring the minimum average weight of a steel tower for a 15 MW DD/WTG to well over 1,000 tons. To achieve the goal of lower cost renewable energy, the offshore wind industry needs to evolve toward using lighter, stronger materials for these larger DD/WTG tower structures and adopt more efficient construction methods to reduce costs and ensure environmental sustainability.

NEW MATERIALS FOR MARINE WTG TOWERS

Rather than the current practice of using steel rebar and concrete made from ordinary Portland cement (OPC), strength and durability can be increased, and overall weight significantly reduced, using an emerging new class of marine concrete using basalt (generic solidified volcanic rock) rebar and geopolymer cement. Compared to a similar diameter steel rebar, basalt rebar is seven-to-nine times lighter while providing the same strength. Since basalt is stone, there is no cover requirement; it is waterproof, chemically resistant, and fireproof. The tensile strength of basalt rebar is three times stronger than steel rebar, resulting in a smaller diameter rebar of equivalent strength, reducing the weight of the completed product.

Geopolymer cement (GPC) is made up of four inexpensive and widely available components: type-2 fly ash, fresh water, waterglass (sodium-silicate), and lye (sodium hydroxide). Fly ash has as little as 2 percent calcium, producing a saltwater-resistant material that is durable and fireproof. Environmental sustainability is important for clean energy initiatives, and GPC results in an 80 percent reduction in carbon dioxide emissions compared to the production of OPC, while sustainably reusing “waste” materials such as fly ash in its composition. Workability is a major concern in the mix flow of GPC due to its high viscosity. This is easily remedied with the use of a new type of superplasticizers made from rice husks. The structural design of the DD/WTG

More than 85 percent of the proposed offshore wind farms around the world are out of the range of fixed bottom support structures, creating a market for innovative floating systems. (Courtesy: Shutterstock)



Until recently, European wind turbine generators' (WTG) original equipment manufacturers had initially dominated the global wind-energy industry with steel tower structures. (Courtesy: Shutterstock)

tower will use basalt rebar for tension requirements and basalt fiber for structural composite reinforcing. The GPC binds to the basalt rebar and fiber on both a chemical and mechanical level to provide the strength characteristics required for this new generation of WTG tower.

Clean, hard, strong aggregate particles will account for 65 to 75 percent of the concrete mix design and will be divided into two distinct categories: fine and coarse. The fine aggregates will consist of granite saw dust, washed and sand sized; and chopped quarter-inch basalt fiber. The coarse aggregates will be crushed granite particles ranging in size from 1/4 to 3/8 inch in diameter. Using both fine and coarse aggregates requires a larger quantity of GPC content that will positively influence the concrete hardening properties, resulting in a stronger final product.

TOWER DESIGN, CONSTRUCTION, AND ASSEMBLY

The geopolymer cement (GPC) and basalt rebar tower for a 15-MW direct drive wind turbine generator (DD/WTG) will be comprised of four sections: three will be constructed of GPC concrete and the fourth one of steel. Due to the consistent viscosity of the GPC mix, slipform production becomes the preferred method for the tower construction. Construction of the three tower zone sections can be done on-site in the back harbor, and because all three sections can be slipformed at once, the entire process can be completed in one week. The construction of most steel towers strong enough for a 15 MW DD/WTG are primarily being constructed in Spain and Russia, resulting in exorbitant freight costs to the United States.

The three concrete tower zone sections are each 121 feet, 4 inches long. Slipform construction will allow for the precision tapering of the outer dimension of the overall tower structure while, at the same time, reducing the wall thickness, resulting in a reduction of weight and subsequent material costs. The use of GPC concrete and basalt rebar and aggregates allows for a stronger and significantly lighter tower design. In addition to the reduction in weight, the

high-strength GPC concrete will act as a means of absorbing a variety of vibratory characteristics of the tower, including the natural frequency of the blade pass, the damping ratio, and vibration mode. The three concrete tower zone sections include a base zone weighing 164 tons, a middle zone weighing 107 tons, and an upper zone weighing 63 tons for a total completed tower weight of 334 tons. The result is a tower one-third the weight of a comparably sized steel tower.

Once slip-forming is complete, the tower zone sections are moved from vertical to horizontal to allow for the efficient installation of the internals. These lighter concrete tower zone sections will greatly reduce the craning costs of any handling of the tower zone sections. Assembly at sea can be optimized by eliminating the expensive bolt-up flange plates, which are the key joining components used to connect traditional steel tower sections. The GPC concrete tower zone section flanges are milled for high exactness. The grinding technology necessary to achieve this high level of exactness between the mating surfaces is achieved using computer-numerical-controlled grading. High-strength bull-nose basalt alignment pins are then installed at each end of the concrete tower zone sections. These alignment pins afford a safe and simple process for assembling the tower zone sections: four pins align the sections, and four additional shear pins provide stability. The precision flanges of the concrete tower zone sections will be held together by the high stress forces of post tension cables (168 tons), plus the weight of the tower aloft of the rotor, hub, and nacelle (784 tons).

Eight integrated slip-formed stanchions are equally spaced on the inside face of each of the tower zone segments. These stanchions serve four important functions:

- ▶ They increase the section modulus of the tower structure for added strength.
- ▶ They support a three-inch continuous hole tangent to the face of the inside of the tower. This hole, after extraction of the slip-formed jack pipe, will serve to house the post tension cables that stress the tower zone sections together.

▼ The center of each stanchion includes an inch and a half hole for supporting the basalt bull-nosed alignment pins.

▼ On either side of the stanchions, four inches from the bottom end, are one-inch-deep internal grooves that support the clamps that hold the internals in the tower.

On top of the three concrete tower zone sections is the steel yaw adapter component for the turbine mounting connection. This steel yaw adapter component also serves as the dead-end supports for the post tension cables. These cables, along with the basalt bull-nose alignment pins, serve to align all the tower zone sections together accurately. The installation of the internals and the assembly of the tower takes one week. Including the one week required to slip-form the three tower zone sections, the total build out of the tower is accomplished in just two weeks.

TOWER MARKET, STRUCTURAL CODES, AND STANDARDS

More than 85 percent of the proposed offshore wind farms around the world are out of the range of fixed bottom support structures, creating a market for innovative floating systems, with a new emphasis on those that can support large 15-MW direct drive wind turbine generators.

Until recently, European wind turbine generators' (WTG) original equipment manufacturers had initially dominated the global wind-energy industry with steel tower structures. Now, there are companies in the U.S. and Europe building tower support structures in engineered wood and precast concrete. The code requirements for fixed bottom WTGs in the U.S. offshore market are well defined and were developed jointly by the American Society of Civil Engineers (ASCE) and the American Wind Energy Association (AWEA) and are collectively known as ASCE/AWEA RP2001. Floating WTGs have their own inherent design complexities, and the International Electrotechnical Commission (IEC) has developed IEC 61400-3 design standards for offshore WTG support structures. The aforementioned codes are minimum standards providing an opportunity for the U.S. offshore wind industry to innovate and develop higher standards using new materials and more efficient production methods.

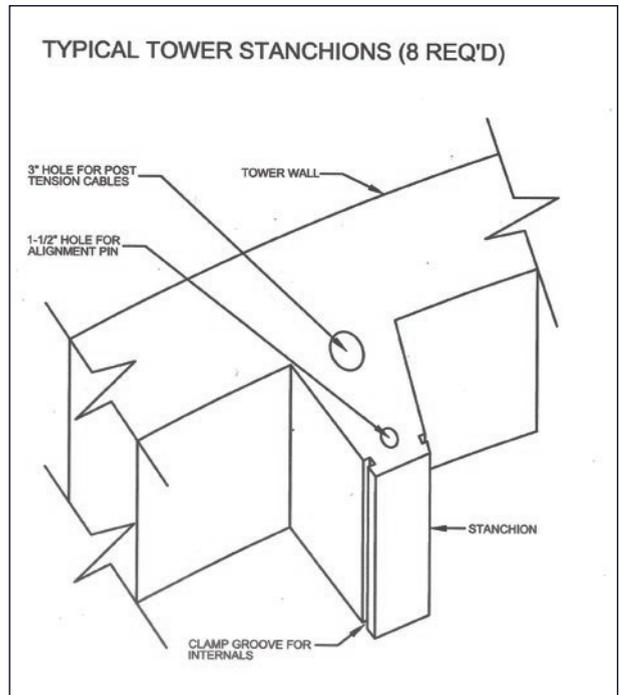
COST SAVINGS ASSOCIATED WITH GPC CONCRETE TOWER CONSTRUCTION EFFICIENCIES

The design and implementation of a geopolymer cement (CPC) concrete and basalt rebar tower suitable for a 15-MW DD/WTG results in a cascade of cost savings and other benefits throughout the production of a floating offshore system:

Construction takes place at a back-harbor location and does not require the remote construction plant or associated freight costs of a comparably sized steel tower.

