



Subsea Innovation's Dynamic Bend Stiffener (DBS) is a retrofit assembly that is installed onto turbine cables of an offshore wind farm. (Courtesy: DLM)

INNOVATION

DLM launches logging system for wind-farm array cables

Dynamic Load Monitoring (DLM), of Southampton, U.K., has manufactured two bespoke monitoring systems that have been installed by dive teams on subsea bend stiffeners at an offshore wind farm. The equipment has been

commissioned, with the first round of data due to be collected in March 2021.

The bespoke products were delivered to Darlington, U.K.-based Subsea Innovation, a manufacturer of subsea equipment, which was challenged by the end user to provide a system to prevent array cables — they connect the site's turbines together — from breaking. Subsea Innovation's Dynamic Bend Stiffener (DBS) is a retrofit assembly installed onto turbine cables of an offshore wind farm, which are subject

to tidal loads that have been causing the power cables to prematurely fail or reduce in efficiency.

Subsea asked DLM to devise a method to monitor forces on the cables and the movement they experience over time, log the data over the course of a year, and make it periodically accessible. The system comprises three dual axis shear pin load cells, two accelerometers, and a programmable logic controller (PLC). The shear pin load cells are dual-axis shear pins that measure forces across two planes in the positive and negative directions. The working load limit (WLL) of each plane is 50kN, in both the positive and negative direction.

"The DBSs connect directly to the turbine bell mouth and encapsulate the cable at the J-Tube exit, and restrain the cable at the point of failure," said Mike Brend, project manager at Subsea Innovation. "The cables are exposed to undesirable bending without a DBS and beyond the expected MBR (minimum bending radius), hence the solution is required to combat such occurrences."

"We do regularly put systems together like this for projects, incorporating load cells with other instrumentation and sensors; we probably do two or three projects a year of this kind, but the functionality and use is always different," said Martin Halford, managing director at DLM. "In this case, we reviewed what off-the-shelf instrumentation and sensors were available, but in the end opted for our recently designed DL-3.0 data-logger, and integrated it into bespoke subsea enclosures."

There are eight DL-3.0 data loggers per system (two for each load pin and two for the accelerometers). The logged data is collated and logged again as a package in a PLC enclosure mounted further up on the turbine platform. From this enclosure, there is an ethernet port on the side that enables a user to plug in a PC to download the data periodically when the platform is accessed. Each system also

includes a stainless-steel subsea junction box.

"The development of the new data logger came at the right time as it just so happened that it met both the angular measurement requirements of the system, but also logged this data along with load data," Halford said. "To col- late all the information and make it accessible, we decided to use a Siemens [ET200SP] PLC as we have extensive experience using controllers with other offshore projects, noting their reliabil- ity and robustness."

"I love these kind of projects — and our engineers do, too," he said. "It is really what we are geared up to do as a company and it differentiates us from some of our competitors."

MORE INFO d1m-uk.com

INNOVATION

Natural Power launches DARC bat curtailment system

Leading renewable energy consultan- cy and service provider, Natural Power, has launched DARC (Detection and Active Response Curtailment)—bat smart curtailment technology to simultane- ously reduce bat fatalities and energy losses at wind farms.

In its efforts to progress wind-farm projects stuck in development due to bat concerns and reduce the impact of wind farms on bat populations while increasing the energy produc- tion and revenue potential, Natural Power brought together a team of bat experts and technology and software engineers to develop this new service.

"What we were trying to solve was a complex puzzle across multiple dis- ciplines," said Jim Adams, president of Natural Power in North America. "It required a deep understanding of bat behavior, as well as interactions with wind-farm operational controls. We had to design our DARC service to have



Using bat monitoring data and wind measurements from a wind-farm site, DARC is able to quantify the impact of various curtailment strategies, comparing the impact on energy loss and bat fatalities of blanket curtailment and DARC. (Courtesy: Natural Power)

no mechanical impact on the wind turbines and to maintain the highest level of cybersecurity that our clients expect."

Following a proof-of-concept de- ployment in 2019 and supported by the U.S. Department of Energy (DOE) as well as the National Renewable En- ergy Laboratory (NREL), Natural Power worked with Alliant Energy to install and operate a full system from August to October 2020 at the English Farms wind farm in Iowa.

While the exact production num- bers for the 69 wind turbines at En- glish Farms are not public, for a wind farm of similar size with average wind conditions, DARC will easily increase the energy production by more than 5,000 MWh per year. Natural Power is confident that through upgrades al-

ready planned during 2021, this will further increase.

"Having the DOE critically review our study design and reports ensures our clients will receive unbiased re- sults on the DARC system," said Chris- tine Sutter, head of Wildlife Technol- ogy at Natural Power. "Access to NREL's GE 1.5MW wind turbine gave us the ability to test the impact of the system far beyond what we would normally be able to do in field deployments."

"Furthermore, working with Alliant Energy enabled us to use its historic bat activity and wind data to forecast the environmental and financial ben- efits of DARC," she said. "Their confi- dence in Natural Power also gave us the opportunity to gain the necessary endangered species research permit from the U.S. Fish and Wildlife Service

for the study under the DOE umbrella.”

Results from the full-scale deployment have also served to validate the suitability analysis tools that provide an early estimation of the energy increase through DARC at a specific project. Using bat monitoring data and wind measurements from a wind-farm site, DARC is able to quantify the impact of various curtailment strategies, comparing the impact on energy loss and bat fatalities of blanket curtailment and DARC. This can then be reflected in the financial analysis of a development project to show the benefit DARC can bring to a wind farm.

The acoustic monitor sits on top of the nacelle and listens for bat calls. When it detects bat activity, it sends a signal to the DARC server where it is processed alongside other SCADA signals from the turbine and meteorological data. The server then decides whether the turbine should shut down or not. If it forces a shut down, the blades will slowly come to a stop before lying motionless for 30 minutes. If more bat activity is detected during this time, the turbines will continue to lie still for 10-minute increments until no activity is detected. The turbines will then start up again.

MORE INFO www.naturalpower.com

MAINTENANCE

PSG names Dale Bartelson senior VP of sales and marketing

Pure Safety Group (PSG), the world's largest independent height safety product development, manufacturing and training company, recently hired Dale Bartelson as senior vice president of sales and marketing.

Bartelson will oversee sales, business development, training, customer service, and commercial marketing for PSG in North America and Latin America.

Bartelson has close to 20 years of experience in the industrial and safety



Dale Bartelson. (Courtesy: PSG)

markets. Prior to joining Pure Safety, he held a variety of sales and channel leadership positions at 3M, including national sales manager for the corporation's Industrial and Safety Markets Center. His experience also includes developing Fastenal's safety portfolio, before taking on director-level positions at GOJO and Capital Safety, the fall protection company that was acquired by 3M in 2015. Bartelson holds an undergraduate degree from Winona State University and an MBA from the University of St Thomas.

“Dale has a deep commitment to delivering safety solutions to customers,” said PSG CEO Jeff Ward. “He is a trusted resource in the safety community among businesses wanting to contin-

ually advance their safety portfolio and approach. His knowledge of fall protection products and innovation, and his ability to partner with companies to plan, particularly for their height safety needs, makes Dale an asset to our customers and our growing organization.”

MORE INFO www.puresafetygroup.com

MAINTENANCE

John Leahy joins GEV board to support its growth ambitions

GEV Wind Power recently announced the appointment of John Leahy to the Board of GEV Wind Power.

Leahy is a seasoned private equity executive with leadership experience across various disciplines enjoying an outstanding record of value enhancement across well-known companies including the luxury travel brand Tumi and Rank Hovis McDougall, owner of brands such as Hovis bread, Bisto gravy, and Mr Kipling cakes.

As chairman, he led the transformation and growth of LM Windpower from a local producer to the global No. 1 wind-turbine blade manufacturer with a turnover of 1.2 billion euros, producing approximately 20 percent of the world's installed rotor blades.