The precision tapering of the overall tower results in a reduced wall thickness resulting in reductions in weight and associated material costs.

The GPC concrete and basalt rebar tower weighs one-third the weight of a similar sized 1,000-ton steel tower,



A concept drawing of typical tower stanchions. Eight integrated slip-formed stanchions are equally spaced on the inside face of each of the tower zone segments. (Courtesy: AMF Concepts)

resulting in a huge cost saving in the construction of the tower as well as the 650-ton reduction in the supporting floating hull structural capacity.

The cost of craning, transport, and deployment handling of these lighter concrete tower components will be substantially reduced.

The efficiencies of slip-forming all three tower zone sections at the same time, and installation of the internals while the tower zone sections are horizontal, result in substantially reduced labor costs and culminate in a total build out in just two weeks.

The precisely milled concrete tower section joints eliminate the tri-annual maintenance costs normally associated with torquing the bolt-up flanges of a steel tower.

The lack of steel in the three tower zone sections, along with the durability of the CPC concrete and basalt rebar assure a longer life of the tower (a minimum 100 years).

A preliminary cost opinion by an independent source estimated a savings of more than \$1.75 million per tower when accounting for all costs associated with the materials, processes, and labor associated with construction of a 15 MW DD/WTG tower with GPC concrete and basalt rebar compared to a steel tower. ↴

ABOUT THE AUTHOR

Andy Filak is a principal with AMF Concepts. He can be reached at amfconcepts@gmail.com or 310-373-5004.

AUTOMATING WIND-TURBINE LUBRICATION FOR SUSTAINABILITY

New technological developments in the field of electrostatic attraction, a technology long used in power plants, is now available in wind turbines. (Courtesy: Shutterstock)

With more demands on lubricants and the importance of the function they provide, it is clear newer technologies will be needed to secure their continuous quality.

By MICKEY WALSH

Since the beginning of the use of lubricants 5,500 years ago, there have been constant efforts to find ways to keep the lubricant clean and last longer. Early lubricants required frequent replacement. How did we know it needed replacing? Wheels started falling off carts at regular intervals. Folks knew that they needed to re-lubricate before that happened. They also noted that lubricant changes were required sooner when environmental conditions were less than ideal, such as a dust storm in the desert. Frequently checking axles and yolks could ensure they could be reliable on a long trip. It could mean the difference between life and death.

Today's modern power generation plant has lubrication issues that affect reliability just like in the old days. Some of these issues can still be life or death, yours or the equipment's. It is still of paramount importance that conditions be checked on a regular basis. The more often you check, the sooner you find and correct a problem or stop a potential problem. This improves reliability and sustains the productivity of the plant.

IMPROVING OPERATION

Changing out the lubricant because of issues of contamination, useful life, or adverse environmental conditions are a few ways to improve reliable operation. Preventing lubricant degradation is another. New technology in additives and improved performance of Base 4 and 5 oil stocks can drive lubricant life. Other mechanical ways to prevent lubricant degradation include:

- Water and moisture contamination can be eliminated with desiccant breathers and vacuum distillation.

- Dust and dirt (larger micron-size particles) removal can use membrane filtration, kidney loop, ceramic filtration, and centrifugal filtration.

- The elimination of sub-micron particles (fine, very small particles) requires advanced filtration methods such as charge agglomeration and electrostatic filtration.

Knowing that modern technicians have a variety of tools available to prevent and correct equipment problems due to contamination, how do they know the best tool to use for the job?

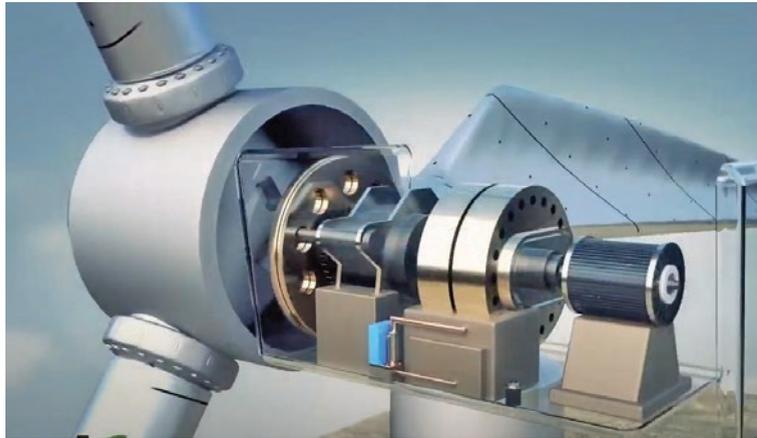
Multi-tools have become a regular item in a mechanics toolbelt. The best solution is a device that addresses all the issues associated with lubricant breakdown and failure. Until recently, there has not been a good single tool for wind turbines that could tackle issues such as moisture [1], oxidation, particulate contamination, and varnish formation.

CURRENT TRENDS

New technological developments in the field of electrostatic

attraction, a technology long used in power plants, is now available in wind turbines. Research and development performed by the University of North Dakota (UND) has proven it can be done. After testing next-generation electrostatic for utility scale power generation plants, UND has been testing electrostatic methods for advanced lubrication filtration. Researchers have found they can reduce particulate contamination to original or better ISO codes from manufacturers. It can even be accomplished with older lubricants containing varnish precursors.

So, if the technology exists to prevent lubricant degradation, then checking the system regularly will ensure operations are where they are supposed to be.



Small footprint of electrostatic filter unit in a wind-turbine nacelle. (Courtesy: Pangea)

ADVANCED FILTRATION TECHNOLOGY

One such advanced filtration technology is Pangea's ELF, an electrostatic filtration device with proven performance in power generating plants, and it is now ready for wind-turbine applications. With IoT technology attached, it can alert wind-turbine managers to trending conditions that may threaten their reliability program.

"Think of electrostatic lubricant filtration as a 'dialysis for lubricants'; when ELF technology is combined with 24/7 IoT monitoring, it becomes a valuable solution for turbine manufacturers who seek to extend equipment life and reduce lubricant costs," said Dan Bicz, president of Pangea Filtration Technology, a Florida-based company that deploys IoT cleantech such as ELF worldwide.

With the data from the university study, as well as power-plant operations to back it up, it is easy to see how advanced filtration technology can reduce the opportunity for lubricant degradation. What is most impressive is the



Typical scale of equipment for electrostatic filtration. (Courtesy: Pangea)

addition of IoT technology to provide real-time management tools. This is a combination of technologies that has been needed for a while. Additional data can provide valuable information for wind-turbine operations where both environmental conditions and frequent inspections are both difficult to schedule.

OTHER FACTORS

Environmental considerations and performance expectations also have affected wind-turbine gearbox design. Smaller, more compact gearboxes under heavier loads are more demanding on lubricants. Other concerns such as extending lubricant change intervals and maintenance cost reductions put equipment at greater risk of wear and failure. Offshore wind farms have their own set of unique operational issues such as water contamination and temperature variations. [2]

With these ever-pressing demands on lubricants and the importance of the function they provide, it is clear newer technologies are needed to secure the continuous quality of lubricants. Keeping these systems moving provides national security and ensures a continuous supply of clean energy for homes and businesses. ✎



Continuous monitoring and reporting assure continued lubricant performance. (Courtesy: Pangea)