David Fletcher, GEV Wind Power CEO (right) welcomes John Leahy. (Courtesy: GEV)

"We are delighted to welcome John to the Board of GEV, bringing his 12 years of experience leading LM Wind Power to our organization," said David Fletcher, CEO of GEV Wind Power. "We look forward to John helping us to shape our growth strategy going forward, with the aim of achieving our goal of being the global partner of choice to our clients, for all blade maintenance requirements."

"I am thrilled to be re-engaging in the wind-energy sector and to have the opportunity to continue my focus on rotor blades and being part of the transformation of this area of maintenance over the coming years, as the industry continues to consolidate and mature," Leahy said. "GEV is well supported and has an excellent platform to lead this process, and I am looking forward to working with David and his team."

An independent service provider of blade-maintenance services, GEV Wind Power is recognized as one of the leading blade maintenance operators across its core markets of Europe and North America. GEV's service offerings vary from straight forward surface conditioning to complex structural repairs using a range of access methods.

MORE INFO www.gevwindpower.com

MAINTENANCE

Sentry offers O&M services within independent division

Sentry Electrical Group, Inc. now offers operations and maintenance (O&M) services for existing renewable energy infrastructure throughout the United States and into Canada. The organization's 15 years of proven experience positions Sentry with the expertise and reliability to deliver safe, quality operations and maintenance services to original equipment manufacturers (OEM) and independent power producers (IPP).



Sentry Electrical Group, Inc. O&M services for existing renewable energy infrastructure in the U.S. and Canada. (Courtesy: Sentry Electrical Group)

As an independent service provider (ISP), Sentry offers O&M operations under the leadership of Director George Tapia. Tapia comes to Sentry with more than 10 years of experience, including field technician, field resource manager, and business development and operations professional.

"I am thrilled to build and lead the Sentry O&M field services division," Tapia said. "Sentry's proven industry reputation puts us in a position to safely provide customers these services with quality, professionalism, and reliability."

Thanks to Sentry's established industry reputation, offering O&M services originated from requests of customers. The organization will continue to build its O&M team with accomplished managers and skilled technicians.

"We are so excited to offer the renewable energy industry our new

O&M services as an ISP," said Sentry President Norm Cowden. "With these services, we will not only be maintaining, but also advancing, the already established wind and solar infrastructure. We are confident in our ability to safely and reliably deliver quality services to new and existing customers no matter the complexity of the need. By expanding our service offerings, we are providing customers a more comprehensive scope of work."

MORE INFO www.sentryelec.com

MAINTENANCE

AMSOIL becomes APQP4Wind-certified lubricant supplier

AMSOIL INC. is the world's first and

only lubricant supplier to earn APQP-4Wind certification. APQP4Wind is a non-profit organization founded by the world's leading wind-turbine manufacturers and suppliers. Its mission is to standardize and simplify processes that ensure product quality across the wind industry. The organization strengthens and facilitates relationships between manufacturers and suppliers to increase efficiency.

"We've worked hard to reach this milestone," said Dave Meyer, vice president of AMSOIL Wind and Industrial Business. "Being the world's first lubricant supplier to become an APQP4Wind member demonstrates the quality of our products for wind assets. It offers additional assurance to our wind customers that they're getting the best possible lubricants for their equipment."

When AMSOIL INC. entered the wind industry in 2005, wind-asset managers were struggling to find a wind-turbine gearbox lubricant capable of delivering superior protection without requiring frequent and expensive oil changes. Many asset managers could expect a high percentage of their gearboxes to fail within the first 10 years of a 20-year design life, driving up operating costs.

AMSOIL developed an innovative synthetic gearbox lubricant that delivers superior protection and significantly longer service life in the demanding conditions in which turbines operate. It has a proven record of more than 10 years of continuous run time with no additive top offs, which helps turbine gearboxes last as designed, or longer, reducing maintenance and costs. AMSOIL also formulates hydraulic oil, grease, and other products for the wind industry.