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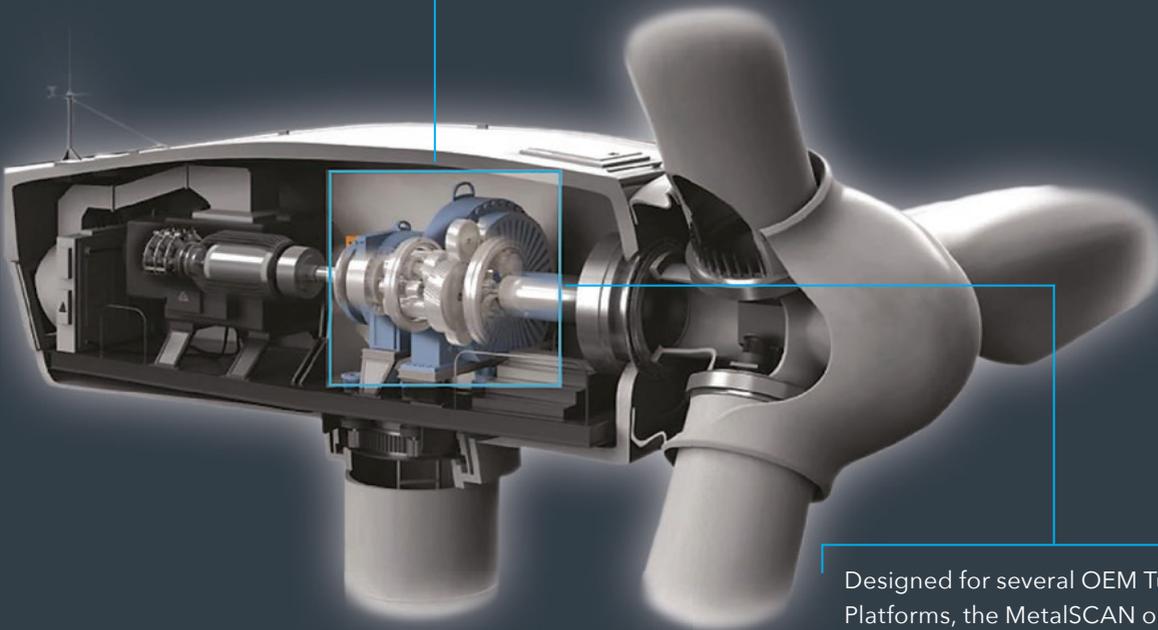
ABOUT THE AUTHOR

JenCode Consultants' Mickey Walsh is a consultant with a 40-year background in fluid management. He can be reached at mickey.walsh@comcast.net.

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gastops

PROFILE

V&SH OFFSHORE SOLUTIONS

EXPERTISE FROM START TO FINISH — GLOBALLY

With WTS Energy's added workforce, V&SH is in a unique position to maximize its background as a contractor. (Courtesy: V&SH Offshore Solutions)

V&SH OFFSHORE SOLUTIONS

FOUNDED
1979

HEADQUARTERS
The Hague, The Netherlands

WEBSITE
www.vshoffshoresolutions.com

V&SH Offshore Solutions contributes to the planet's growing renewable energy projects by providing a wide range of high-voltage activities for offshore wind power.

By KENNETH CARTER ▸ Wind Systems editor

When a wind turbine starts spinning and creating power, that electricity has to be moved to the thousands of homes and businesses that need it. The skill involved in connecting the turbine and the cables delivering that power is essential, and the experts behind V&SH Offshore Solutions are responsible for the necessary HV operations regarding that final connection.

“We perform the testing and termination works, which is the final connection between turbine and cable, making sure that the turbine can basically deliver its power to the substation,” said Gerard Lak, managing director of V&SH Offshore Solutions. “We do the connections in the substation as well, together with the export cable, which is the final cable going to the land. We provide technical expertise, training, necessary equipment, and labor, and we do a test on that final connection making sure it will perform as intended.”

In order to achieve that goal, V&SH provides its services with the mentality of a contractor combined with the flexibility of a large global workforce, according to Lak.

“It is a skill that you need to be trained for,” he said. “You need to be trained for it, because obviously you’re making the final connection of a wind turbine, and, currently, that goes up to 66,000 volts, and this is expected to increase in the coming years, so you don’t want to make a mistake with that. More importantly, there will be no power transferred in case of a bad connection.”

WTS ENERGY

Recently, V&SH Offshore became part of the WTS Energy Group. With the addition of WTS Energy’s assets and global presence, V&SH is even better suited for the task of HV cable connection globally and its goal of contributing to the global electrification.

“It’s increasing our flexibility — a lot,” he said. “WTS was already active globally for 20 years. It has 18 offices world-

wide. They are well-equipped to deliver people for world-wide services. The market currently asks for a service provision model, so you provide labor on a day rate. It makes us far more flexible. We had a skilled pool of labor within our former company, and now that skill pool is simply about 10 times larger as WTS has all the connections around the world. We basically count all those people that are within the WTS database as our possible employees.”

WTS Energy brings offshore experience rooted in oil and gas; however, the company has made a lot of inroads into renewable energy, according to Lak, which is part of what made the company a good fit with V&SH Offshore. WTS Energy brings a global presence, flexibility, and a larger workforce capable of creating local content and a sustainable solution for onshore and offshore wind, as well as solar.

“They already have created local content in southern Africa, for instance, with a turbine manufacturer where we train locals to operate and maintain an onshore wind farm,” he said.

CONTRACTOR RESPONSIBILITIES

With WTS Energy’s added workforce, V&SH is in a unique position to maximize its background as a contractor, according to Lak.

“We are in this for the long-term,” he said. “We want to think with our clients in order

to optimize their process. If we can find optimization so our client reduces its offshore time in regards to safety, risks, and cost, then that’s what we’re here for. That’s why we think early involvement with our clients is the key to joint success and the possible start of a long-term relation.”

TOOLBOX SUITE

As part of that commitment to its clients, WTS has developed an app called Toolbox Suite that Lak said can add a lot of value to the company’s services.

“We provide our work procedure, which is put in the app, for instance, and we can provide all as-built data within 24

▾ It is a skill that you need to be trained for. You need to be trained for it, because obviously you’re making the final connection of a wind turbine, and, currently, that goes up to 66,000 volts, and this is expected to increase in the coming years, so you don’t want to make a mistake with that. More importantly, there will be no power transferred in case of a bad connection. ▸



V&SH doesn't want to just make its clients successful; it also wants to achieve that goal by making the world a greener place. (Courtesy: V&SH Offshore Solutions)



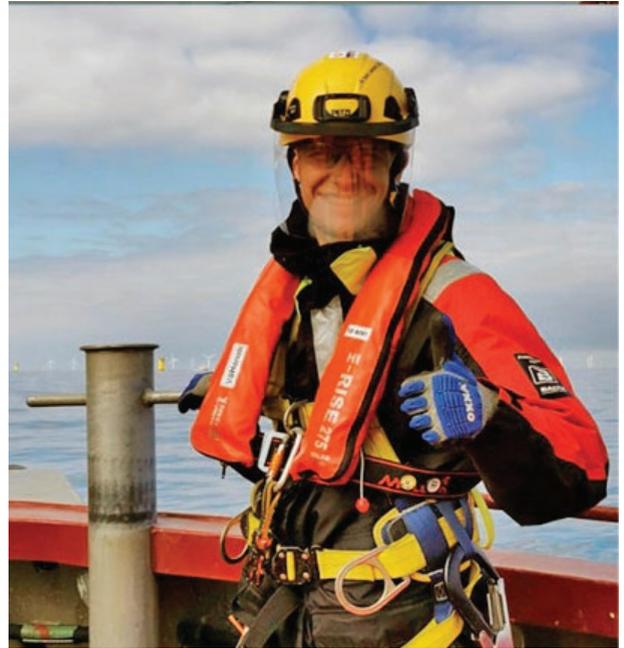
V&SH provides its services with the mentality of a contractor combined with the flexibility of a large global workforce. (Courtesy: V&SH Offshore Solutions)

to 48 hours," he said. "It makes sure our clients have all of the reports in order to start energizing their project and start delivering power as soon as possible. Obviously, for subsidy reasons, that's an important one. It's all real-time based. It's open source, so our client has direct access. It's a transparent system. That's the way we work."

GREEN GOALS

V&SH doesn't want to just make its clients successful; it also wants to achieve that goal by making the world a greener place, according to Lak.

"We want to simply help our clients by making the en-



V&SH provides its services with the mentality of a contractor combined with the flexibility of a large global workforce. (Courtesy: V&SH Offshore Solutions)

vironment better," he said. "Obviously, we are in this to make money as well, because otherwise it would not be a sustainable business. But that's it. With WTS, we now have the possibility of creating local content as well. Take your market, as an example — the U.S. I think by now we all believe that's going to be huge."

To that end, V&SH already has opened an office in Houston, Texas, and is looking for another location that will be central to future U.S. offshore projects as well, according to Lak.

"We want to put up an office and do the same as we do best, here in Europe, which is train people, train local, in order to make a sustainable local business," he said. "That means that we're going to put some experienced European guys there and will bring our 10-plus years of experience to the U.S. Obviously, no doubt within the U.S., you have some very experienced onshore high-voltage people. We just want to make sure that everybody that works for us and goes offshore for us is trained and skilled, making sure we deliver quality and service. The plan is to set up our own training school to basically pick the best and start working."

Setting up a training center is just part of how V&SH continues to share its expertise with the ever-evolving wind market, according to Lak.

"The evolving market has basically made us the specialists we are today," he said. "We have been at the forefront since the start and have been providing our knowledge to all parties over the last several years, whether it has been as contractors, cable manufacturers, or suppliers. Furthermore, it has helped us in building the experience we have

with making in excess of 10,000 HV joints and over 90,000 FO connections, and our workforce of HV jointers has been involved with the vast majority of them.”

THE EVOLUTION OF V&SH

Before V&SH merged with WTS Energy, it began as part of VolkerWessels, one of the largest construction companies in The Netherlands, according to Lak.

VolkerWessels’ specialty was in directional drilling, gas lines, and high-voltage networks. It also had a subsea division formerly known as VBMS, a joint venture with Boskalis. When that was sold to Boskalis around 2016, the remaining parts included high-voltage specialists and mechanics.

“That was made into a testing and termination team for high-voltage works offshore, making the final connection to the wind turbines for the array cables,” Lak said. “Array cables are the cables between the turbines, which is a specialty, and it needs highly skilled labor. All our staff (including office staff) has experience going offshore, and, therefore, we are safe to say that we know what offshore is, and we know the risks involved. We understand that every day that we can save our client having the need to go offshore is one day with safety risks reduced and costs reduced. We constantly strive for that in order to optimize that for our clients.”

CLOSELY INVOLVED WITH PROJECTS

Since the time table for getting a wind farm up and running can be a years-long process, Lak emphasized that it’s important for V&SH Offshore to be involved as close to the beginning of a project as possible.

“Within offshore wind, it can basically take a few years from first tender to project execution. These projects go from the development stage where they need rough quotes for testing and termination works, to the contractor finally being selected possibly some years later. There are separate rounds of tenders. To us, it’s all up to the contractor. We like to get involved as early as possible so we can share our technical knowledge and see what we can do in order to reduce costs, risk, optimize procedures and train people, and make the costs as reliable as possible.”

With so many countries setting renewable energy goals for 2050 and onward, Lak said he expects there to be a lot more work to come for V&SH.

“I see Asia as being a growing market, which is not settled, but it’s there,” he said. “I see the States, obviously, as the next new big thing, when it comes to offshore wind. I see V&SH Offshore in that aspect, having offices in all regions with a local workforce that requires training and on our payroll. That means next to Europe, people in Taiwan, people in the States. We’re looking at onshore wind in Africa; we’re looking at solar in Africa. If we can help the renewable energy sector and energize this world, that will definitely help. We’re not bound to the Netherlands and Germany anymore. Our aim is simply to become the best jointing company in the world.” ↵

YOUR SOURCE FOR WIND ENERGY NEWS

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Kim Sandgaard-Mørk

Executive Vice President for Renewables Certification ▸ DNV

“DNV wants to play an important role in the energy transition in one of the biggest economies in the world trying to reduce the impact of CO₂ emissions.”

▸ DNV recently achieved CNAS accreditation for certification of wind turbines and components for use in China. What does that mean for DNV?

This is an important milestone for DNV in China because we are now able to serve the local market to achieve certification according to local requirements for domestic markets. It also establishes the fact that our local organization is a strong team that can meet the needs of the growing wind industry in China. The outlook for renewable energy in China is huge since there is a bold target of carbon neutrality and, therefore, a complete energy transition.

The distance from customer to DNV and market has become lower due to this CNAS accreditation.

▸ What makes the Chinese wind market important to DNV?

The Chinese wind market is not only a big market by quantity, but a lot of Chinese stakeholders are also becoming very strong in developing new technology and build on experience. Therefore, the reach for Chinese OEMs and developers may become more international and important due to the bigger impact they have on the industry.

DNV wants to play an important role in the energy transition in one of the biggest economies in the world trying to reduce the impact of CO₂ emissions. DNV believes that, with our knowledge and experience, we can increase cost efficiency and technology without compromising on the environmental impact and the quality of products.

▸ What predictions has DNV's Energy Transition Outlook made about wind in China?

The Energy Transition Outlook released in 2020 puts Greater China as the undisputed leader in energy transition, topping investments in renewable power and fuels. At least 35 percent of power generation is to come from renewables by 2030, and China has begun its shift to a subsidy-free era

relying on renewables obligations and tendering systems.

More than half of final energy demand is supplied by electricity in 2050. This is the highest of all regions and driven by electrification of all demand sectors — transport, manufacturing, and building, with 9 percent coming from offshore wind and 28 percent from onshore wind.

▸ Why is it important to be accredited by CNAS (China National Accreditation Service)?

The accreditation assures that DNV delivers certification according to a specific and agreed scope, and all procedures are under constant monitoring of the accreditation body. This gives confidence to external customers or stakeholders in DNV the ability to comply with local regulations and laws. The accreditation is also a trademark that enables customers to know what is included when we provide the certification service, and the local authorities can accept our certificates for the domestic market. So, the CNAS accreditation is a way to localize certification.

▸ Why must Chinese wind projects need access to risk mitigation measures?

As DNV sees it, there is rising competition in the wind market in China due to less subsidy from the government. This means that cost is even more under pressure and having a third party assuring quality in projects is one beneficial way to even competition and make sure the quality is high despite any cost pressure. Also, we believe that we are able to easier help manufacturers to the market with a qualitative product.

When the market is booming, developers with limited experience may enter the market due to the obvious opportunities, and when a third party is mandatory again, this helps customers to enter the market on a safer level.

▸ Why is it important that DNV's customers ensure their products meet local Chinese requirements?



The Chinese wind market is not only a big market by quantity, but a lot of Chinese stakeholders are also becoming very strong in developing new technology and build on experience. (Courtesy: DNV)

One reason, naturally, is that requirements are given to meet safety standards and, thereby, have a more reliable source of electricity.

The people of China are relying on the government to provide a stable and continuous power supply in a growing economy, so meeting the local requirements is key to a success for the economic growth of China.

► **What types of certification services are available from DNV for wind energy?**

There are several different services available from DNV for wind energy, but the main services seen as needed by customers in China are type and component certification, shop approval, site specific design assessment, type approval of materials, and project certification.

DNV is supplying these services locally to customers, but, so far, project certification is not a requirement. DNV sees

this as a potential to secure the assets for the wind industry, and in many markets, this is provided because developers and financiers and insurance companies see this as a means to secure a reliable power supply.

► **Will the CNAS accreditation allow DNV to offer tailored conformity assessment services? How so?**

The accreditation provides a set scope, and, therefore, the statement of compliance should always be the same. If, however, customers have a wish to discuss how to reach the conformity statements, DNV is willing to have this discussion as long as it is understood by all parties that there are certain given criteria that need to be met for DNV to issue a statement or certificate. DNV cannot and will not compromise on quality and integrity. ↴