Today, AMSOIL is the industry's pre-eminent lubricant supplier, with nearly half the wind turbines in the U.S. using AMSOIL products and global shares rising steadily in China, India, Brazil, and Europe. AMSOIL also has more original equipment manufacturer (OEM) approvals than most other lubricant manufacturers, and many operators now specifically require



The Murtomäki wind project will consist of 15 V162-6.0 MW turbines. (Courtesy: Vestas)

use of AMSOIL synthetic lubricants in their wind assets. Earning APQP-4Wind membership is the company's latest achievement as it continues to support and strengthen renewable energy.

"Our APQP4Wind membership will only help improve our standing in the industry," Meyer said. "We look forward to working with the organization and its other members as we continue to improve our products and processes for this market."

MORE INFO www.AMSOIL.com

► MANUFACTURING

Vestas seals EnVentus order for 90-MW Finland project

Vestas has secured a 90 MW order from new customer Ålandsbanken for the Murtomäki wind project.

The project comprises 15 V162-6.0 MW turbines maximizing the yield under the permitted tip height and a 30-year active output management 5000 (AOM 5000) service agreement. Leveraging the upgraded rating of the EnVentus platform, the tailored solution is designed to ensure an industry-leading level of energy production for the lifetime of the project at a highly competitive levelized cost of energy.

Winning the second deal with the upgraded V162-6.0 MW wind turbines, Vestas reinforces its presence in Finland's wind market and surpasses 600 MW in orders of EnVentus turbines in the country.

"Murtomäki wind farm with Vestas turbines is the first investment of the newly established Wind Power Fund of Ålandsbanken," said Juha Känkänen, investment director of Ålandsbanken Funds. "We would like to thank the Vestas team for its efforts in bringing down the levelized cost of energy and constructive approach during contract negotiations."

The project has been developed by YIT Suomi Oy and will continue to be a part of their project development process until completion in 2023.

"This project strongly supports our climate goals, since the Murtomäki wind farm produces an amount of renewable domestic electricity that is equal to the consumption of approximately 15,000 single-family houses annually," said Harri Kailasalo, EVP, Infrastructure Projects, YIT. "During the construction and production period, the project also has a significant positive economic impact on the town of Pyhäjärvi."

"I would like to thank our new, well-established business partners Ålandsbanken and YIT Suomi Oy for the trust they placed in us," said Nils de Baar, president of Vestas Northern & Central Europe. "We are certain that the competitiveness of the V162-

6.0 MW turbine together with the key focus on Finland and our long-term service offering ensures maximum value for our customer's business case."

The contract includes supply, installation, and commissioning of the wind turbines as well as a VestasOnline® Business SCADA solution, lowering turbine downtime and thus optimizing the energy output.

Turbine delivery is expected to begin in the second quarter of 2023, while commissioning is planned for the third quarter of 2023.

MORE INFO www.vestas.com

MANUFACTURING

Port of Albany to be first offshore tower manufacturing site

New York Gov. Andrew Cuomo recently announced in his 2021 State of the State a historic offshore wind investment that included the selection of the Port of Albany as the first offshore wind tower manufacturing site in the nation. This major renewable energy and economic development project will further the governor's green energy agenda, create hundreds of jobs, and become a key part of the governor's \$644 million statewide public and private port investments.

This project will transform the Port's 80-acre expansion site in the Town of Bethlehem into a world-class manufacturing facility and maritime operation. The project will also develop land in the Port's existing district and use recently improved maritime enhancements to support this endeavor.

Components of the project will include a new state-of-the-art wharf, a new bridge, new and improved internal roadways, and more than 600,000 square feet of manufacturing space in four buildings. A joint venture between Marmen Inc. and Welcon A/S with partner Equinor Wind US LLC will lease the entirety of the project



Historic wind-energy investment in New York will transform the Port of Albany's 80-acre expansion site in the Town of Bethlehem into a world-class manufacturing facility and maritime operation. (Courtesy: Port of Albany)

site where they will fabricate offshore wind towers.