MORE INFO ► www.dnv.com

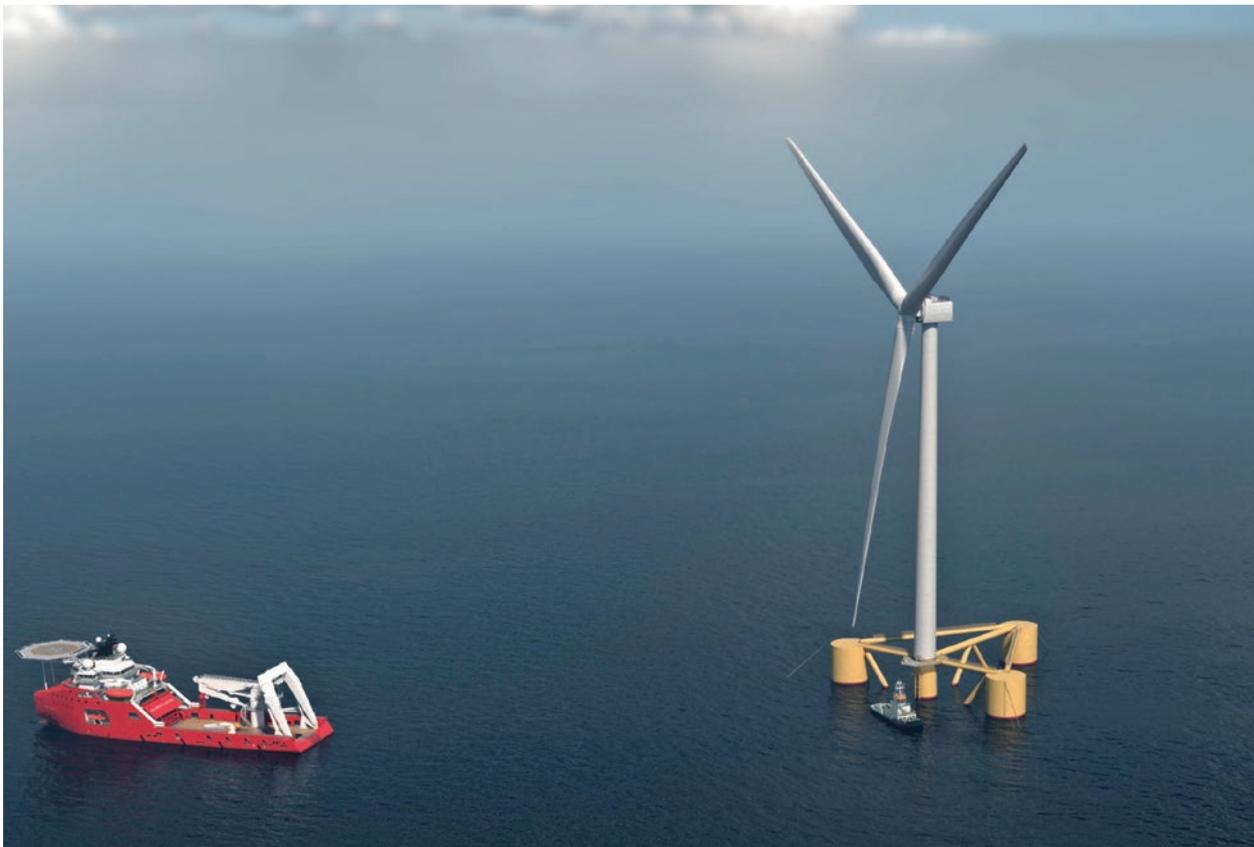


Illustration of a floating wind turbine. (Courtesy: Cerulean Winds)

CONSTRUCTION

Cerulean Winds names NOV as offshore delivery partner

Green infrastructure developer Cerulean Winds has named NOV as the first of its delivery partners for the fabrication of its proposed integrated 200-turbine floating wind and hydrogen development off the coast of Scotland.

The arrangement would establish NOV as the exclusive provider of floating and mooring systems in support of the venture, which would have the capacity to accelerate the decarbonization of oil and gas assets in the UKCS by more than halving the 18 million metric tons of CO₂ they currently produce by 2025.

NOV, one of the largest providers of marine equipment and wind-vessel designs in the world, has more than 20 years of experience in the offshore wind sector and unrivaled expertise in the installation and maintenance of floating structures in the energy space. Its participation as a delivery partner confirms the viability of Cerulean Winds' trailblazing proposal.

Cerulean Winds is led by Dan Jackson and Mark Dixon, who have more than 25 years' experience working together on large-scale offshore infrastructure developments in the oil and gas industry.

"We are very pleased to announce NOV's involvement with the project," Dixon said. "As the largest and most qualified provider of marine equipment and wind-vessel designs working in this space, the experience and

knowledge they will bring to a project of this magnitude is second to none. Having them on board brings the scheme a step closer to reality. We have a number of Tier 1 delivery stakeholders signed up. We can't disclose who they are at this stage, but they are some of the largest providers in the world, with the scale and capacity to deliver, and we look forward to making further announcements over the coming months."

"We are very excited to partner with Cerulean on this groundbreaking proposal, which will leverage NOV's core competencies as well as our U.K. and European infrastructure and personnel in a key energy transition project, which will drive major progress in the goal of decarbonizing the Offshore U.K. sector," said Joe Rovig, president of NOV Rig Technologies. "NOV is eager to

demonstrate our abilities as one of the key partners and household names in the global energy transition, just as it has been for decades in the traditional oil and gas industry.”

Targets set out in the recently published North Sea Transition Deal call for a reduction in offshore emissions by 10 percent by 2025 and 25 percent by 2027. To achieve that, preparatory work must begin now if those targets are to be met. Failure to do so undermines the objectives of the Deal.

If it gets the go-ahead, the £10 billion Cerulean Winds project has the capacity to generate enough power to electrify the majority of assets in the UKCS to meet and exceed those targets within the timescale.

However, the timing involved in gaining approvals for the project is critical. Cerulean Winds has submitted a formal request to Marine Scotland for seabed leases, and these must be granted by Q3 in 2021 to target financial close in Q1 2022 and to begin construction soon after so that the infrastructure is in place by 2024-2026.

To support this, the venture is calling on the Scottish and U.K. governments to make an “exceptional” case to deliver an “extraordinary” outcome for the economy and the environment.

“The U.K. has set world leading targets to progress energy transition, but to achieve them there must be a greater sense of urgency and joined up thinking,” Jackson said. “If assets don’t reduce their CO2 emissions by the mid-2020s, increased emissions penalties through carbon taxes will see many North Sea fields become uneconomical and move them toward decommissioning by the end of the decade at the cost of thousands of jobs. That would seriously compromise the U.K. oil and gas industry’s role in homegrown energy security. It must remain a vital element in the transition journey for decades to come, but emissions have to be cut significantly to make the production greener.”

“This project will accelerate that process enabling assets to not only

cut their emissions in line with targets but to greatly exceed them,” he said. “There are no other proposals currently in the pipeline with the scale and capacity to deliver that result, but to achieve it, the process must begin now, which is why a favorable decision on seabed leases by Q3 2021 is essential.”

The proposed development involves:

- ▼ More than 200 of the largest floating turbines at sites West of Shetland and in the Central North Sea with 3GWh of capacity, feeding power to the offshore facilities and excess 1.5 GWh power to onshore green hydrogen plants.

- ▼ Ability to electrify the majority of current UKCS assets as well as future production potential from 2024 to reduce emissions well ahead of abatement targets.

- ▼ 100 percent availability of green power to offshore platforms at a price below current gas turbine generation through a self-sustained scheme with no upfront cost to operators.

- ▼ The development of green hydrogen at scale and £1 billion hydrogen export potential.

- ▼ No subsidies or CFD requirements and the generation of hundreds of millions of pounds in government revenue via leases and taxation through to 2030 and beyond.

Cerulean has undertaken the necessary infrastructure planning for the

scheme to ensure the required level of project readiness, targeting financial close in Q1 2022. The company is being advised by Société Générale, one of the leading European financial services groups, and Piper Sandler, corporate finance advisors to the energy industry.

MORE INFO ceruleanwinds.com

► CONSTRUCTION

Collett & Sons to transport components for Scotland wind farm

Collett & Sons, specialists in heavy hauling, will transport and manage all wind-turbine components for the Windy Rig wind farm in Dumfries & Galloway, Scotland.

Heavy haulage specialists Collett are the first transport company to use a Blade Lifter on a U.K. wind farm. Working in partnership with P. Adams Transport, Collett have been appointed to manage and transport all wind turbine components for Windy Rig wind farm in Dumfries & Galloway, Scotland.

The Windy Rig wind farm will consist of 12 Vestas V112 turbines when finished. Each turbine features 55-meter long blades and a 69-meter hub height.



Collett is the first transport company to use a Blade Lifter on a U.K. wind farm. (Courtesy: Collett & Sons)



An Enerpac cylinder compresses the top and bottom wheels together. (Courtesy: DLM)

Collett will use its Super Wing Carriers to transport the 55-meter-long blades during night deliveries from the Port of Ayr to a transition point located 18 kilometers from the main wind farm site. The blades are then transferred onto the Blade Lifter operated by P. Adams for the final part of the trip.

The company's fleet of specialized trailers will deliver the rest of the components; including tower clamp trailers for the tower sections and multi-axle low-bed trailers for the heavier components such as the nacelle and drive trains.

The Blade Lifter mounts the blade

horizontally on to the module. Using the Blade Lifter's hydraulic lifting system, the blade can be tilted to an angle of up to 60 degrees, avoiding the need for extensive and expensive civil engineering.

Collett & Sons will be the first company to use a Blade Lifter on a U.K. wind farm. Using the Blade Lifter has enabled planning consent for the Windy Rig farm without the risks and costs associated with third party land.

All equipment deliveries are under way and are expected to be completed later in 2021.

MORE INFO www.collett.co.uk

▀ CONSTRUCTION

DLM's saddleback holdback tensioner used for subsea cable

Dynamic Load Monitoring Ltd. of Southampton, U.K., has expanded its range of line tension measurement technology with a new device for measuring tension and creating holdback force on a single piece of subsea cable. The product, which combines the established Saddleback product from DLM's catalog with an additional hold

back tension element, is being primarily used by the vessel NKT Victoria, with further devices in the pipeline for a number of customers.

When consulted about a solution for measuring line tension and creating a holdback force for a cable lay project, DLM, a specialist in the design, manufacture, repair, and calibration of load cells and load monitoring equipment, devised the saddleback holdback tensioner (SB-HBT).

The SB-HBT (450 kilograms) works by creating additional line tension on the subsea cable running through it, specifically for bundled cable lays. A saddleback can measure line tension from zero to 5,000 kilograms and is suited for more delicate cable, including telecommunication cables or large cable where a running line monitor is unsuitable. Moreover, a twin pair of Dunlop 18 x 7 SMO LCE tyres are connected to a hydraulic cylinder to clamp the two wheels together, and a disc-braking system is used to con-

trol the rotational speed of the wheels on the SB-HBT. The device can create 750 kilograms of clamping force between the wheels and holdback 500 kilograms of line tension. On the top wheel there is an encoder to measure speed and distance.

“This is the first requirement we have had (for the SB-HBT), but we have discussed it with other potential customers; this seems to be a reoccurring problem aboard vessels,” said Chris Scrutton, technical manager at DLM. “It can be used when a cable-laying vessel is completing a new lay project and needs to control the departure speed to small diameter cables being bundled alongside larger cable diameters. The reason for doing this is that the small diameter cable often does not bundle tightly enough with the larger diameter cables and can run free of the bundle when departing off of the vessel.”

In this instance, NKT, a provider of turnkey cable solutions that meet the

ever-growing demand for power, is using the SB-HBT on a 22-millimeter-diameter fiber optic cable. The “holdback” (holdback force is essentially a term for adding line tension to a cable) element of the device creates additional tension to control the departure speed of the cable for bundling with DC power cable prior to being laid subsea.

An Enerpac cylinder compresses the top and bottom wheel together to create grip pressure onto the cable before the brakes are employed to slowly rotate the wheels. Without clamping the two wheels together, the cable would simply run free.

The (orange) HBT element houses all of the components, while the saddleback is the item bolted to the front of the frame.

“This was another project where we were approached by a client with a design brief to develop a product for their application,” Scrutton said. “NKT had a specific requirement for a device that could measure the line

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tension and create the holdback force. The concept went from a design discussion to a delivered product in less than six months.”

MORE INFO www.dlm-uk.com

INNOVATION

UAT announces vertical-helix wind-turbine testing

Umbra Applied Technologies Group, Inc., a subsidiary of Umbra Applied Technologies, recently announced that its proprietary, advanced wind turbine soon will begin undergoing field testing.

Dubbed the V-HET, the high-tech vertical helix turbine is constructed of aluminum, carbon fiber, additional composite materials, and steel, making each unit robust enough to withstand the elements but light enough to harness the maximum amount of wind power. The technology uses a modified helix-shaped, wind-capturing design that increases the unit’s ability to harness more of the wind’s energy. The helix blades use an electromagnetic field to “float” the blades to reduce mechanical resistance and the loss of energy associated with the friction that plagues many modern systems in use. This enables the unit to generate power at extremely low wind speeds typically only common of much smaller units, while producing exponentially more energy.

Testing will also include the V-HET variant, V-HETp. The V-HETp or vertical helix turbine power station, harnesses energy from wind, solar, ambient temperature differentiation, and in-ground telluric currents. This is a significant leap forward in producing true clean energy using more than 75 percent recycled materials to manufacture each unit. The company estimates the carbon cost of delivering each unit to be a fraction of existing platforms.

An array of 12 units is estimated to



The V-HET, the high-tech vertical helix turbine is constructed of aluminum, carbon fiber, additional composite materials, and steel, making each unit robust enough to withstand the elements but light enough to harness the maximum amount of wind power. (Courtesy: UAT)

produce as much as 85,500 kWh of energy annually — about what seven average American homes burn in a year. A building’s electrical system will take the energy when it is available and switch to power from the local utility when it is not. The V-Het will cost a fraction of what many wind turbines currently in use do and are targeted to deliver more electricity than units similar in size.

“Units have been under development for several years and represent a paradigm shift in current wind-harnessing technology,” said UAT’s CEO, Alex Umbra. “I am optimistic that once delivered, this platform will represent a significant leap forward in the clean-energy segment.”

The company estimates this technology can cut the carbon emissions of a 10-story commercial building by about 2 million pounds annually and saving the equivalent of 44,000 gallons of gasoline each year.

The units will be tested in varying environments across the United States in a partnership that includes business owners that have been long-time shareholders. These shareholders have volunteered to assist in the testing and development process onsite, at their places of business, to include several automotive dealerships.

“From the moment we launched Hygiea-related products, we have in-

cluded shareholders in the testing and development process in a shareholder-centric partnership,” Umbra said. “This partnership affords the company an opportunity to include our shareholders in a way that most companies do not. Who better to get feedback from than those that have a vested interest in the company’s success? With Helix (V-HET), the goal is to test the unit’s ability to not only capture energy but determine its ability to deliver that energy for the purposes of charging EVs. This will assist in further reducing the carbon footprint of such vehicles and deliver true clean energy to charge them.”

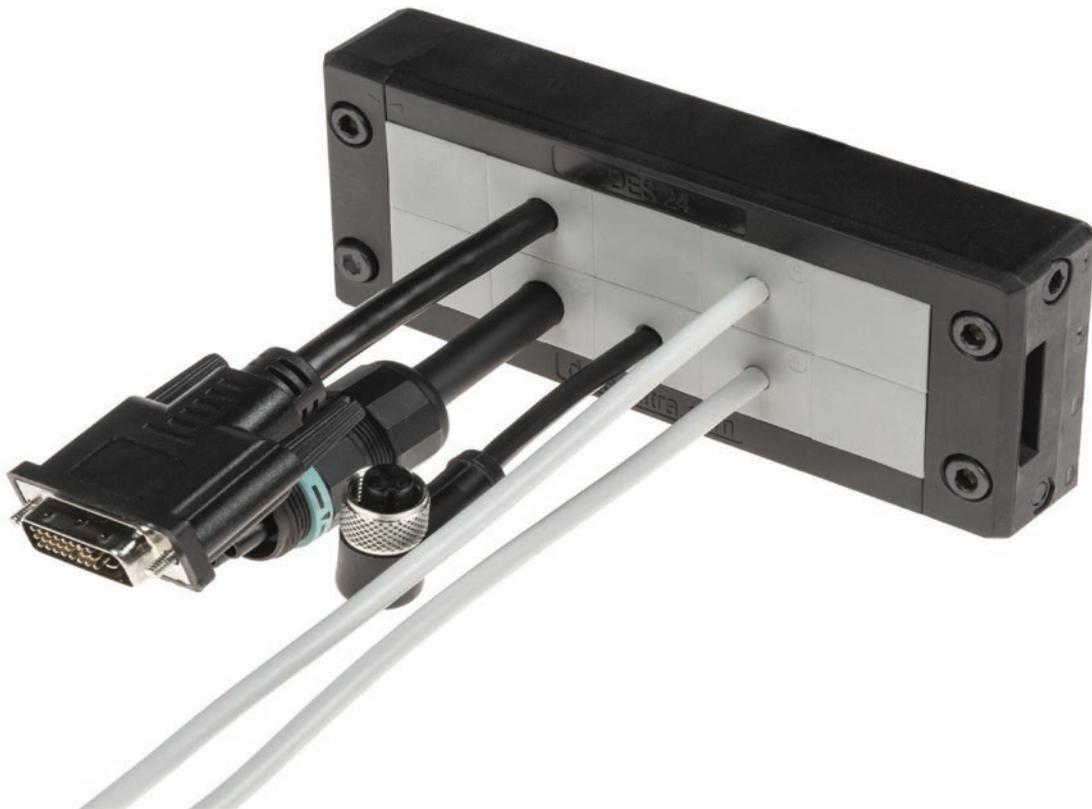
MORE INFO umbraappliedtechnologies.com

INNOVATION

AerosUSA offers cable protection system for offshore equipment

AerosUSA is offering High-Performance Cable Protection Systems to increase the ability of offshore wind equipment.

As wind farms increasingly move offshore, environmental factors will play a larger role. For example, turbine towers will be exposed to a greater



AerosUSA is the North American distributor of DetasUltra cable entry systems. (Courtesy: AerosUSA)

and more constant amount of wind. Increased motion will then cause more torsion, vibration, and abrasion to the cabling and wiring, which leads to higher possibilities of rework and retrofiting.

The system includes conduits, fittings, and accessories that meet various industries' regulations. Its core products are manufactured from high-performance polyamide resins and include FLEXAquick, one-piece fitting technology from AerosUSA.