The manufacturing operation will make use of the wharf and quayside facilities for load out of their products onto transport and installation vessels. The products will be shipped via the Hudson River maritime transportation network to offshore wind development sites in the ocean. This project will have capacity to supply New York State projects and other offshore wind projects along the Eastern Seaboard.

Construction is expected to begin in 2022. The construction of the facilities and development of the site is expected to create 500 jobs. Once complete, the project will create 300 full-time employees in well-paying manufacturing jobs.

The project partnership is committed to supporting local workforce development, training, and recruitment programs directly accessible to the nearby environmental justice community in the City of Albany's South End. The development of this site will serve as a positive economic anchor to the future of the historically underserved South End.

Marmen Inc, Welcon A/S, Equinor, and the Port of Albany bring together nearly a century of safe, reliable, and experienced maritime administration

capabilities together with a world leader in offshore wind development and a proven wind-tower manufacturing team that has global experience. This partnership will make substantial investment to develop this offshore wind-manufacturing hub in the heart of New York State along the Hudson River that is within a day's shipping to the wind-energy area development site in the Atlantic Ocean.

The total project investment is expected to be more than \$350 million.

MORE INFO www.portofalbanyny.us

MANUFACTURING

Test bench of blade bearings successful in regular operation

The Fraunhofer Institute for Wind Energy Systems IWES recently completed a successful series of accelerated tests on rotor blade bearings at the bearing test bench in Hamburg. Within the scope of research and industry projects, bearings were subjected to dynamic endurance tests to increase their reliability and gain insights into the causes of wear. The first bearing

tests were thoroughly successful with both the test method developed by Fraunhofer IWES and the test bench itself proving their worth. Accelerated test procedures allow the institute to acquire vital insights into damage mechanisms that can reduce future development costs and yield losses.

The accelerated testing of rotor blade bearings as part of research and industrial projects at Fraunhofer IWES has been a success. During testing, the load is applied to a bearing by means of six hydraulic cylinders on the BEAT6.1 (Bearing Endurance and Acceptance Test) test bench with up to 50 MNm of static load. The test bench also simulates the movements of a wind turbine during operation together with the associated load changes. This accelerated test can thus recreate loads equivalent to 20 years of operation in just four to six months. Since its commissioning in May 2019, the Fraunhofer IWES has tested a range of bearing types for a 7.5 MW wind turbine.

In the HAPT (Highly Accelerated Pitch Bearing Test) research project, the institute concentrated first and foremost on the use of IPC (individual pitch control) for rotor blade bearing endurance tests. IPC is a measure aimed at reducing wind-turbine loads: It aligns the loads of the individual rotor blades against each other in order to reduce the loads acting on the wind-turbine structure. The test results for the first bearings have shown that the wearing behavior can be recreated successfully on the test bench.

“During the tests, we demonstrated that the load application works with a dynamic accuracy of 0.1 percent,” said Dr. Matthias Stammeler, senior engineer at the Fraunhofer IWES. “We were also able to test our continuous operation concept to great success. In addition, we gained valuable insights into the development of wear in blade bearings, which can subsequently prevent wear.”

Testing of the rotor blade bearings for the first industrial projects highlighted bearing-specific challenges, which provide customers with key insights into damage mechanisms. This,



Offshore wind deployment has moved down the cost-learning curve. (Courtesy: DNV-GL)

in turn, allows future development costs to be lowered and yield losses to be reduced.

The Fraunhofer IWES testing concept is continuously being optimized and expanded. For example, the institute is set to test a novel type of bearing in a next step: T-solid bearings.

“T-solid bearings boast a higher fatigue life compared with four-point bearings,” said Hubertus Frank, head of Technology, IMO Group. “We are now looking forward to putting this design through wear endurance testing in comparison with four-point bearings to check its operational suitability.”

MORE INFO www.iwes.fraunhofer.de

► CONSTRUCTION

Standardized solutions help yards become cost-effective

To unlock floating wind’s massive potential, ship yards in Korea, Japan, China, and elsewhere require standardized solutions that support serial

production and modularization for competitive, responsive project delivery. The term “constructability” summarizes this need.