The lighter weight solution includes UV protection and several levels of IP ratings. AerosUSA has, for more than 10 years, supported onshore sites, so its cable protection product portfolio is uniquely suited for offshore needs.

MORE INFO aerosusa.com

INNOVATION

Kenzen makes heat stress trackable with additions to smart PPE

Kenzen has improved its smart PPE system to keep workers safer in hot environments. The additions can now track heat susceptibility and sweat rate, both of which are important to managing stress, injury, and fatality risk.

The system calculates a worker's susceptibility to heat, classifying that into low, moderate, or high risk categories. The calculations are determined by workers' physical fitness, medical conditions, history of heat injury or illness, chronic illnesses, medications, and age.

The system does not track personal information, and is only used to help supervisors manage and monitor heat risk.

"Managers have so much to worry about at their worksite, including if their workers are physically able to work safely to get the job done well and on time," said Nicole Moyon, Kenzen's vice president of research and development. "This new feature tells managers which workers to monitor closely on hot days, and when and how to alter an individual's schedule or workload."

Kenzen's sweat rate monitoring feature uses a worker's information and physiological data to calculate and predict their sweat rate in liters per hour. A manager can view an individual's sweat rate on the Kenzen analytics dashboard, which also indicates



Poseidon Systems is deploying its DM4500 to a total of 402 turbines. (Courtesy: Poseidon Systems)

how much water that person needs to drink each hour to stay hydrated. The data eliminates the guesswork in how to keep workers safely. Using the system, managers can bring enough water to the worksite to hydrate their teams sufficiently, based on each individual's sweat rate and the predicted environmental conditions that day. Kenzen's proprietary sweat rate feature gives a hydration plan that is accurate within one quarter of a liter (1 cup of water).

"There is no 'one size fits all' when it comes to hydration, which is why it's important to use each person's sweat rate for an individualized hydration plan," Moyen said. "Dehydration is a major problem on worksites and increases the chances of someone getting a heat injury or illness, having an accident at the worksite, or suffering from cognitive impairment. Staying hydrated is a simple fix to avoid most of these problems."

Kenzen devices worn by workers contain sensors that monitor, in real time, an individual's physiological responses. The system warns workers when their core temperature is too high and they are in danger of a heat-related injury. Managers have a corresponding app that alerts them when a worker needs an intervention to stop work, rest, and hydrate, and a second alert for when it's safe to return to work. The system can also

aggregate data over weeks and months.

Kenzen's heat monitors are used by workforces across the globe in domains such as construction, mining, field services, manufacturing, renewable energy, utility oil and gas, agriculture, and transportation.

This summer, Kenzen has a rental program for companies to quickly deploy the technology with packages of 10, 20, and 50 devices.

MORE INFO [Kenzen.com](https://www.kenzen.com)

INNOVATION

Poseidon deploys wear debris monitoring system

Poseidon Systems is deploying its wear debris condition monitoring device, the DM4500, across 10 sites in Duke Energy Sustainable Solutions' wind turbine fleet.

The sites include wind turbines from Siemens Gamesa, Suzlon, Nordex, and GE wind turbines, a total of 402 turbines.

"We appreciate Duke Energy Sustainable Solutions' forward thinking and innovation integrating wear debris CMS into their already existing vibration-based CMS monitoring program," said Mark Redding, CEO and

founder of Poseidon Systems.

Poseidon's monitoring is being deployed alongside Duke's existing vibration-based condition monitoring system to provide earlier detection of gearbox faults, better indicators of fault severity and end-of-life, as well as catastrophic event detection.

"The addition of the Poseidon Wear Debris Monitor Device to our toolbox will greatly improve our ability to understand the current condition or status of our gearboxes," said Jeffrey Wehner, Duke Energy Sustainable Solutions' Vice President of Operations. "This device, coupled with vibration and lubrication analyses, will allow the team to provide more specific recommendations to extend gearbox life. Being able to predict future gearbox events and plan repairs or replacements prior to catastrophic failure will result in cost savings to the business unit."

Poseidon Systems projects that it will have 10,000 wind-turbine condition monitoring kits installed by end of 2021.

Using data from the Poseidon Systems' installed base, Poseidon will continue to work with Duke Energy Sustainable Solutions and other wind customers to develop more advanced detection alarms and life extension algorithms. This development has extended to recent integration of journal bearings on wind-turbine gearboxes,

using the DM4500's superior detection range of non-ferrous materials for better detection of emerging faults.

Through Poseidon Live (PSL), cloud-based online monitoring software, Poseidon Systems is helping customers detect asset failures at the earliest possible point in time and prevent failures through identification of root causes before failure occurs.

MORE INFO poseidonsys.com.

▀ **MAINTENANCE**

Deutsche WindGuard gains body type A inspection status

Deutsche WindGuard has repositioned its wind energy turbine service area, which will now operate independently as Deutsche WindGuard Inspection GmbH.



The German Accreditation Body “This new classification as a type For 20 years, Deutsche Windguard has inspected offshore and onshore wind turbines. (Courtesy: Deutsche WindGuard)

DAkKS awarded Deutsche WindGuard in early June.

The company was accredited back in 2010, and since then it has constantly expanded its range of services. Today, the company inspects about 800 turbines on sea and land in each year.

An inspection body is the logical consequence of our many years of experience and service quality,” said Jan Wallasch, managing director of Deutsche WindGuard Inspection. “This accreditation, in accordance with an internationally valid standard, certi-

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fies us and guarantees our customers maximum independence and highest quality standards,” Wallasch said.

The certification comprises inspection of wind turbines and their components, including commissioning inspections, recurring inspections, lifetime extension inspections, endoscopic inspections of gearboxes, bearings and generators, and hoist platform inspections.

“For all these tasks, we are optimally positioned with our almost 20 qualified experts,” Wallasch said. “Most of them have been contributing their expertise to the success of our inspection body for many years.”

MORE INFO www.windguard.com

MAINTENANCE

R&D develops Bolt-Check tension measurement tool

R&D, an engineering company headquartered in Denmark that supplies test systems and consultancy for the wind-energy sector, has developed the Bolt-Check system, a bolt-tension measuring tool.

Designed to be used on standard bolts, Bolt-Check offers wind turbine manufacturers and service companies a series of benefits normally only available at much higher prices.

Wind turbines typically contain more than 6,000 bolts, and every bolted joint requires regular in-service tension inspections, because force and vibrations can loosen bolts over time. These inspections are time-consuming and expensive, and results can vary based on the inspection method.

“This Bolt-Check system can be implemented at a cost of 3-4 euros per bolt, which represents a cost advantage for wind-turbine manufacturers since alternative systems using specialized bolts can increase the cost 10 to 50 times per bolt, or even more, depending on the bolt size,” said Flem-

ing Selmer Nielsen, R&D’s senior specialist.

The Bolt-Check system uses its proprietary method based on combining an ultrasonic length measurement with a mechanical measurement, which eliminates the requirement for thousands of bolts to be loosened and then tensioned again to measure the loading on the joints.

Hundreds of bolts can be checked in just a few hours.

“We are offering a solution that gives a high level of accuracy at a very competitive price and even more importantly, it saves a huge amount of time,” Selmer said. “Traditional tools are heavy and potentially dangerous as they operate at high hydraulic pressure,” he said. “Bolt-Check is easy to use and hand-held, therefore, it also provides a significant health, safety, and environment improvement.”

R&D offers Bolt-Check solutions for both new bolts and for bolts already in operation, and includes unique ID tags that are easily added to the bolts either at the installation stage or first inspection check. Tagging the bolt guarantees traceability and detailed documentation.

The system has obtained DNV-GL certification, allowing the Bolt-Check solution to be used for service and maintenance inspections as an alternative to torque or tension tools. The certificate provides independent verification that Bolt-Check fulfils the stringent standards of wind turbine tools and services.

Bolt-Check is scheduled to be presented at the Husum Wind exhibition Sept. 14-17, 2021.

MORE INFO www.rd-as.com/bolt-check

MANUFACTURING

Vestas wins 92-MW order in the U.S.

Vestas has received a 92 MW order to power an undisclosed wind project



The Vestas V150-4.2 MW turbine. (Courtesy: Vestas)

in the U.S. The project consists of 22 V150-4.2 MW turbines.

The order includes supply, transport, and commissioning of the turbines, as well as a multi-year Active Output Management 5000 (AOM 5000) service agreement, designed to ensure optimized performance of the asset.

Turbine delivery will begin in the second quarter of 2022 with commissioning scheduled for the fourth quarter of 2022. The customer and project are undisclosed.

Vestas is the energy industry’s global partner on sustainable energy solutions.

The company designs, manufactures, installs, and services onshore and offshore wind turbines across the globe, and with more than 136 GW of wind turbines in 84 countries, it has installed more wind power than anyone else.

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MORE INFO www.vestas.com



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PREPARING FOR A WIND-FARM EMERGENCY

Providing essential basic medical training to the personnel who work on offshore projects helps protect their health and safety and that of their colleagues. (Courtesy: Remote Medical International)

Consistent and continuous medical training keeps offshore workers safe, healthy, and working.

By **DUNCAN HIGHAM**

When an emergency medical situation arises on an offshore wind farm, especially one requiring the extraction of an injured employee, every minute counts. This is often more complicated if the injury occurs in a difficult-to-access area like in the nacelle of a wind turbine. Not only does the injured worker need to be safely moved to the extraction point, but proper, life-saving first aid needs to be administered throughout the process.

The first step is ensuring a complete, updated medical emergency response plan. These plans, along with medical consulting services from an experienced partner, ensure your team can proactively and successfully prepare for and respond to medical emergencies. A comprehensive plan includes medical site surveys, emergency action checklists, evacuation plans, transportation options, and communication plans that help workers effectively handle a medical emergency.

WHY TRAIN?

While requiring every worker to complete first aid courses is important, most workers remain undertrained and ill-equipped to provide care for major traumas. First aid training takes place on average every two years.

Studies show, however, that if the skills are not used regularly, both knowledge and ability fade significantly after about nine months. Even with on-site medical support provided by a partner such as Remote Medical International, there is an essential need to train the workforce on offshore wind farms.

In essence, it comes down to time-to-care. Wind farms are often spread across miles — some may even be up to 50 miles across. If a medic is not available when a major medical issue or trauma occurs, the first aider must give treatment from the point of the incident and during the transfer and transportation to a hospital or treatment center — a process that could take hours.

For example, on one offshore site, a young worker, who had been in good health, unexpectedly had a heart attack while working on the turbine. Because of ongoing training, the worker's team members knew how to stabilize him on the turbine, lower him down in a position that would allow care to continue and mitigate complications, transfer him to the vessel, and then continue to provide first aid until the medic met them en route to port and took over care.

TRAINING PROCESS

The most important type of training, and something everyone should have, is first aid and rescue training. For the most part, this is standard practice. But most, if not all, of those trained have never practiced or trained on their turbines. This is very important as every turbine has different res-

cue methods. For example, a worker may be familiar with a turbine with internal climbing but have never worked on or practiced external climbs or on zip lines. In addition, most training facilities have a limited supply of turbines, and most are short, rarely the height you will find on an actual wind farm. "Classroom" training is very different from performing a rescue on-site. The first time any worker should do this is in practice, never on an actual rescue.

When training on-site, it's important to train under different conditions as the weather, sea, and other factors are constantly changing on a wind farm. Therefore, practice should be customized and varied to address the anticipated (and unexpected) conditions, the type of equipment and turbines, and other factors unique to each site. These factors also should be integrated into the overall medical emergency response plan.

While everyone should have basic first aid training, minimally, there should be one person fully trained and capable of a rescue per team. Ideally, there should be two or three individuals. Training typically takes place on off-weather days when factors are too dangerous for regular work, or on days where the wind is ideal for the turbines to produce. If a team is on-site for 10 days, for example, there may be six days where training and practice can occur.

This gives crews time to become familiar with the different types of rescue and medical equipment, including the medic box and rescue apparatus, where it is, when it's called for in the training procedure, and how to use it properly. In addition, they can partake in regular basic first aid re-fresher courses and practice.

Additionally, they can run scenarios, from simple rescues going from the nacelle to the platform, until the trainer and crew are 100 percent happy with the outcome and confident in their abilities.

Many studies have been done on how quickly skills fade when not used daily. A study by the General Medical Council in the United Kingdom showed that skills decline over periods ranging from six to nine months, according to a curve, with a steeper decline at the outset and a more gradual decline as time passes. The amount of time between learning and losing a skill varies between skills and between individuals.

WHY PARTNER?

Rescue operations on a wind turbine require specialized skills and knowledge. The column in a generic wind turbine is incredibly cramped, and the nacelles were not necessarily designed with emergency access capabilities in mind.

As a result, providing critical emergency care during the Golden Hour (the crucial period when prompt emergency care can result in the injured person surviving) is even more difficult. But having a professional team that can reach the



When training on-site, it's important to train under different conditions as the weather, sea, and other factors are constantly changing on a wind farm. (Courtesy: Remote Medical International)

injured party quickly and effectively, regardless of conditions, will help the workforce operate in relative safety.

For example, treating someone on a stretcher as they are being lowered feet first down a tube is very difficult. While the general treatment for the illness or condition may be the same as in other settings, it may require specific modifications and in-depth knowledge of both the situation and medicine.

For example, how do you successfully modify the process in a situation where you can't raise the injured or ill individual's feet above his or her head while lowering and still complete the rescue quickly? A trained EMT or medic will know this instinctively.

Emergencies can arise when least expected, resulting in potentially life-threatening injuries. Providing essential basic medical training to the personnel who work on offshore projects helps protect their health and safety and that of their colleagues. It also helps keep projects on track and running successfully.

The best way to guarantee that proper medical treatment is available is to retain a professional staffing service that provides trained medical personnel for local or

remote medical support. These organizations, such as Remote Medical International, provide a complete range of medical services including training, medical and safety staff, topside support, case management, and evacuation services.

In addition, by providing wellness checks and thorough basic observation, they can identify and prevent minor injuries from potentially becoming reportable incidents. Most importantly, by providing all these services under one roof, they provide an unparalleled continuity of care from the incident to case resolution. ✎

ABOUT THE AUTHOR

Duncan Higham founded SSI Risk Management (SSI) in 2012 and SSI Energy in 2016 and successfully grew the SSI Group into a multi-million-dollar business prior to its acquisition by Remote Medical International. He graduated from Cardiff University and Imperial College in Economics before receiving emergency medical training in Cape Town, South Africa. In his current role as VP Global Strategy with RMI, Higham is responsible for the direction of growth for RMI with a particular focus and expertise in renewable-energy emergency response.

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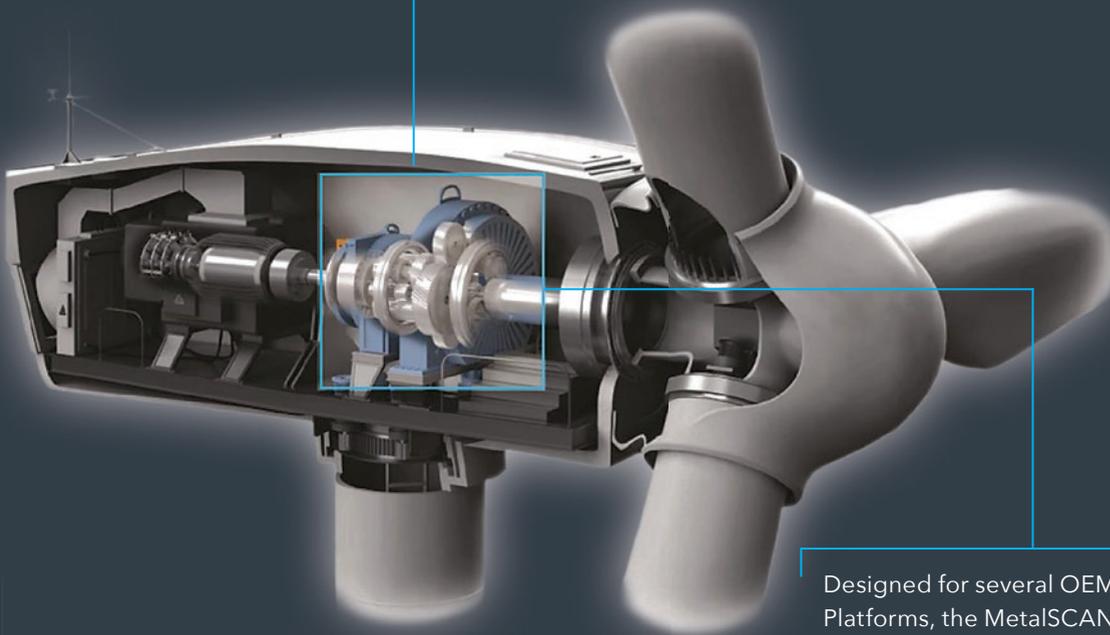


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