With some major floating wind projects likely to begin construction by 2023, the well-known DNV GL class for ships and offshore structures rules can provide reassurance on cost and risk when making development choices. For example, the company’s new class rules for floating offshore wind turbine installations (DNVGL-RU-OU-0512) combine offshore, energy, maritime, and digital expertise into an integrated rule set. These rules complement DNV GL’s existing verification and certification services and standards for floating wind, thus providing well-tested rules and standardized processes for the new structures. In this way, both experienced and new players in the offshore project ecosystem can have a familiar framework to integrate new processes into existing production structures with confidence.

Owners, yards, original equipment manufacturers (OEMs), and others are used to working with DNV GL’s standards, are familiar with the process,

and know the acceptance criteria. Studying the benefits of such familiarity in the oil and gas industry, it was found that using a new standard instead of an existing one increased the uncertainties and cost of project phases in the yard.

The new rules are timely. Floating wind is moving up the agenda for governments worldwide as they set targets to decarbonize their energy systems and promote green jobs growth for economy recovery.

As a part of these efforts, some yards might initially be looking to win as much work associated with floating wind as possible. However, they may be hesitant if this threatens to tie up their traditional ship and offshore capacity, as these wind projects will often be large-scale, intensive, multi-year projects. On the other hand, yards already have an excellent project and supply chain management track record and could use these skills to manage the needed capacity for floating wind projects.

Other yards might tender for more of the fabrication work, but could also potentially spread some of this work among subsidiary yards to maintain their capacity. Additionally, and depending on the OEMs, yards may also bid to integrate the floater with the tower and possibly also the wind-turbine nacelle and blades, essentially undertaking the full commissioning of the unit at quayside before float-out.

Substantial quayside space and deep berths will be needed for marshalling and assembling structures with deep drafts. Large projects might support investment in yard infrastructure to create capacity and enable local content. Smaller projects may make yards think twice about the scope and scale of what they bid for.

To support decision making, DNV GL's new class rules cover all potential floater (hull) designs for floating wind: barge, semi-submersible, vertical floating columns (spar) and tension-leg platform.

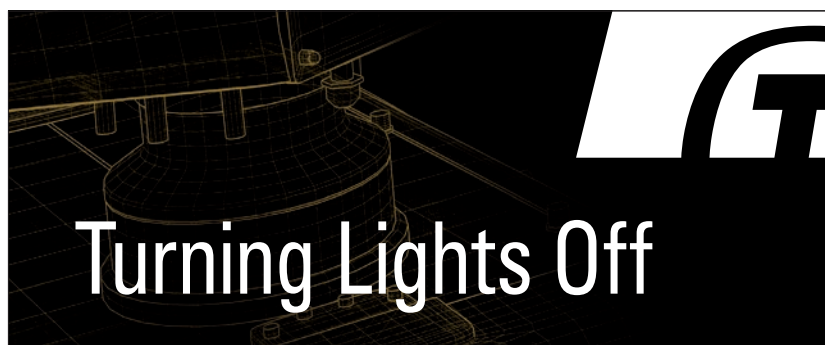
Class rules also work with design and construction follow-up to verify that a unit was built according to de-

sign. Some owners now request class because it can also apply to operations follow-up, so that learnings from operations can be fed back through frequently updated rules.

DNV GL's new class rules are designed to scale as they consider not just the individual units but the entire floating wind field with data-based services and condition-based monitoring and through linking with fatigue

methodology sensor data. For tow-out, floating wind will involve large-scale use of existing ships, such as tugs. However, some specialist mobile units will be needed for maintenance work offshore, and there may be a need for a new class of crane vessel with enormous reach for floating wind-turbine installation. ✎

MORE INFO www.dnvgl.com



Terma's Aircraft Detection Lighting System (ADLS) vastly reduces the impact of Aviation Obstruction Lights on local wildlife and communities while preserving the dark skies

- FAA and FCC compliant
- Scalable and cost-effective
- A single radar covers one or more wind farms



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